RUTGERS

THE STATE UNIVERSITY
OF NEW JERSEY

Rutgers University

2025-2026 New Brunswick Undergraduate Catalog

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Undergraduate Education in New Brunswick (NBUG)

UNDERGRADUATE EDUCATION IN NEW BRUNSWICK

Undergraduate students in New Brunswick complete degrees in 10 degree-granting undergraduate schools. First-year students enroll in the School of Arts and Sciences, or one of the five professional schools admitting first-year students: the School of Environmental and Biological Sciences, the Mason Gross School of the Arts, the Ernest Mario School of Pharmacy, the School of Engineering, or the Rutgers Business School: Undergraduate-New Brunswick. School of Arts and Science students may complete majors offered by the School of Arts and Sciences or by one of the four professional schools admitting upper-division students of the School of Arts and Sciences: the School of Communication and Information, the School of Social Work, the Edward J. Bloustein School of Planning and Public Policy, and the School of Management and Labor Relations. Students completing majors in these four professional schools receive a single bachelor's degree conferred by the School of Arts and Sciences in conjunction with the professional school. The Edward J. Bloustein School of Planning and Public Policy and the School of Management and Labor Relations admit upper-division transfer degree-completion students directly; those students receive degrees conferred by those schools.

While all of the schools are dedicated to providing the highest quality education, each school establishes its own admission, scholastic standing, and graduation requirements, and each offers specific academic programs that reflect the school's particular mission and philosophy. Students are urged to consult each school section both for a general description of the school and for a list of the academic programs that each offers. Decisions about which school to attend are made based on intended major.

The faculty of the School of Arts and Sciences offers most of the academic programs available to students in that school. It encompasses more than 740 tenured and tenure-track faculty members and offers more than 75 major programs and options, as well as numerous minor programs and other specializations.

The degree-granting professional schools in New Brunswick, both undergraduate and graduate, each have their own separate faculty. Taken together, the Rutgers faculty in New Brunswick comprises a distinguished teaching and research staff of nearly 2,000 faculty members.

Rutgers University-New Brunswick is made up of five campuses located on both sides of the Raritan River. The campuses are connected by a free, campuswide bus system. The undergraduate schools are residential, with a variety of living accommodations on the five campuses.

The university's extensive facilities and extracurricular activities are described on the Information for Current Students website.

Major Programs of Study (NBUG)

MAJOR PROGRAMS OF STUDY

A wide variety of academic programs are offered at the ten undergraduate schools at Rutgers University-New Brunswick. The following list summarizes the major programs available at one or more of the schools. Students

should consult the individual schools' sections for a list of majors offered at each school.

In addition, academic departments offer numerous options and specialized programs of study within these general fields, as well as opportunities for interdisciplinary work. Several dual-degree programs also are available, and in some subjects both liberal arts and professional programs are offered. Thus, the list of majors merely serves to suggest the breadth of academic programs for undergraduate students.

Accounting

Actuarial Mathematics

Aerospace Engineering

African, Middle Eastern, and South Asian Languages and Literatures

Africana Studies

Agriculture and Food Systems

American Studies

Animal Science

Anthropology, Cultural

Anthropology, Revolutionary

Applied Sciences in Engineering

Art

Art History

Asian Studies

Astrophysics

Biochemistry

Biological Sciences

Biomathematics

Biomedical Engineering

Biotechnology

Business Analytics

Cell Biology and Neuroscience

Chemical Engineering

Chemistry

Chinese

Cinema Studies

Civil Engineering

Classics

Cognitive Science

Communication

Comparative Literature

Computer Science

Criminal Justice

Dance

Design

Digital Filmmaking

Ecology, Evolution, and Natural Resources

Economics

Electrical and Computer Engineering

English

Entomology

Environmental and Business Economics

Environmental Engineering

Environmental Planning

Environmental Policy, Institutions, and Behavior

Environmental Sciences

Environmental Studies (available as a second major only)

European Studies

Exercise Science

Finance

Food Science

French

Genetics

Geography

Geological Sciences

German

Global Humanities

Health Administration

History

History/French

History/Political Science

Human Resource Management

Industrial Engineering

Information Technology and Informatics

Italian

Jewish Studies

Journalism and Media Studies

Korean

Labor and Employment Relations

Labor Studies and Employment Relations

Landscape Architecture

Latin American Studies

Latino and Caribbean Studies

Linguistics

Management and Global Business

Marine Sciences

Marketing

Materials Science and Engineering

Mathematics

Mechanical Engineering

Medieval Studies

Meteorology

Microbiology

Middle Eastern Studies

Molecular Biology and Biochemistry

Music

Nursing

Nutritional Sciences

Pharmacy

Philosophy

Physics

Planning and Public Policy

Plant Biology

Political Science

Portuguese

Psychology

Public Health

Public Policy

Religion

Russian

Social Work

Sociology

Spanish

Sport Management

Statistics and Biostatistics

Statistics/Mathematics

Supply Chain Management

Theater Arts

Urban Planning and Design

Visual Arts

Women's, Gender, and Sexuality Studies

Minor Programs of Study (NBUG)

MINOR PROGRAMS OF STUDY

The minors listed below are offered by various disciplines and interdisciplinary programs at one or more of the schools. Students should consult the individual schools' sections of this catalog for a list of the minors open to students at each school.

African Area Studies

African, Middle Eastern, and South Asian Languages and Literatures

Africana Studies

Agriculture and Food Systems*

Agroecology*

American Studies

Animal Science*

Anthropology, Cultural

Anthropology, Evolutionary

Arabic

Archaeology

Architectural Studies

Art**

Art History

Asian Studies

Astrobiology

Astronomy

Biochemistry*

Biological Sciences

Business Administration*******

Business and Technical Writing

Chemistry

Chinese

Cinema Studies

Classical Humanities

Cognitive Science

Community Health Outreach*

Comparative and Critical Race and Ethnic Studies

Comparative Literature

Computer Science

Creative Writing

Criminology

Critical Intelligence Studies

Culinary Nutrition*

Dance**

Developmental Psychology

Digital Communication, Information, and Media******

Ecology, Evolution, and Natural Resources*

Economics

Education as a Social Science*****

English

Entomology*

Entrepreneurship*******

Environmental and Business Economics*

Environmental Geomatics*

Environmental Planning*

Environmental Policy, Institutions, and Behavior*

Environmental Sciences*

Environmental Studies

European Studies

Fisheries Science*

Food Science*

French

Gender and Media********

Geography

Geological Sciences

German

Greek (Ancient)

Greek (Modern)

Green Technology*

Health Administration****

Health Equity

Health and Society

Hebrew Language (Modern)

Hindi

History

Holocaust Studies

Horticultural Therapy*

Human Resource Management***

Hungarian

International and Global Studies

Italian

Italian Studies

Japanese

Jewish Studies

Korean

Labor Studies***

Landscape Design*

Language and Culture of Ancient Israel

Latin

Latin American Studies

Latino and Caribbean Studies

Law and History

Leadership Skills*

Linguistics

Marine Sciences*

Mathematics

Medicinal and Economic Botany*

Medieval Studies

Meteorology*

Microbiology*

Middle Eastern Studies

Military Science (Aerospace)

Military Science (Military)

Military Science (Naval)

Military Science (Non-commissioning)

Music**

Nonprofit Leadership*

Nutrition*

Organizational Leadership

Persian

Philosophy

Philosophy, Politics, and Economics

Physics

Planning and Public Policy****

Plant Science*

Political Science

Portuguese

Psychology

Public Administration and Management****

Public Garden Management*

Public Health****

Public Policy****

Quantitative Economics

Religion

Russian

Science Communication*

Sexualities Studies

Social Justice

Sociology

South Asian Studies

Spanish

Sport Management

Statistics

STEM in Society

Sustainability*

Sustainable Global Food Systems*

Theater Arts**

Turkish

Urban Forestry*

Urban Studies****

Women's, Gender, and Sexuality Studies

Minors without an asterisk are available through the School of Arts and Sciences.

*Available through the School of Environmental and Biological Sciences
**Available through the Mason Gross School of the Arts
***Available through the School of Management and Labor Relations
****Available through the Edward J. Bloustein School of Planning and Public Policy
*****Available through the Graduate School of Education
******Available through the School of Communication and Information
*******Available through the Rutgers Business School: Undergraduate-Newark and New Brunswick
********Available jointly through the School of Arts and Sciences and the School of Communication and Information

Certificate Programs (NBUG)

CERTIFICATE PROGRAMS

Certificate programs are available in a number of fields and are open to all undergraduate students at Rutgers University-New Brunswick, regardless of school affiliation.

The certificate programs are designed to allow students to complement their major program with study in either a broad, but well-defined, area or a specialized field. Since the certificate programs are intended to enhance a major program, a certificate may be awarded only in conjunction with the awarding of a baccalaureate degree in a major field.

Academic Spanish for Heritage Speakers

Akan Proficiency

Akan Translation

Ancient Greek Postbaccalaureate Certificate

Arabic Proficiency

Arabic Translation

Asian/Asian American Studies

Behavioral Pharmacology

Bengali Proficiency

Bengali Translation

Cartography/Geospatial Information Science (GIS)

Chemistry Education

Civic Engagement/Public Scholarship Pathway

Community Development****

Community Sustainability****

Computational Economics and Data Analytics

Computational Genetics

Curation and Cultural Programming

Creative Writing

Drama and Performance Studies

Eagleton Undergraduate Associates (American Politics and Public Policy)

Economic Theory

Environmental Geomatics*

Environmental Planning*

Evolutionary Medicine

Financial Economics

Food Systems Education and Administration*

French Basic Knowledge

Genetic Counseling

German Proficiency

Global Economics

Global Politics

Health Disparities****

Hebrew Proficiency

Hebrew Translation

Hindi Proficiency

Hindi Translation

Historic Preservation

Horticultural Therapy*

Hungarian Proficiency

International Geographic Perspectives

International Studies

Italian Proficiency

Korean-English Translation/Interpreting

Latin Postbaccalaureate Certificate

Leadership Scholars Certificate (Institute for Women's Leadership)

Medicinal and Economic Botany*

Paul Robeson Leadership Certificate

Persian Proficiency

Persian Translation

Philosophy, Politics, and Economics

Plant Biosecurity*

Portuguese Major/Global Studies

Professional Writing

Public Health Advocacy/Education****

Public Health Management****

Public Health Preparedness****

Public History

Public Policy Economics

Quantitative Economics

Quantitative Political Science Methods

Real Estate****

Recording Arts**

Russian Proficiency

Rutgers Civic/International Scholars Program

Rutgers International Civic Scholar

Sanskrit Proficiency

Sanskrit Translation

Spanish-English, English-Spanish Translation Proficiency

Spanish-English Translation/Interpreting Proficiency

Spanish Major/Global Studies

Speech and Hearing Sciences in Linguistics

Swahili Proficiency Swahili Translation Teacher Education***

Technical Writing

Turfgrass Science*

Turkish Proficiency

Turkish Translation

Urban/Community Forestry*

Urban Planning****

Urdu Proficiency

Urdu Translation

Women's Global Health Leadership

Youth Mentoring Theory and Practice

*Available through the School of Environmental and Biological Sciences
**Available through the Mason Gross School of the Arts
***The Graduate School of Education administers teacher certification programs in numerous areas. See Education in the Programs of Study for Liberal Arts Students section.
****Available through the Edward J. Bloustein School of Planning and Public Policy

Honors Programs (NBUG)

HONORS PROGRAMS

As part of its ongoing commitment to academic excellence, Rutgers University-New Brunswick offers numerous honors programs that provide outstanding students with challenges beyond those found in regular coursework.

The Honors College of Rutgers University-New Brunswick selects top students from among those admitted to the different schools at Rutgers. It provides a living-learning experience in the first year, and prepares engaged, talented students for the challenges of the 21st century with special curricula and opportunities. With its emphasis on interdisciplinary thinking, hands-on research, and creative problem solving, students will work closely with Rutgers' world-renowned faculty in small classes, workshops, and mentorships.

Many of the undergraduate schools offer specially designed honors programs that involve introductory seminars for well-prepared first-year students. Selection into a school honors program is based on SAT or ACT scores and high school record, and is at the invitation of each school.

In addition, exceptional upper-class students who are not in school honors programs may be selected to participate in honors seminars offered by the department of their major. Information on school honors programs may be found in the school sections of this catalog; departmental honors programs are described under each major.

Students who participate in honors programs receive a high degree of individual attention from faculty. Seminars, tutorials, lectures, discussions, and independent research afford an opportunity for sophisticated scholarship and growth in self-understanding and also may assist Rutgers students in pursuing their special interests and professional ambitions after graduation.

Prizes and Awards (NBUG)

PRIZES AND AWARDS

Many academic departments offer prizes and awards for outstanding achievement. In some cases, eligibility is based on achievement in specific courses. Information about these awards should be obtained from the departments so that students are aware in advance of the criteria for selection.

Organization of the Catalog (NBUG)

ORGANIZATION OF THE CATALOG

This catalog includes all undergraduate education at Rutgers University-New Brunswick.

The catalog begins with the Programs, Faculty, and Courses section, a large A-to-Z listing of undergraduate programs and courses offered by several faculties, principally to students at the School of Arts and Sciences. Students should also consult the School of Arts and Sciences section, which includes important information about the school's specific aims, policies, academic programs, and degree requirements.

The professional school sections include similar school information and also include detailed programs of study and course listing chapters covering the academic programs offered by each of their faculties. Professional students also should refer to the large introductory A-to-Z listing both for courses required in their curriculum that are taught by other faculties and for elective courses in the arts and sciences.

In general, individual undergraduate courses offered at Rutgers in New Brunswick are open to students at all the undergraduate schools, subject to prerequisite restrictions and space limitations.

Note: See the **University Policies and Procedures** section in the Rutgers Main catalog for university-wide academic policies and procedures.

Some courses are cross-listed in more than one department. Students should note that a cross-listed course is the same course listed under two or more subject indexes, and they cannot receive credit for repeating the same course under a different course number.

Programs, Faculty, and Courses (SAS)

Programs, Faculty, and Courses

Availability of Majors

Course Notation Information

Accounting 010

African Area Studies 016

African, Middle Eastern, and South Asian Languages and Literatures 013

Africana Studies 014

American Studies 050

Anthropology 070

Archaeology 075

Architectural Studies 076

Art 080

Art History 082

Arts and Sciences 090

Asian Studies 098

Astrobiology 101

Astrophysics 105

Biological Sciences 119

Cell Biology and Neuroscience 146

Chemistry 160

Chinese 165

Cinema Studies 175

Classics

Cognitive Science 185

Comparative Literature 195

Computer Science 198

Criminal Justice 202

Criminology 204

Dance 203

Data Science 219

Economics 220

Education 300

English

Environmental Studies 381

European Studies 360

Exercise Science 377

French 420

Gender and Media 438

Genetics 447

Geography 450

Geological Sciences 460

German 470

Greek, Modern Greek Studies 489

Health and Society 502

History

History/French Joint Major 513

History/Political Science Joint Major 514

Holocaust Studies 564

Human Resource Management 533

Hungarian 535

Individualized Major 555

Interdisciplinary Studies, SAS 556

International and Global Studies 558

Italian 560

Japanese 565

Jewish Studies 563

Korean 574

Labor Studies and Employment Relations 575

Latin American Studies 590

Latino and Caribbean Studies 595

Law

Life Sciences

Linguistics 615

Mathematics 640

Medicine and Dentistry

Global Medieval Studies 667

Middle Eastern Studies 685

Military Education, Air Force 690

Military Education, Army 691

Military Education, Naval 692

Military Science Minor (Military Science 691N, Naval Science 692N, Aerospace Science 693N, Non-Commissioning 695N)

Molecular Biology and Biochemistry 694

Music

Nursing

Organizational Leadership 713

Pharmacy

Philosophy 730

Physics 750

Polish 787

Political Science 790

Portuguese 810

Psychology 830

Religion 840

Russian 860

Sexualities Studies 888

Slavic and East European Studies Minor 861

Social Justice 904

Social Work 910

Sociology 920

South Asian Studies 925

Spanish 940

Sport Management 955

Statistics 960

Study Abroad 959

Theater 965

Ukrainian 967

Women's, Gender, and Sexuality Studies 988

World Language Proficiency Certificates

About the School of Arts and Sciences (SAS)

ABOUT THE SCHOOL OF ARTS AND SCIENCES

Websites: Here

History and Aims of the School

Degree Requirements

Programs of Study for Arts and Sciences Students

Administration

History and Aims of the School (SAS)

HISTORY AND AIMS OF THE SCHOOL

School of Arts and Sciences

Websites: Here
Here

The School of Arts and Sciences (SAS) has deep roots at Rutgers University.

Rutgers was founded in 1766 with the mission of providing a classical liberal arts education that at the time included such subjects as Latin, Greek, arithmetic, and geometry.

As it grew from a small colonial college to a major public research university, Rutgers built an expansive liberal arts program while striving to create the ideal setting and structure for undergraduate education.

By the 1970s, four outstanding undergraduate colleges were educating Rutgers-New Brunswick students: Douglass College, Livingston College, Rutgers College, and University College.

The School of Arts and Sciences was launched in 2007, bringing together the talent, traditions, energy, and resources of all four colleges with a new, unifying vision.

The classical liberal arts education that the first Rutgers students received now finds full expression in the more than 100 majors and minors at SAS, covering the spectrum of life sciences, mathematical and physical sciences, humanities, and social and behavioral sciences.

Today, the School of Arts and Sciences is a diverse, dynamic, and creative community, dedicated to preparing students for meaningful lives and advancing knowledge that improves the world.

Degree Requirements (SAS)

DEGREE REQUIREMENTS

Requirements

Graduation

Requirements (SAS)

REQUIREMENTS

Requirements (SAS)

Credits and Residency

Credits and Residency

All students must earn at least 120 credits, with a minimum cumulative grade-point average of 2.000. Students should successfully complete 15 degree credits each fall and spring semester, or a total of 30 degree credits a year including Summer Session in order to earn the required 120 credits in four years. Students admitted with placement into noncredit remedial courses and students in majors with rigid sequencing requirements that require certain courses be taken in the first year will need to plan very carefully to complete their baccalaureate requirements in four years of full-time study. The deans and advisors in the SAS Office of Advising and Academic Services can assist in developing an academic plan.

Students matriculated (i.e., registered in pursuit of a degree) at the School of Arts and Sciences (SAS) must earn 30 of their last 42 credits while registered in classes offered by Rutgers University-New Brunswick departments or registered in special programs, such as Study Abroad, approved in writing by the SAS Office of Advising and Academic Services. Students who transfer into SAS from other institutions with senior status must earn a minimum of 30 credits while registered as SAS students in order to receive a bachelor's degree from the school.

Requirements (SAS)

Core Curriculum

Core Curriculum

The School of Arts and Sciences (SAS) requires that all students complete a goal-based Core Curriculum, as well as an approved major and an approved minor. Students who are pursuing an approved credit-intensive major or who are double majoring will have the minor requirement waived.

The distinctive SAS Core Curriculum is structured as a set of core arts and sciences learning goals. All are framed as activities students will be able to do at a foundational level by virtue of meeting the specified core goal. Courses may be counted as meeting up to two learning goals; students generally will complete the core in 10 to 14 courses of 3 or 4 credits each. A course used to meet core goals may also be used to fulfill a major or minor requirement. Only graded degree credit-bearing courses worth at least 3 credits and certified by the SAS faculty may be used to meet core goals. For lists of courses certified as meeting each goal, see here.
SAS Core Curriculum course lists are also available in the Rutgers online degree audit system, Degree Navigator, and each semester the Schedule of Classes is searchable by Core Code.

AREAS OF INQUIRY

CONTEMPORARY CHALLENGES [CCD], [CCO] Students must take two approved courses that meet these goals.

Diversities And Social Inequalities [CCD]

- Analyze the degree to which forms of human differences and stratifications among social groups shape individual and group experiences of, and perspectives on, contemporary issues. Such differences and stratifications may include race, language, religion, ethnicity, country of origin, gender identity, sexual orientation, economic status, abilities, or other social distinctions and their intersections.
- Analyze contemporary social justice issues and unbalanced social power systems.
- **Our Common Future [CCO]** Analyze a contemporary global issue from a multidisciplinary perspective.
- Analyze the relationship that science and technology have to a contemporary social issue.

Natural Sciences [NS] Students must take two approved courses that meet one or both of these goals.

- Understand and apply basic principles and concepts in the physical or biological sciences.
- Explain and be able to assess the relationship among assumptions, method, evidence, arguments, and theory in scientific analysis.

Social and Historical Analysis [HST] [SCL] Students must take two approved courses that meet one or both of these goals.

Historical Analysis [HST] Students must take one approved course that meets one or both of these goals.

- Explain the development of some aspect of a society or culture over time, including the history of ideas or history of science.
- Employ historical reasoning to study human endeavors, using appropriate assumptions, methods, evidence, and arguments.

Social Analysis [SCL] Students must take one approved courses that meets one or both of these goals.

- Understand different theories about human culture, social identity, economic entities, political systems, and other forms of social organization.
- Employ tools of social scientific reasoning to study particular questions or situations, using appropriate assumptions, methods, evidence, and arguments.

Arts and Humanities [AH] Students must take two approved courses that meet one or more of these goals.

- Examine critically philosophical and other theoretical issues concerning the nature of reality, human experience, knowledge, value, and/or cultural production. [AHo]
- Analyze arts and/or literatures in themselves and in relation to specific histories, values, languages, cultures, and technologies. [AHp]
- Understand the nature of human languages and their speakers. [AHq]
- Engage critically in the process of creative expression. [AHr]

COGNITIVE SKILLS AND PROCESSES [WC] [WCr] [WCd]

Writing and Communication [WC] Students must take three approved courses that meet all 5 of these goals, including College Writing 01:355:101 or College Writing Extended 01:355:104; one WCr; and one WCd.

- Communicate complex ideas effectively, in standard written English, to a general audience.
- Respond effectively to editorial feedback from peers, instructors, and/or supervisors through successive drafts and revision. [WCr]
- Communicate effectively in modes appropriate to a discipline or area of inquiry. [WCd]
- Evaluate and critically assess sources and use the conventions of attribution and citation correctly.
- Analyze and synthesize information and ideas from multiple sources to generate new insights.

Students receiving a score of 4 or above on the AP English composition or literature tests, or transferring in an equivalent to College Writing, are exempted from College Writing 01:355:101. For such students the writing and communication goals become a two-course requirement: WCr and WCd.

The Revision-Based Writing and Communication learning goal [WCr] must be fulfilled by taking a class at Rutgers University-New Brunswick; transfer and AP courses are not certified to meet this learning goal.

Quantitative and Formal Reasoning [QQ] [QR] Students must take two approved courses that meet one or more of these goals.

- Formulate, evaluate, and communicate conclusions and inferences from quantitative information. [QQ]
- Apply effective and efficient mathematical or other formal processes to reason and to solve problems. [QR]

Requirements (SAS)

Completion of a Major and a Minor

Completion of a Major and a Minor

Students must complete an approved major and an approved minor listed in the Programs of Study chapter in this section. The requirement for a minor may be waived for students completing multiple majors or credit-intensive majors. Students in credit-intensive majors are encouraged to complete a minor, even though they are not required to do so, if their graduation plan can support it.

All students are responsible for consulting with the undergraduate director in the department of their major and of their minor to ensure that they will have fulfilled all requirements by the time of graduation.

Requirements (SAS)

Declaration and Change of Major and Minor

Declaration and Change of Major and Minor

Students are not admitted to the School of Arts and Sciences (SAS) by major. Full-time students normally declare their major in the second semester of their second year, although some majors encourage students to declare even earlier in order to facilitate the planning needed for an appropriate sequence of the courses required to complete the major within four years. Part-time students normally declare their major by the time they have completed 60 credits. Declaration requirements vary by department; some academic departments have prerequisites and/or require approval by a department advisor.

Students who are not able to declare their major by their third year are encouraged to seek advising to ensure timely degree completion.

A list of majors open to SAS students is included under the Programs of Study and Courses for Liberal Arts and Sciences Students in this catalog and online here. Students are strongly urged to consult with an academic advisor and the specific departments offering the majors they are considering during their first year at SAS. Some majors, including many in the sciences and in world languages, require that courses be sequenced in a particular way, making planning during the first year critical to timely completion of the major.

The major and the minor may not be selected from the same academic program. In general, there are no other SAS restrictions on selection of available majors and minors; however, some combinations are prohibited. Please see the Major/Minor restrictions here.

Please check the requirements of the specific majors and minors you are considering.

Students are advised to consult Degree Navigator and department webpages for the most up-to-date information on the requirements for majors and minors.

In addition, certain bachelor of arts (B.A.) and bachelor of science (B.S.) majors offered in other Rutgers University-New Brunswick schools may require separate admission. These schools include: the Edward J. Bloustein School of Planning and Public Policy; the School of Communication and Information; the School of Management and Labor Relations, and the School of Social Work. SAS students completing these majors will receive a single bachelor's degree conferred by SAS in conjunction with the cognate professional school.

Prospective applicants to any of these professional schools at Rutgers University need to refer to the section of the catalog for the school of interest for specific application guidelines and a listing of the courses to be completed prior to application. All students should meet with an academic advisor to determine how the sequence of courses to be completed for application will affect their graduation from SAS if their application to the professional school is unsuccessful.

Change of Major or Minor. Students wishing to apply for a change of major or minor should complete the appropriate form online here. Please note that changes or additions of major/minor that would delay degree completion will not be approved. Students should have their major and minor declarations set by Junior year at the latest to ensure on-time graduation.

Requirements (SAS)

Second Baccalaureate Degree

Second Baccalaureate Degree

Students who have already completed a bachelor's degree at an accredited college or university may pursue a second bachelor's degree at the School of Arts and Sciences (SAS) in a major area entirely different from their previous major.

If you intend to take a course which requires a pre-requisite, you may be required to take a placement test. Students with international bachelor's degrees are required to take the English placement test.

1. A minimum of 30 credits at Rutgers University-New Brunswick beyond those applied to the initial degree
2. All requirements for a new major
3. The SAS Core Curriculum

Students may apply approved coursework completed during the first degree toward the Areas of Inquiry and Cognitive Skills and Processes components of the Core Curriculum. However, all second-degree candidates must complete at least the Contemporary Challenges [CC] learning goals and one Writing and Communication with revision [WCr] course at Rutgers-New Brunswick as part of the second degree; courses taken as part of the first degree cannot be used to satisfy these requirements. Second Degree students are not eligible to have their SAS Core Curriculum waived through the New Jersey Statewide Transfer Agreement (NJSWTA).

Two baccalaureate degrees may not be earned concurrently except through approved dual-degree programs, such as that between SAS and the School of Engineering. Students who complete multiple majors earn a single bachelor's degree.

Graduation (SAS)

GRADUATION

Degrees are conferred at the annual commencement at the end of the spring semester. Students completing degree requirements in August (after Summer Session) or January (after the fall semester) will receive a letter of completion by the end of their graduation month, and will have the degree noted on the official Rutgers transcript approximately one month after graduation. All diplomas are mailed to the student's permanent mailing address within three months of degree completion.

Graduation with Honors. The bachelor's degree is conferred with the distinction summa cum laude for graduates with a Rutgers cumulative grade-point average of 3.850 or higher; magna cum laude for those with an average of 3.700 or higher; and cum laude for those with an average of 3.500 or higher. Averages are not rounded to the next higher number in the calculation of honors. Students who successfully complete the Rutgers School of Arts and Sciences Honors Program receive special recognition at graduation. Academic departments may recommend students for departmental honors or recognition based on special work and/or examinations. See statements under individual department listings.

Phi Beta Kappa. Phi Beta Kappa, established in 1776, is the oldest and most widely recognized liberal arts honorary society in the United States. Each spring semester, the Phi Beta Kappa Society invites to membership the outstanding students of the junior and senior classes. Election to the society is based on high academic achievement, a record of coursework that is at least three-quarters liberal in nature, proficiency in a world language through the intermediate level, a minimum of two years equivalent of full-time coursework at Rutgers University, and breadth of scholarship.

Departmental Honors. Many departments have a departmental honors program for outstanding students in their majors. Small group seminars, honors course sequences, specialized advising, and senior thesis programs are available in certain departments. For further information about the specific offerings of the departmental honors program in a particular department, see the website for each major program.

National Society of Collegiate Scholars. The National Society of Collegiate Scholars is an honors organization which recognizes outstanding academic achievement among first- and second-year college students. The society was founded in 1994 at The George Washington University in Washington, D.C., and has grown to nearly 300 colleges and universities nationwide. The three pillars of the society are: scholarship, leadership, and service.

Prizes and Honors. The School of Arts and Sciences, academic departments, and other units of Rutgers University offer a variety of prizes and awards for students with excellent academic records or special eligibility. Students should consult with their academic departments and visit the corresponding websites for additional information.

Post-Obitum Degrees. In the unfortunate event of the death of a student while registered at the School of Arts and Sciences as a senior, requests will be considered for the awarding of the degree that was being earned. The request may be submitted in writing to the Rutgers Office of the Dean of Students.

Programs of Study for Arts and Sciences Students (SAS)

PROGRAMS OF STUDY FOR ARTS AND SCIENCES STUDENTS

Students are advised to consult Degree Navigator and department webpages for the most up-to-date information on the requirements for majors and minors.

Majors

MAJORS

Students must declare and complete a major from among the following disciplines, as well as a minor from among those listed under Minors.

- African, Middle Eastern, and South Asian Languages and Literatures
- Africana Studies
- American Studies
- Anthropology, Cultural
- Anthropology, Evolutionary
- Art
- Art History
- Asian Studies
- Astrophysics
- Biological Sciences
- Biomathematics
- Cell Biology and Neuroscience
- Chemistry
- Chinese
- Cinema Studies
- Classics
- Cognitive Science
- Communication
- Comparative Literature
- Computer Science
- Criminal Justice
- Dance
- Data Science
- Earth and Planetary Sciences
- Economics
- English

- Environmental Studies (available as a second major only)
- European Studies
- Exercise Science
- French
- Genetics
- Geography
- German
- Health Administration
- History
- History/French
- History/Political Science
- Human Resource Management
- Information Technology and Informatics
- Italian
- Japanese
- Jewish Studies
- Journalism and Media Studies
- Korean
- Labor Studies and Employment Relations
- Latin American Studies
- Latino and Caribbean Studies
- Linguistics
- Mathematics
- Medieval Studies
- Middle Eastern Studies
- Molecular Biology and Biochemistry
- Music
- Philosophy
- Physics
- Political Science
- Portuguese
- Psychology
- Public Health
- Public Policy
- Religion
- Russian
- Social Work
- Sociology
- Spanish
- Sport Management
- Statistics
- Statistics/Mathematics

- Theater Arts
- Urban Planning and Design
- Women's, Gender, and Sexuality Studies

A bachelor of arts degree is conferred for all majors except the following, for which a bachelor of science degree is awarded: astrophysics; chemistry; evolutionary anthropology; exercise science; geological sciences; health administration; public health; sport management; and urban planning and design. Either a bachelor of arts degree or a bachelor of science degree is available in the following subjects: computer science, data science, mathematics, and physics. For subjects offering both a bachelor of arts and a bachelor of science degree, students may not graduate with a bachelor of arts degree, then return to complete the courses necessary for a bachelor of science degree. All courses required for the desired degree must be completed at the time of graduation.

For information, see the departmental listing in the Programs of Study and Courses for Liberal Arts and Sciences Students chapter.

Minors

MINORS

- African Area Studies
- African Languages
- African, Middle Eastern, and South Asian Languages and Literatures
- Africana Studies
- Agroecology
- American Studies
- Animal Science
- Anthropology
- Anthropology, Cultural
- Anthropology, Evolutionary
- Arabic
- Archaeology
- Architectural Studies
- Art
- Art History
- Arts Management and Leadership
- Asian American Studies
- Asian Studies
- Astrobiology
- Astronomy
- Biochemistry
- Biological Sciences
- Business Administration

- Business and Technical Writing
- Chemistry
- Chemistry Education
- Chinese
- Cinema Studies
- Classical Humanities
- Cognitive Science
- Comparative and Critical Race and Ethnic Studies
- Comparative Literature
- Computer Science
- Creative Expression and the Environment
- Creative Writing
- Criminology
- Critical Intelligence Studies
- Culinary Nutrition
- Dance
- Data Science
- Developmental Psychology
- Digital Communication, Information, and Media
- Disabilities Studies
- Earth and Planetary Sciences
- Ecology, Evolution, and Natural Resources
- Economics
- Education as a Social Science
- English
- Entomology
- Entrepreneurship
- Environmental and Business Economics
- Environmental Policy, Institutions, and Behavior
- Environmental Sciences
- Environmental Studies
- European Studies
- Food Science
- French
- Gender and Media
- Geography
- German
- Government and Business
- Greek (Ancient)
- Greek (Modern)
- Health Administration
- Health and Society

- Health Equity
- Hindi
- History
- History- Law and History
- History- STEM in Society
- Holocaust Studies
- Horticulture Therapy
- Human Resource Management
- Hungarian
- International and Global Studies
- Italian
- Japanese
- Jewish Studies
- Korean
- Labor Studies
- Labor Studies - Diversity in the Workplace
- Labor Studies - Labor Unions and Social Movements
- Labor Studies - Law and the Workplace
- Labor Studies - Work Organization and Management
- Labor Studies - Work, Globalization, and Migration
- Landscape Design
- Language and Culture of Ancient Israel
- Latin
- Latin American Studies
- Latino and Caribbean Studies
- Linguistics
- Marine Sciences
- Mathematics
- Medical Ethics and Health Policy
- Medieval Studies
- Meteorology
- Middle Eastern Studies
- Military Science (Aerospace)
- Military Science (Military)
- Military Science (Naval)
- Military Science (Non-commissioning)
- Music
- Music Technology
- Nutrition
- Organizational Leadership
- Persian
- Philosophy

- Philosophy, Politics, and Economics
- Physics
- Plant Science
- Political Science
- Portuguese
- Psychology
- Public Administration and Management
- Public Health
- Public Policy
- Quantitative Economics
- Religion
- Russian
- Sexualities Studies
- Slavic and Eastern European Studies
- Social Justice
- Sociology
- South Asian Studies
- Spanish
- Sport Management
- Statistics
- Theater Arts
- Turkish
- Urban Planning and Design
- Urban Studies
- Women's, Gender, and Sexuality Studies

Many of the five year, accelerated graduate programs that are offered to School of Arts and Sciences students will substitute for the minor requirement; please see an academic advisor for details.

Certificate Programs

CERTIFICATE PROGRAMS

A number of academic departments and programs offer a variety of certificates to School of Arts and Sciences students. Certificates are awarded only with or subsequent to the awarding of a baccalaureate degree. Please visit the certificate programs page in the Undergraduate Education in New Brunswick chapter of this catalog.

Other Academic Programs

OTHER ACADEMIC PROGRAMS

Accelerated M.A. Degree Program in Political Science - Concentration in the United Nations and Global Policy Studies

Arts and Sciences Coordinated B.A. or B.S./M.B.A. in Professional Accounting

Bachelor's Degree/J.D. Degree Program with Rutgers Law School

Bachelor's Degree/Master of Applied Psychology

Bachelor's Degree/Master of Arts Co-Terminal Degree in Art History

Bachelor's Degree/Master of Arts Degree in Criminal Justice Program

Bachelor's Degree/Master of Arts in Feminist Practices for Social Change

Bachelor's Degree/Master's Degree Programs with the Edward J. Bloustein School of Planning and Public Policy

Bachelor's Degree / Master in Communication and Media (BA/MCM) Dual Degree Pathway

Bachelor's Degree (ITI)/ Master of Information (BA/MI) Dual Degree Pathway

Bachelor's Degree/M.P.H. Degree Program with Rutgers School of Public Health

Doctor of Physical Therapy (DPT) 4+3 Program

Five-Year, Dual-Degree Program in Engineering and Liberal Arts/Sciences

Bachelor of Science / Entry Level-Master of Science Clinical Nutrition Program

Five-Year, Dual-Degree Program MA/BA in Religion

Five-Year Teacher Certification Program

Future Leaders M.B.A. (B.A./B.S. Accelerated M.B.A. for Undergraduates)

Joint Programs (Economics 4 + 1 Masters Program)

Master of Science in Speech-Language Pathology (MSSLP)

Postbaccalaureate Prehealth Program

School of Arts and Sciences Honors Program

School of Arts and Sciences/Rutgers Biomedical and Health Sciences Articulated Programs

School of Management and Labor Relations Joint Bachelor's and Master's Five-Year Program

Study Abroad

Thesis Programs

Administration (SAS)

ADMINISTRATION

Administration

Juli Wade, Executive Dean

James Masschaele, Executive Vice Dean

Zaire Dinzey-Flores, Vice Dean of Diversity, Equity, and Inclusion

Susan Lawrence, Vice Dean for Undergraduate Education

Bob Maruca, Vice Dean of Administration

Tom Vosseler, Executive Director of IT and Data Analytics

Rob Eccles, Senior Director of Development

Kareem Mumford, Senior Director of Communications and Marketing

Division Deans

Lori Covey, Dean of Life Sciences

Robin Leichenko, Dean of Social and Behavioral Sciences

James Masschaele, Dean of Humanities (Interim Fall 2025)

Thu Nguyen, Dean of Mathematical and Physical Sciences

Ben Sifuentes-Jauregui, Dean of Humanities (Spring 2025)

Office of Undergraduate Education

Susan Lawrence, Vice Dean for Undergraduate Education

Sharon Bzostek, Senior Associate Dean for Undergraduate Education

Courtney Stanzione, Associate Dean and Director of Advising and Academic Services

Vanessa Coleman, Assistant Dean and Director for Student Records and Administrative Systems

A. Musu Davis, Dean of SAS Honors

Michelle Shostack, Associate Dean and Director of the SAS Educational Opportunity Fund

Academic Policies and Procedures (SAS)

ACADEMIC POLICIES AND PROCEDURES

Note: See the **University Policies and Procedures** section in the Rutgers Main catalog for university-wide academic policies and procedures.

Academic Credit

Academic Support Services

Registration and Course Information

Academic Standing

Poor Academic Performance

Grades and Records

History and Aims (SEBS)

HISTORY AND AIMS

Our History: How George H. Cook Shaped Rutgers

George Hammell Cook (1818-1889) was raised on a small farm in Morris County, NJ, in the early 1800s. After high school, he spent a number of years as an itinerant, working as an engineer with a railroad in the Catskills, teaching and studying at the Rensselaer Institute, managing a glassmaking house in Albany, NY, and teaching at the Albany Academy. He came to Rutgers College as professor of chemistry and natural sciences in 1853 at the invitation of then President Theodore Frelinghuysen. By the time he came to Rutgers, Cook had expertise in geology, chemistry, engineering, and agriculture. Among Cook's first research projects was the chemical analysis of "greensand marl," a soil deposit found in central and south Jersey. This research led to his appointment as assistant state geologist. A thorough geological survey of New Jersey, published in 1840, was already out of date, and Professor Cook was appointed to undertake its revision. His work would become the model for the U.S. Geological Survey.

In 1862, the Morrill Act was signed into law by President Abraham Lincoln. The Morrill Act was driven by the idea that everyone (every young man, at least) could benefit from an education in the sciences. The act provided for the establishment of a college in each state where students would receive an education that included scientific and classical studies, military tactics, agriculture, and the mechanic arts. A unique American contribution to higher education, the land-grant concept applied scientific research to local problems. Cook, who was a strong believer in the concept of scientific agriculture, led successful lobbying efforts (against Princeton and the state Normal School at Trenton) to have Rutgers designated as the site of the land-grant college. The Rutgers Scientific School (as it was then called) was founded in 1864 as New Jersey's land-grant college, with George H. Cook at the head. A 100-acre farm on the outskirts of New Brunswick was purchased from the estate of James Neilson to serve as the school's

experimental farm. (Rutgers was given 210,000 acres of what is now Utah under the Morrill Act, which was sold to establish the college and purchase land for the experimental farm.) That land is now the heart of the G. H. Cook Campus.

In 1887, the Morrill Act was amended by the Hatch Act, which established funds for state agricultural experiment stations. These federal- and state-appropriated funds were used to build New Jersey Hall, which housed Rutgers Scientific School, and to acquire additional faculty and farmland. George H. Cook became the first director of the New Jersey Agricultural Experiment Station, which now includes offices in all 21 New Jersey counties. In 1912, the (by then) College of Agriculture moved from the College Avenue Campus to the campus of the experiment station. The land-grant triad was completed in 1914 with the Smith-Lever Act. This act established the Agricultural Extension Service, which located College of Agriculture faculty in each of the counties.

Under the land-grant framework, campus-based academic programs complement experiment station research, which in turn is disseminated to the public by local extension agents. Residents call extension agents with a problem, who either work to resolve the problem or initiate research into it. In 1917, the New Jersey legislature designated the Rutgers Scientific School, also called the State College of Agriculture, as the State University of New Jersey. In 1924, Rutgers College assumed the name Rutgers University, but the College of Agriculture remained as a distinct unit. It was not until 1945 that Rutgers University as a whole (with the College of Agriculture as a unit) achieved state university status. In 1965, the College of Agriculture became the College of Agriculture and Environmental Sciences (CAES).

The creation of Cook College from the CAES in 1971 was in many ways transformative. Cook College aimed to offer an interdisciplinary, problem-oriented curriculum that emphasized environmental studies as well as the arts and sciences. This combination of features in a land-grant school was unique at the time. Today, with the transformation to the School of Environmental and Biological Sciences (SEBS), the focus on creating a multidisciplinary learning environment remains, and new efforts have begun to enhance the learning environment for students. Through living-learning communities, an emphasis on hands-on and service learning, as well as international education opportunities, SEBS students will gain a deeper, more nuanced understanding of their curricular work. Together with NJAES, Rutgers and, more specifically the School of Environmental and Biological Sciences, works to fulfill the goals of land-grant institutions by enlarging the land-grant mission to include the study of environmental problems, natural resources, economic and community development, fisheries, nutrition, public health, and youth development--all of which address the diverse needs of a highly developed state.

The Morrill Act laid the foundation for the development of our nation's great public university system. The commitment of Rutgers University to the land-grant concept makes us unique among the universities in New Jersey. Rutgers students and faculty are part of a proud tradition of academic study, research, and public service, a tradition that began with the remarkable efforts of George H. Cook--educator, innovator, and public servant. As committed to science-based solutions as George H. Cook was in the 19th century, the faculty of the School of Environmental and Biological Sciences and the New Jersey Agricultural Experiment Station are equally committed to addressing the socioeconomic issues that face our state's residents today.

History and Aims (SEBS)

Mission-Oriented Education, Research, and Outreach

Mission-Oriented Education, Research, and Outreach

The School of Environmental and Biological Sciences pursues excellence in research, teaching, and outreach in areas of study that address the biological spectrum from organisms to ecosystems. Its emphasis is on both the fundamental sciences and the social and human dimensions. The school offers 21 undergraduate majors, including plant biology and animal sciences; entomology; microbiology; biotechnology; biochemistry; agriculture and food systems; landscape architecture; environmental planning and design; food and nutritional sciences; ecology, evolution, and natural resources; marine science and oceanography; environmental sciences and meteorology; environmental policy, institutions, and behavior; and environmental and business economics.

In addition to instruction in the classroom, field, and laboratory, students have opportunities for experiential learning on and off campus, including a growing emphasis on international experiences through short- and long-term study abroad. Students also have access to a robust program of applied research and outreach hosted by the New Jersey Agricultural Experiment Station laboratories, farms, business incubators, and marine stations throughout the state.

History and Aims (SEBS)

Scholarships

Scholarships

Students attending the School of Environmental and Biological Sciences have the opportunity to compete on both a merit and a need basis for school-based scholarships.

In February of each academic year, the school's Office of Academic Programs notifies students matriculated in the School of Environmental and Biological Sciences (except seniors) of the start of the annual scholarship application process for the following academic year.

Academic prizes and departmental scholarships are also awarded through academic departments to the schools' students in various fields of study, often on the recommendation of the faculty in the appropriate curriculum. Students automatically are considered for all awards for which they are eligible. For additional scholarship information, visit here.

History and Aims (SEBS)

General Information

General Information

Faculty, staff, and students are the core of the School of Environmental and Biological Sciences community. There are about 240 on-campus faculty members and about 3,700 undergraduate students. The school offers an education that encompasses the personal and professional development of its students in a small campus setting within the larger Rutgers community.

The school's undergraduate instruction programs are closely linked to the rest of the university. Its students, like all Rutgers students, are able to take courses offered by the schools at Rutgers University-New Brunswick.

Degree Requirements (SEBS)

DEGREE REQUIREMENTS

The School of Environmental and Biological Sciences is unique within the university system. As a professional school, the school is engaged in the land-grant mission of educational scholarship designed to develop knowledge and skills that will enable students and the public to address challenges facing society in the areas of food, the environment, natural resources, and agriculture. The school's undergraduate and graduate programs are designed to promote the study of these challenges by integrating the natural and physical sciences with the social sciences and humanities and by using conceptual frameworks that explore human interactions with the earth's system.

Credits and Residency (SEBS)

CREDITS AND RESIDENCY

To be awarded a degree, a student in the School of Environmental and Biological Sciences must complete a minimum of 120 credits* of coursework with a cumulative grade-point average of 2.000 or better. The student must satisfactorily complete the requirements of one of the curricula (major programs of study) available to the school's students. These curricula are listed and their requirements are outlined in the chapter on Programs of Study. In addition, the student must complete 30 of the last 42 credits at Rutgers. With careful planning, full-time students who begin their higher education at the School of Environmental and Biological Sciences, and who have not placed into remedial courses or changed majors, should be able to complete their degree requirements in four years.

*Students completing the Fall 2015 SEBS Core must complete 128 credits. Students completing the Environmental Engineering degree will complete 129 credits.

Double Majors (SEBS)

DOUBLE MAJORS

Students seeking to complete the requirements of a second program of study offered by the School of Environmental and Biological Sciences and/or another school of Rutgers University must complete a second major form available both at the Office of Academic Programs in Martin Hall and online, in order to have that declaration verified by the curriculum or department offering the program. Satisfactory completion of these requirements is noted on the student's final transcript, but only one bachelor's degree is conferred upon graduation. Students should consult with an academic adviser at the Office of Academic Programs, Martin Hall, when considering adding any additional majors, minors or certificate programs.

Second Bachelor's Degree (SEBS)

SECOND BACHELOR'S DEGREE

Students with a previously earned bachelor's degree from another institution who matriculate at the School of Environmental and Biological Sciences for the purpose of earning a second degree must: 1) complete a minimum of 30 credits from Rutgers University, and 2) fulfill the course requirements listed under experience-based education and proficiency in a field/concentration for the major (see the Programs of Study chapter). These requirements may, however, be modified by the undergraduate program director, in consultation with the student, and subject to final approval by the school's Admissions and Scholastic Standing Committee.

Mission, Goals, and Core Curriculum of the Undergraduate Program (SEBS)

MISSION, GOALS, AND CORE CURRICULUM REQUIREMENTS OF THE UNDERGRADUATE PROGRAM

Human impacts on the earth's ecosystem are profound and far reaching. The faculty of the School of Environmental and Biological Sciences is committed to educating students to understand and sustain the integrity of this ecosystem, as both specialists within their fields of concentration and well-informed citizens. The programs of study offered by the school apply the natural and social sciences to this dynamic system.

The curricula are designed to achieve the following goals for graduates of the School of Environmental and Biological Sciences:

To understand and appreciate the interaction between the natural and social sciences as they relate to the earth's ecosystem, students master the basic knowledge and approaches of a field of specialization and are introduced to multidisciplinary perspectives that locate their field and its contributions in this larger context.

To evaluate issues critically, so that graduates may become autonomous, versatile, and productive people who understand that they are inextricably related to the natural world and to other people. Mastery of both quantitative and qualitative modes of inquiry develops each student's ability to deal with the complexity and dynamism of real-world issues.

To understand and appreciate human impacts on the earth's ecosystem, students develop a historical, global, and multicultural consciousness in order to expand their bases for decision making.

To sustain the integrity of the global ecosystem, students develop the ethical sensitivity and analytical skills necessary to address questions of social responsibility, environmental ethics, moral choice, and social equity.

Core Curriculum Requirements

CORE CURRICULUM REQUIREMENTS

The School of Environmental and Biological Sciences (SEBS) offers bachelor's degree programs in 21 programs of study (curricula), many with several areas of further concentration (options). All programs of study are designed to achieve the goals outlined in the section on Missions, Goals, and Core Curriculum Requirements of the Undergraduate Program.

First-year students matriculating fall 2015 to fall 2018 and transfer students matriculating fall 2016 to spring 2019 must complete a goal-based Core Curriculum: Here. Students wishing to adopt the fall 2019 Core Curriculum must meet with a dean at the Office of Academic Programs.

First-year and transfer students matriculating fall 2019 must complete a goal-based Core Curriculum: Here.

The SEBS goal-based Core Curriculum is structured as a set of core liberal arts and sciences learning goals framed as activities that students will be able to do at a foundational level by virtue of meeting the specific core goal. Courses may be counted as meeting multiple learning goals; students generally will complete the core in 10 to 13 courses of 3 or 4 credits each. A course used to meet core goals may also be used to fulfill a major or minor requirement. Only graded degree credit-bearing courses worth at least 3 credits and certified by the faculty may be used to meet core goals. Lists of courses certified as meeting each goal can be found in the Degree Navigator system.

Contemporary Challenges

(6 credits) Students must take two courses and meet one goal in each of the Contemporary Challenges areas. [CC-D, CC-O]

Diversities and Social Inequalities [CC-D]

- Analyze the degree to which forms of human differences and stratifications among social groups shape individuals and group experiences of, and perspectives on, contemporary issues. Such differences and stratifications may include race, language, religion, ethnicity, country of origin, gender identity, sexual orientation, economic status, abilities, or other social distinctions and their intersections.
- Analyze contemporary social justice issues and unbalanced social power systems.

Our Common Future [CC-O]

- Analyze a contemporary global issue from a multidisciplinary perspective.
- Analyze the relationship that science and technology have to a contemporary social issue.

Experiential Learning (previously called Experience-Based Education, EBE)

(3 credits) Practical application of disciplinary knowledge. Students must participate in a certified experience that meets this goal. [EL]

- Complete and report on an applied experience (e.g., professional practice, service learning, or research) in order to examine and evaluate ideas within a discipline.

Areas of Inquiry

Natural Sciences (6 credits) Students must meet two goals with courses in two of the following disciplines: physical, biological or environmental sciences. [NS]

- Understand and apply basic principles and concepts in the physical or biological sciences.
- Explain and be able to assess the relationship among assumptions, method, evidence, arguments, and theory in scientific analysis.
- Identify and critically assess ethical and societal issues in science.

Social and Historical Analysis (9 credits; see HST and SCL below.)

- Understand the bases and development of human and societal endeavors across time and place.
- Explain and be able to assess the relationship among assumptions, method, evidence, arguments, and theory in social and historical analysis.
- Identify and critically assess ethical issues in social science and history.

Historical Analysis (3 credits) Students must meet one goal. [HST]

- Explain the development of some aspect of a society or culture over time, including the history of ideas or history of science.
- Employ historical reasoning to study human endeavors.

Social Analysis (6 credits) Students must meet one goal in each area below. [SCL]

Social Cultural Analysis/ Economic Analysis (3 credits) [SCL-SCA/ECN]

- Understand different theories about human culture, social identity, economic entities, political systems, and other forms of social organization.
- Apply concepts about human and social behavior to particular questions or situations.
- Use the principles of economics, finance, and accounting to analyze and solve problems related to institutions, policies, and management.
- Evaluate the institutional factors that underlie and influence policy decisions.

Governance and Regulation Analysis (3 credits) [GVT]

- Analyze ethical, moral, and legal dimensions of environmental resource use, regulation, and management spanning governmental and nongovernmental institutions.
- Use theory and evidence from the social sciences to analyze the decisions made by organizations that affect resource use, the environment, and health; including the organizations involved, the influences on those decisions, and the intended and unintended consequences that are likely to result.

Arts and Humanities (3 credits) Students must meet one goal. [AH]

- Examine critically philosophical and other theoretical issues concerning the nature of reality, human experience, knowledge, value, and/or cultural production.
- Analyze art and/or literature in themselves and in relation to specific histories, values, languages, cultures, and technologies.
- Understand the nature of human languages and their speakers.
- Engage critically in the process of creative expression.

Cognitive Skills and Processes

Writing and Communication (6 credits) Students must meet one goal in two areas. [WC, WCd]

Expository Writing (101) or Exposition and Argument (103) (3 credits) [WC]

- Communicate complex ideas effectively, in standard written English, to a general audience.
- Evaluate and critically assess sources and use the conventions of attribution and citation correctly.
- Analyze and synthesize information and ideas from multiple sources to generate new insights.

Writing in a Discipline (3 credits) [WCd]

- Communicate effectively in modes appropriate to a discipline or area of inquiry. [WCd]

Quantitative and Formal Reasoning (6 credits) Students must meet two goals. [QQ; QR]

- Formulate, evaluate, and communicate conclusions and inferences from quantitative information. (Includes various quantitative methods courses as well as 640 courses) [QQ]
- Apply effective and efficient mathematical or other formal processes to reason and to solve problems. (Includes 640 courses and formal reasoning course--or placement out of) [QR]

Area Requirements for Students Matriculating Prior to Fall 2015

AREA REQUIREMENTS FOR STUDENTS MATRICULATING PRIOR TO FALL 2015

In the following descriptions of the first seven of these area requirements, the numbers of credits indicated are the minimum requirements established by the school's faculty for all bachelor's degree programs. Many programs

require specific courses that must be used to fulfill some of these areas and in some cases these program-specific requirements may exceed the school's minimum requirements. No course may be used to fulfill simultaneously more than one of the general school core requirements (Areas I-VII); however, a given course may fulfill simultaneously both a general school core requirement in Areas I-VII and a major program requirement (Area VIII--proficiency in a field). Before selecting courses, students should consult the requirements for each program that they are considering, and discuss these with their academic adviser.

Lists of courses that fulfill the various requirements can be found in the Degree Navigator system (Here).

Descriptions of some of the courses available for fulfillment of Areas I to VII can be found in the New Brunswick Undergraduate Catalog 2013-2015.

Area I. School Mission: Interdisciplinary Critical Analysis

The undergraduate program's goals are to help students develop the abilities to think critically; address problems with a variety of modes of inquiry; and recognize and assess ethical problems related to the environment, natural resources, food and human nutrition, and agriculture, in order to make decisions based upon an understanding of the long- and short-term implications of the various choices. As a means of meeting these goals, students are required to complete one 3-credit junior/senior colloquium course. This colloquium course is a capstone, integrative educational experience for students concluding their undergraduate studies, enabling them to synthesize information and techniques gained in previous courses. Working cooperatively with peers who have different capabilities and interests and using the case study method, students in these courses devise creative, interdisciplinary solutions to multifaceted problems with ethical, social, political, and technical content in the school's mission areas. Current lists of the junior/ senior colloquia offerings are posted on the school's website: Here.

Area II. Introductory Life and Physical Sciences

To provide a foundation for understanding and evaluating important questions related to the life and physical sciences, students are required to complete courses in both the life sciences and in the physical sciences, as follows:

A. Life Sciences (4-8 credits). Introductory courses in biological sciences (subject 119), plant biology (subject 776), animal sciences (subject 067), ecology and evolution (subject 216) with a laboratory.

B. Physical Sciences (3-5 credits). A basic chemistry (subject 160) or physics (subject 750) course, or an introductory course that applies the physical sciences to earth systems including geography (subject 450), geology (subject 460), environmental sciences (subject 375), marine sciences (subject 628), meteorology (subject 670).

Many programs of study require specific courses and additional credits in the life and physical sciences. Students should consult the requirements of the specific program(s) of study they are considering before selecting courses from this list.

Area III. Humanities and the Arts

To develop an understanding and appreciation of the humanities, art forms, and modes of critical response and interpretation, students are required to complete a minimum of 6 credits in the following subject areas. Upper-level literature and art courses in a foreign language may satisfy this requirement, but elementary and intermediate foreign language courses (i.e., conversation, grammar, and composition courses) do not satisfy this requirement. The two courses selected may be from the same or different disciplines.

Area IV. Multicultural and International Studies

To encourage students to see the world through the eyes of people whose culture differs from their own, students are required to complete a minimum of 6 credits in multicultural and international studies. These courses are intended to expose students to international, cross-cultural, and historical perspectives; to acquire an appreciation for the diversity and variability of institutions, cultures, and individuals; and to consider the complex and changing interactions of cultural, situational, and institutional factors that affect human behavior.

Several programs of study require specific courses or additional credits in multicultural and international studies. Students should consult their advisers and/or the requirements of the specific majors they are considering before selecting courses from the list.

Students who have studied outside the United States at an accredited institution for one semester or more may waive 3 credits of this requirement.

Area V. Human Behavior, Economic Systems, and Political Processes

Civic engagement in our democratic society is enhanced by an understanding of human behavior and of the political processes and institutional frameworks within which public policies are developed, and by the ability to evaluate policy issues through the application of economic concepts and theory. To develop these understandings, students are required to complete courses in human behavior, in economic systems, and in political processes.

Area VI. Oral and Written Communication

To develop the speaking and writing skills essential for success in both the university and in the professions that students are preparing to enter, written and oral presentations are incorporated into all courses, where feasible. Students are further required to complete a minimum of 6 credits.

Area VII. Experienced-Based Education

To develop the ability to apply curricular and extracurricular-based learning, including leadership development and personal as well as interpersonal management skills, within settings appropriate to their fields, each of the school's programs of study specifies a course or mechanism of study. Examples of currently available options are internships and cooperative education placements through the Student to Professional Internship Network (SPIN) Program, practica, independent research, and the George H. Cook Scholars Program.

Students completing two major programs offered by the School of Environmental and Biological Sciences must complete at least one experience-based education course, approved by both curricula.

Area VIII. Proficiency in a Field/Concentration

To develop proficiency in a field/concentration related to the environment, natural resources, food and human health, or agriculture, each curriculum specifies required courses, elective courses, and, where applicable, option requirements. Every program of study also specifies minimum requirements in quantitative skills and in professional ethics as they apply to the particular field/concentration for which it prepares its students.

Quantitative Skills. The quantitative skills requirement is designed to help students develop mathematical literacy and skills for analytical reasoning, including an understanding of statistical methodologies appropriate to the field for which students are preparing.

Professional Ethics. The professional ethics requirement is designed to help students develop the ability to recognize, assess, and respond to ethical problems that could be encountered in the careers students are preparing to enter.

Additional Requirements. Each degree program stipulates additional required courses in the field and may require students also to fulfill requirements in more specialized options.

Area IX. Unspecified Electives

All students must complete a minimum of 128 credits for the bachelor's degree (or 159 credits for the five-year bioenvironmental engineering curriculum). The minimum credit requirements to satisfy areas I-VIII total 125 credits or less for at least one option in every major available at the school (with the exception of the five-year bioenvironmental engineering major). The additional 3 or more credits required for graduation may be fulfilled by any courses for which the student has met all the prerequisites. Students who have completed at least 60 credits of coursework may register for up to two of these unspecified elective courses (no more than one per semester) on a Pass/No Credit basis.

Graduation (SEBS)

GRADUATION

Degrees are conferred by Rutgers University on the recommendation of the faculty of the School of Environmental and Biological Sciences only at the annual commencement in May. Students completing degree requirements in August or January may obtain a letter from the Office of Academic Programs or ask the university registrar for a certificate attesting to their completion of degree requirements, provided they have filed a Diploma Information Card.

Degrees are conferred in absentia when the candidate has advised the school's Office of Academic Programs in advance of his or her inability to attend the University Commencement ceremony.

Students who complete courses at other institutions or return to Rutgers to complete degree deficiencies must notify the school's Office of Academic Programs of their intent to graduate and arrange to have an official transcript forwarded to the School of Environmental and Biological Sciences, Office of Academic Programs, Rutgers, The State University of New Jersey, 88 Lipman Drive, New Brunswick, NJ 08901-8525. Deadlines for this notification are February 1 for May graduation, August 1 for an August degree date, and November 1 for a January degree date.

Diplomas will be withheld from all students whose financial accounts are not clear.

Graduation with Honors. Academic excellence is recognized by the school faculty's recommendation that the bachelor's degree be conferred with summa cum laude to students whose cumulative grade-point average is 3.850 or higher; magna cum laude to those whose cumulative grade-point average is 3.700 to 3.849; and cum laude to those whose cumulative grade-point average is 3.500 to 3.699.

Phi Beta Kappa. Each spring semester, the Phi Beta Kappa Society invites to membership outstanding students of the junior and senior classes. Election to the society is based on high academic achievement, a record of coursework that involves the pursuit of a liberal arts major, proficiency in a foreign language through the intermediate level, a minimum of two years equivalent of full-time coursework at Rutgers University, and breadth of scholarship. Phi Beta Kappa, established in 1776, is the oldest and most widely recognized liberal arts honorary society in the United States.

Prizes and Honors. The School of Environmental and Biological Sciences, its individual academic departments, and other units of the university offer a variety of prizes and awards for students with excellent academic records or special eligibility. Students should consult with their academic departments for additional information.

Post-Obitum Award of Degree. In the unfortunate event of the death of a student who was enrolled in the School of Environmental and Biological Sciences as a senior in good standing, requests will be considered for the awarding of the degree that was being earned. The request may be submitted in writing to the school's Admissions and Scholastic Standing Committee.

Programs of Study (SEBS)

PROGRAMS OF STUDY

Summary

Agriculture and Food Systems 020

Animal Science 067

Biochemistry 115

Bioenvironmental Engineering 117

Biological Sciences 119

Biotechnology 126

Ecology, Evolution, and Natural Resources 216

Entomology 370

Environmental and Business Economics 373

Environmental Engineering 366

Environmental Planning 573

Environmental Policy, Institutions, and Behavior 374

Environmental Sciences 375

Exercise Science 377

Food Science 400

Landscape Architecture 550

Marine Sciences 628

Meteorology 670

Microbiology 680

Nutritional Sciences 709

Plant Science 776

Public Health 832

Minors and Certificate Programs

Student to Professional Internship Network (SPIN)

Military Education

Honors Programs

Study Abroad Programs

Educational Opportunity Fund (EOF)

Preprofessional Programs

Combined Degree Programs

Summary (SEBS)

SUMMARY

Graduation from the School of Environmental and Biological Sciences requires the successful completion of one of the curricula (major programs of study) listed below. Any student in the school who decides to double-major may choose the second major from those offered by other faculties or schools at Rutgers University; however, only one bachelor's degree is conferred upon graduation. Students in the School of Environmental and Biological Sciences may also minor in programs offered by other faculties and schools. They may also enroll in individual courses offered by other faculties and schools of the university.

Any potential student who does not wish to major in a curriculum that is on the list below should apply directly to the school at Rutgers that offers the desired major. Any student already enrolled in the School of Environmental and Biological Sciences, but who no longer wishes to major in a curriculum on the list below should consult with one of the school's deans in the Office of Academic Programs in Martin Hall about initiating an application for a school-to-school transfer within Rutgers (here).

The School of Environmental and Biological Sciences uses a system of adviser codes to aid in the advising and registration process. Adviser codes are indicated in the lists of faculty advisers for each curriculum.

Summary (SEBS)

Premedical, Predental, and Prelaw Programs

Premedical, Predental, and Prelaw Programs

Please note that there are no specific programs of study for students interested in medical, dental, or law school. Individuals can major in any of the programs available to students in the School of Environmental and Biological Sciences and complete the necessary admission requirements for these professional programs.

Agriculture and Food Systems 020 (SEBS)

AGRICULTURE AND FOOD SYSTEMS 020

Degree: B.S.

Director: -

Program Website: Here

(Sunsetting curriculum) Agriculture and food systems aim to appeal to those who are interested in an entrepreneurial and innovative education in the agricultural sciences, spanning the entire range from production to table. The A&FS major targets students who seek careers in agribusiness, government service, and agricultural education and extension, as well as those preparing to be owners/operators of farming enterprises.
Students interested in agricultural education can enroll in the Agricultural Education option within the Agriculture and Food Systems major. This option must be combined in a 4 + 1 program with the Graduate School of Education.

Agriculture and Food Systems 020 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

Students matriculating prior to the fall semester of 2015 in the School of Environmental and Biological Sciences (SEBS) must complete the SEBS general education requirements. In addition, students majoring in agriculture and food systems must complete the major requirements described below.

Students matriculating fall 2015 or after and transfer students matriculating in 2016 and after must complete a goal-based Core Curriculum in place of general education requirements. The goal-based core is described here. Courses are certified for the Core Curriculum by a faculty committee. A current list of certified courses can be found here.

Agriculture and food systems major requirements are as described below. The program has flexibility so academic advising is provided to ensure that students choose courses that support their career goals.

For an up-to-date description of agriculture and food systems major requirements, courses, and course sequences please refer to the program website here.

Total Credits: 60 to 63 credits

A. Required Courses:

i. Science Requirements:

- At least one introductory biology course (01:119:101 or 103 or 119 or 199)
- At least one introductory chemistry course (01:160:126 or 127 or 128 or 134 or 140 or 159 or 161 or 163)
- At least one introductory earth science, ecology, or geological sciences course (01:460:100 or 101; or 11:216:101 or 217 or 351; or 11:374:101; or 11:375:101; or 11:573:445)

ii. Agriculture and Food Systems Requirements:

11:020:210 Introduction to Agriculture and Food Systems
11:020:215 Applied Practical Applications in Agriculture and Food Systems

iii. Soils Requirement (choose one course):

11:216:422 Soil Organismal Diversity
11:375:360 Soils and Water
11:375:453 Soil Ecology
11:776:102 Soils and Society
11:776:440 Soil Fertility

iv. Economics Requirement (choose one course):

01:220:102 Introduction to Microeconomics
01:220:103 Introduction to Macroeconomics
11:373:101 Economics, People, and Environment
11:373:121 Principles and Applications of Microeconomics
11:373:122 Principles and Applications of Microeconomics

v. Quantitative Requirements (2 courses):

01:640:026 Intermediate Algebra or place into Pre-calculus (01:640:111)

and

One quantitative skills course (Pre-calculus I or II; or calculus; or statistics or applied statistics)

vi. Experiential Learning (choose one course):

11:020:490 Agriculture and Food Systems Practicum
11:020:495 or 495 Special Problems in Agriculture and Food Systems
11:067:201, 202, 203, 205, or 207 Animal Science Practicum
11:554:488 G. H. Cook Scholars Program
11:776:350 Agroecology Practicum
11:776:495 or 496 Special Problems in Plant Science
11:902:301 or 302 or 400 School of Environmental and Biological Sciences (SEBS) Internship

B. Foundational Courses for Agriculture and Food Systems (3 courses from):

01:830:101 General Psychology (NB)
01:920:101 Introduction to Sociology (NB)
11:020:305 Starting and Managing A Small Farm (NB)
11:020:315 Direct Farm Marketing and Agritourism (NB)
11:067:142 Animal Science (NB)
11:216:101 Introduction to Ecology and Evolution (NB)
11:216:217 Principles of Natural Resource Management (NB)
11:216:272 Dendrology (NB)
11:216:332 Plant Ecology (NB)
11:216:351 Principles of Ecology (NB)
11:370:226 Pesticide Impacts on Humans and Environmental Health (NB)
11:370:308 Apiculture (NB)
11:370:350 Agricultural Entomology and Pest Management (NB)
11:370:381 Insect Biology (NB)
11:374:101 Introduction to Human Ecology (NB)
11:375:101 Intro to Environmental Sciences (NB)
11:400:103 Science of Food (NB)
11:400:104 Food and Health (NB)
11:400:106 Food as Medicine (NB)
11:400:201 Principles of Food Science (NB)
11:628:120 Introduction to Oceanography (NB)
11:709:201 Culinary Nutrition (NB)
11:709:255 Nutrition and Health (NB)
11:776:210 Principles of Botany (NB)
11:776:211 Introduction to Horticulture (NB)
11:776:231 Commercial Floral Design (NB)
11:776:242 Plant Science (NB)

C. Additional course selected in consultation with an advisor:
A total of 30 credits from {Area of Inquiry 1: Agricultural Sciences, Area of Inquiry 2: Agribusiness and Entrepreneurship, Area of Inquiry 3: Food Systems; Culture; Community Food Justice and Advocacy; Nutrition & Health, Area of Inquiry 4: Policy, Politics, Economics, Ethics and Law, Area of Inquiry 5: Education, Communication, Leadership, Foundational Course Taught by the School of Arts and Sciences}

- with at least 3 credits from {Area of Inquiry 1: Agricultural Sciences, Foundational Course Taught by the School of Arts and Sciences}
- and at least 3 credits from {Area of Inquiry 2: Agribusiness and Entrepreneurship}
- and at least 3 credits from {Area of Inquiry 3: Food Systems; Culture; Community Food Justice and Advocacy; Nutrition & Health}
- and at least 3 credits from {Area of Inquiry 4: Policy, Politics, Economics, Ethics, and Law}
- and at least 3 credits from {Area of Inquiry 5: Education, Communication, Leadership}

Agriculture and Food Systems 020 (SEBS)

Agriculture and Food Systems Teacher Education Track

Agriculture and Food Systems Teacher Education Track

The B.S. in Agriculture and Food Systems Teacher Education Track is designed for preparation to become a certified K-12 Teacher of Agriculture. It also prepares students for agricultural extension and outreach work.

This program provides agricultural science, subject area preparation toward teacher certification at the Rutgers Graduate School of Education (Five Year, 4+1 Agricultural Science Education, teacher education program). However, graduates will also be prepared to pursue teacher certification at other graduate schools or the Alternative Route teaching certificate. Successful completion of N. J. Teacher Certification is required to qualify as a K-12 Teacher of Agriculture. Students apply to the 5-year program at GSE by February 1, ideally in their Junior year.

For more information, contact Dr. Xenia Morin or Dr. Thomas Leustek.

Graduation Requirements

A minimum of 120 earned credits are required to graduate with a B.S. in Agriculture and Food Systems, Teacher Education Track. Students must fulfill the SEBS Core graduation requirements and the following Agriculture and Food Systems Education Option requirements.

R1: Science Requirements (all AFS majors) (9 credits)
A total of 3 courses, one in each of the following categories:

- One chemistry course
- One biology course*
- One ecology, earth science, or geology class

*Note: These are minimum science requirements. Students are encouraged to take the biology course sequence 01:119:115, 01:119:116 and 01:119:117 if they intend to become certified to also teach biological sciences or if these biology classes are pre-requisites for other classes.

R2: Agriculture and Food Systems Required Foundation Courses for the Education Track (15 credits)

A total of 5 courses as agriculture and food systems foundational classes (for all AFS Majors)(6 credits)

- 11:020:210 Introduction to Agriculture and Food Systems
- 11:020:215 Applied Practical Applications in Agriculture and Food Systems

And two of these three classes (6 credits):

- 11:067:142 Animal Science
- 11:776:211 Introduction to Horticulture
- 11:776:242 Plant Science

One of these (3 credits):

- 11:776:391 Weeds, Diseases, and Insects of Plants (3)
- 11:776:105 Stories of Plant Diseases (3)
- 11:776:402 Weeds: Impact and Management (3)
- 11:067:330 Animal Nutrition (3) along with 11:067:331 Animal Nutrition Laboratory (1)

R3: Educational Foundation Courses specific to the Education Track (18 credits)
Five classes from this list:

Pre-admission to the 5-year program and taken in Sophomore or Junior Year

- 05:300:200 Introduction to Education (3) 05:300:201
- Introduction to Education Field Based Lab - Clinical Experience (0.5)
- 05:300:306 Educational Psychology: Principles of Classroom Learning (3)
- 11:374:416 Environmental Education in the School (3)

SEBS Senior Year, Fall Semester (also Year 1 of 2 of GSE requirements)

- 05:300:498 Clinical Experience Phase I (0.5)
- 05:300:450 Urban Education 1 (1.5)
- 05:300:307 Human Development: Infancy through Early Adulthood (3)
- 11:020:425 Developing Ideas in Agricultural Education (3) or 11:300:425 Developing Ideas in Agriculture (3)

Senior year, Spring semester (also Year 1 of 2 of GSE requirements)

- 05:300:498 Clinical Experience Phase 2 (0.5)
- 11:020:426 Teaching Agriculture and Food Systems (3) or 11:300:426 Teaching Agriculture (3)

Note: The 11:300:425/426 will be replaced by 11:020:425/426 starting in Fall 2019.

R4: Soils Requirement (all AFS Majors) (3 credits)
A total of 1 class from a list of soils classes:

- 11:776:102 Soil and Society (3)
- 11:776:440 Soil Fertility (3).

Note: Soils and Water or Soils and Organisms can be taken if you have the prerequisites.

R5: Economics Requirement (all AFS Majors) (3 Credits)
A total of 1 class:

- 11:373:121 Microeconomics

R6: Quantitative Skills (all AFS Majors*)(3 credits)
Complete one of the following:

- Placement into pre-calculus or complete Intermediate Algebra (01:640:026) or equivalent transfer credit.
- Total of 1 quantitative course which meet the QQ and QR requirements for the SEBS Core. (3 credits): (*New expanded list!)

R7 Experiential Learning (6 credits)
6 credits from an approved experiential learning course(s) (one course, or a combination of courses to make 3 credits):

- 11:300:417 Supervised Ag Educational Experience Practicum (3)
- 11:020:255 Special Topics in Agriculture and Food Systems (3) Subtopics: Ag Tech

Acceptable alternatives if related to agriculture and food systems or education:

- 11:067:200-207 Animal Practicums (1-3 credits)
- 11:020:490 Agriculture and Food Systems Practicum (1-3 credits)
- 11:902:300 SEBS Internship I (3)
- 11:902:301 SEBS Internship II (3)

R8 Approved electives for the Agriculture and Food Systems Education Track (minimum 21 credits; at least 12 credits should be at, or above, 300 level)
A minimum of 12 credits in agricultural sciences, food science, ecology, and natural resource management, landscape architecture with 6 credits coming from agriculture and food systems or plant science:

At least 12 credits from:

- 11:020:296 Honors Seminar in Agriculture and Food Systems
- 11:020:321 Principles and Practices of Small Organic Farming (summer farm course)
- 11:020:340 Indoor Cultivation of High Value Crops
- 11:020:455 Special Topics in Agriculture and Food Systems
- 11:020:436 Sustainable Agriculture

Any of the following 200 or higher:

- 11:776:202 Applied Physiology of Horticultural Crops (3)
- 11:776:205 Intro to Ethnobotany (3)
- 11:776:242 Plant Science (3)*
- 11:776:221 Principles of Organic Crop Production (3)
- 11:776:257 Edible and Poisonous Fungi (3)
- 11:776:390 Hemp and Medical Cannabis (3)
- 11:776:302 General Plant Pathology (3)
- 11:776:310 Plant Propagation (3)
- 11:776:321 Greenhouse Systems Management (3)
- 11:776:341 Fruit Production (3)
- 11:776:391 Weeds, Diseases and Insects of Plants (3)
- 11:776:439 Nursery Crop Production (3)
- 11:776:440 Soil Fertility (3)
- 11:776:442 Agroecology

Other approved elective courses:

Approved Animal Science Courses

- 11:067:200-207 Animal Practicum, Cattle; Sheep; Swine; Lab Animal; Horse (2);
- 11:067:330 Animal Nutrition (3) with 11:067:331 Animal Nutrition Laboratory (1)

Approved Entomology Courses

- 11:370:226 Pesticide Impacts on Human and Environmental Health (3)
- 11:370:350 Agricultural Entomology and Pest Management (3)
- 11:370:308 Apiculture (3)

Approved Food Science Courses

One of:

- 11:400:103 Science of Food (3)
- 11:400:106 Food as Medicine (3)
- 11:400:107 Foods: From Field to Table (3)

Approved Landscape Agriculture Courses (035) such as

- 11:550:271 Agriculture and the Landscape (3)

Approved Agriculture and Natural Resource Courses

- 11:035:268 Environmental Pollution - Issues in Agriculture, Industry, and Communities (2)
- 11:035:272 River and Stream Ecology (1)
- 11:035:274 Organic Farming and Gardening (2)
- 11:035:280 American Lawns and Turfgrass (1.5)

- 11:035:288 Edible Gardening for Enrichment and Education (2)

Approved Urban Forestry Courses

- 11:216:332 Plant Ecology (4)
- 11:216:365 Arboriculture (4)
- 11:216:377 Practicum in Forest Management (1-12)
- 11:216:403 Urban Forestry (3)
- 11:770:391 Diseases of Urban and Forest Trees (1.5)

Approved Marine Science Courses

- 11:628:309 Fishery Science (3)
- 11:628:317 Aquaculture (3)

Approved Microbiology Course

- 11:680:103 Microbiology of Agricultural Products in New Jersey (3)

Note: Other courses approved with permission of the undergraduate program director for agriculture and food systems. At least 3 credits in agribusiness or entrepreneurship.

- 11:020:305 Starting and Managing a Small Farm (3)
- 11:020:340 Indoor Cultivation of High Value Crops (4)
- 11:020:442 Entrepreneurial Agriculture (3)
- 11:373:231 Introduction to Marketing (3)
- 11:373:241 Introduction to Management (3)
- 11:373:331 Economics of the Food Marketing System (3)
- 11:035:300 Agricultural Commodities and Markets

A least 3 credits in food systems, policy, economics, ethics, or law:

- 11:020:333 Community Food Justice and Advocacy
- 11:020:337 Sustainability: Tackling Food Waste\
- 11:020:465 Feeding America's Cities
- 11:374:279 Politics of Environmental Issues (3) (also a SEBS core class)
- 11:374:289 Sustainable Food: Politics, Policy and Ethics (3)
- 11:374:313 U.S. Environmental Policy (3)
- 11:373:218 Sustainable Food Policy for Developing Countries (3)
- 11:373:323 Agriculture and Food Policy (3)
- 11:373:362 Natural Resource Economics
- 11:373:371 Food, Nutrition and Health Policy (3)
- 11:373:XXX Food Policy and other approved 11:373:XXX approved courses

Optional credits in education, communication, leadership, and youth development.

- 11:374:227 Agriculture in Society and Mass Media (3)

- 11:607:200 Principles of Leadership (3)
- 11:607:202 Leadership and Civic Engagement (3)
- 11:607:203 Foundations of Volunteer Management (3)
- 11:607:401 Foundations of Program Planning (3)
- 11:607:402 Building Community Partnerships (3)
- 11:607:484 Practical Leadership Applications in Agricultural Science (4)

Animal Science 067 (SEBS)

ANIMAL SCIENCE 067

Degree: B.S.

Director: Aparna Zama (zama@rutgers.edu)

Undergraduate Program Website: Here

Department Chair: Nicholas Bello

Department Website: Here

The animal science curriculum provides training and career development for students that have an interest in animal biology or related fields including veterinary medicine, biomedical research, laboratory animal care, companion animal-related careers, equine science, agribusiness, and livestock production and management. The biological sciences form a basis for the study and management of animals.

Options within the Animal Science Major

1. Preveterinary Medicine/Research. Rigorous instruction and experience are provided in the biological and molecular basis of animal sciences in preparation for further education in medical or graduate studies. This option fulfills the academic course requirements of most U.S. veterinary colleges. Students completing this option may also enter medical and dental schools or pursue graduate studies leading to advanced degrees.

2. Companion Animal Science. Instruction and practical experience in companion animal science (selection, breeding/reproduction, nutrition, physiology, behavior) and appropriate business courses provide students the basic knowledge and skills to manage commercial or not-for-profit companion animal science enterprises.

3. Laboratory Animal Science. Instruction and practical experience are provided in research techniques and the care and use of laboratory animals. Many graduates choose careers in animal care programs as well as research laboratories of major pharmaceutical and related industries, many of which are located in New Jersey.

4. Equine and Production Animal Science. Instruction and practical experience in equine and production animal science (selection, breeding/reproduction, nutrition, physiology, behavior) and appropriate business courses provide students with the basic knowledge and skills needed to manage commercial or research enterprises in the horse and livestock (dairy/beef, poultry, sheep, swine) industries, or pursue careers in related/supporting fields such as the feed and animal health care industries, zoos, or wildlife preserves.

Animal Science 067 (SEBS)

Learning Goals

Learning Goals

Learning goals for students who successfully complete the program in animal science:

1. Students will gain a broad knowledge of the animal science discipline to understand the future of the field and its diversity.
2. Students will apply biological and chemical principles and quantitative reasoning to concepts presented in core subject areas in animal science such as physiology, nutrition, genetics, and reproduction.
3. Students will develop an in-depth understanding of option-specific subject areas such as preveterinary medicine, equine and production animal science, companion animal science, and lab animal science.
4. Students will acquire skills for handling and caring for laboratory animals and livestock species.
5. Students will develop critical thinking skills to identify scientific questions and devise solutions, including designing experiments, analyzing and interpreting research data, and summarizing findings.
6. Students will develop oral and written communication skills to effectively deliver scientific and technical information to scientists as well as the public.
7. Students will develop an understanding of the principles of animal welfare and the ethical treatment of animals.

Animal Science 067 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

All students matriculating at SEBS must complete a goal-based Core Curriculum. The goal-based core is described here. Courses are certified for the Core Curriculum by a faculty committee. A current list of certified courses can be found here. Animal science major requirements are as described below.

For an up-to-date description of animal sciences major requirements, courses, and course sequences please refer to the program website here.

Major Requirements for All Students Regardless of Matriculation Date

A. REQUIRED COURSES (35-37)

01:119:115,116 General Biology I, II (4,4) or 01:119:101,102 General Biology (4,4)

01:119:117 Biological Research Laboratory (2)

01:160:161,162 General Chemistry I, II (4,4) or equivalent

01:160:171 Introduction to Experimentation (1)

11:067:142 Animal Science (3)

11:067:300 Integrative Physiology (4) or 01:146:356 Systems Physiology (3)

11:067:327 Animal Reproduction (3)

11:067:328 Animal Genetics (3) or 01:447:380 Genetics (4 cr)

11:067:330 Animal Nutrition (3)

11:067:331 Animal Nutrition Laboratory (1)

B. OPTIONS (42-61)

1. Preveterinary Medicine and Research (57-61)

Required Courses (35-36)

01:160:307-308 Organic Chemistry (4,4)

01:160:311 Organic Chemistry Laboratory (2)

01:640:135 Calculus I (4) or 01:640:151 Calculus for Mathematical and Physical Sciences (4)

01:750:193-194 Physics for the Sciences (4,4) or equivalent

01:960:401 Basic Statistics for Research (3)

11:115:403,404 General Biochemistry (4,3) or 01:694:407,408 Molecular Biology and Biochemistry (3,3)

11:680:390 General Microbiology (4) or 01:447:390 General Microbiology (4)

Option-specific Electives: at least three of the following (9-12):

01:146:322 Human Histology (4)

01:146:328 Human Parasitology (3)

01:146:474 Immunology (3)

01:377:213 Functional Human Anatomy (4)

01:377:424 Human Anatomy (4)

01:640:136 Calculus II (4) or equivalent

11:067:389 Companion Animal Nutrition (3)

11:067:390 Equine Nutrition (3)

11:067:391 Comparative Mammalian Anatomy (3)

11:067:398 Advanced Equine Health Care and Management (3)

11:067:404 Animal Diseases (3)

11:067:410 Neuroendocrinology (3)

11:067:416 *In Vivo* Lab Animal Techniques

11:067:430 Animal Microtechniques and Tissue Culture (4)

11:067:450 Endocrinology (4)

11:067:461 Topics in Companion Animal Science Issues (3)

11:067:490 Pathophysiology (3)

11:067:491 Reproductive and Developmental Toxicology (3)

11:067:492 Molecular and Cellular Physiology (3)

11:126:481 Molecular Genetics (3) and 11:126:482 Molecular Genetics Laboratory (4)

11:216:441 Animal Behavior (3) or equivalent

11:370:406 Medical and Veterinary Entomology (3)

Experiential Learning courses (7); no more than 6 credits from practicum or research courses.

01:090:320 Peer Instructor Education (3)

11:067:150 Introduction to Animal Handling (P/NC 1)

11:067:175 Animal Handling, Fitting, and Exhibition (P/NC 1)

11:067:176 Animal Handling, Fitting, and Exhibition Supervisor (P/NC 1)

11:067:201 Cattle Practicum (2)

11:067:202 Small Ruminant Practicum (2)

11:067:203 Swine Practicum (2)

11:067:205 Laboratory Animal Practicum (2)

11:067:207 Horse Practicum (2)

11:067:210 Introduction to Veterinary Technology (3)

11:067:260 Animal Evaluation and Selection (3)

11:067:275 Laboratory Animal Science: Management and Techniques (3)

11:067:322 Dairy Cattle Artificial Insemination (1)

11:067:350 Canine Behavior and Training (3)

11:067:406 Farm Productivity Analysis (3)

11:067:411 Studies in Animal Science (BA)

11:067:414 Teaching in Animal Science (BA)

11:067:415 Leadership in Animal Science (BA)

11:067:416 In Vivo Lab Animal Techniques (3)

11:067:493,494 Research in Animal Science (BA, BA)

11:902:300,301,400 SPIN (3-6)

11:554:487,488 George H. Cook Scholars Program (3-6, 3-6)

Animal Science Electives (6)
At least 6 additional credits approved by the adviser, depending on the student's interests and career goals. See additional courses listed in the Animal Science (067) section of the Course Listings chapter.

2. Companion Animal Science (49)

Required courses (36)

01:160:209 Elementary Organic Chemistry (3) or equivalent

01:160:211 Elementary Organic Chemistry Laboratory (1) or equivalent

01:640:115 Precalculus College Mathematics (4) or equivalent

11:115:301 Introductory Biochemistry (3)

11:115:313 Introductory Biochemistry Laboratory (1)

11:373:121,122 Principles and Applications if Microeconomics/Macroeconomics (3,3)

11:067:101 Careers in Animal Science (3)

11:067:250 Companion Animal Science (3)

11:067:404 Animal Diseases (3)

11:704:441 Animal Behavior (3)

At least two of the following (6):

01:830:311 Learning Processes (3)

01:830:313 Physiological Psychology (3)

01:830:315 Comparative Psychology (3)

11:067:310 Domestic Animal Behavior and Welfare (3)

11:067:350 Canine Behavior and Training (3)

11:067:395 Animal Assisted Therapy (3)

11:067:461 Topics in Companion Animal Science Issues (3)

11:216:240 Behavioral Biology (3)

Option-specific Electives (6):

11:067:275 Laboratory Animal Science: Management and Techniques (3)

11:067:322 Dairy Cattle Artificial Insemination (1)

11:067:336 Livestock Production and Management II (3)

11:067:384 Horse Management (3)

11:067:389 Companion Animal Nutrition (3)

11:067:390 Equine Nutrition (3)

11:067:391 Comparative Mammalian Anatomy (3)

11:067:395 Animal Assisted Therapy (3)

11:067:398 Advanced Equine Health Care & Management (3)

11:067:401 Topics in Equine Science (3)

11:067:402 Equine Exercise Physiology (3)

11:067:406 Farm Productivity Analysis (3)

11:067:410 Neuroendocrinology (3)

11:067:450 Endocrinology (4)

11:216:323 Ornithology (4)

11:216:325 Vertebrate Zoology (4)

Experiential Learning courses (7); no more than 6 credits from practicum or research courses.

01:090:320 Peer Instructor Education (3)

11:067:150 Introduction to Animal Handling (P/NC 1)

11:067:175 Animal Handling, Fitting, and Exhibition, Section DO (P/NC 1)

11:067:176 Animal Handling, Fitting, and Exhibition, Supervisor (P/NC 1)

11:067:201 Cattle Practicum (2)

11:067:202 Small Ruminant Practicum (2)

11:067:203 Swine Practicum (2)

11:067:205 Laboratory Animal Practicum (2)

11:067:207 Horse Practicum (2)

11:067:210 Introduction to Veterinary Technology (3)

11:067:275 Laboratory Animal Science: Management and Techniques (3)

11:067:322 Dairy Cattle Artificial Insemination (1)

11:067:336 Production Animal Management (3)

11:067:406 Farm Productivity Analysis (3)

11:067:411 Studies in Animal Science (BA)

11:067:414 Teaching in Animal Science (BA)

11:067:415 Leadership in Animal Science (BA)

11:067:416 *In Vivo* Lab Animal Techniques (3)

11:067:493,494 Research in Animal Science (BA,BA)

11:902:300,301,400 SPIN (3-6) in a companion animal-related field

11:554:487,488 George H. Cook Scholars Program (3-6, 3-6) or equivalent

3. Laboratory Animal Science (49)

Required Courses (36)

01:160:307-308 Organic Chemistry (4,4)

01:160:311 Organic Chemistry Laboratory (2) or 01:160:313,314 Organic Chemistry Laboratory (1,1)

01:640:115 Precalculus College Mathematics (4) or equivalent

01:960:401 Basic Statistics for Research (3)

11:067:205 Laboratory Animal Practicum (2)

11:067:275 Laboratory Animal Science: Management and Techniques (3)

11:067:404 Animal Diseases (3)

11:067:430 Animal Microtechniques and Tissue Culture (4)

11:373:121 Principles and Applications or Microeconomics (3)

11:680:390 General Microbiology (4) or 01:447:390 General Microbiology (4)

Experiential Learning courses (7); no more than 6 credits from practicum or research courses.

01:090:320 Peer Instructor Education (3)

11:067:150 Introduction to Animal Handling (P/NC 1)

11:067:175 Animal Handling, Fitting, and Exhibition (P/NC 1)

11:067:176 Animal Handling, Fitting, and Exhibition Supervisor (P/NC 1)

11:067:201 Cattle Practicum (2)

11:067:202 Small Ruminant Practicum (2)

11:067:203 Swine Practicum (2)

11:067:207 Horse Practicum (2)

11:067:210 Introduction to Veterinary Technology (3)

11:067:260 Animal Evaluation and Selection (3)

11:067:322 Dairy Cattle Artificial Insemination (1)

11:067:336 Production Animal Management (3)

11:067:406 Farm Productivity Analysis (3)

11:067:411 Studies in Animal Science (BA)

11:067:414 Teaching in Animal Science (BA)

11:067:415 Leadership in Animal Science (BA)

11:067:416 *In Vivo* Lab Animal Techniques (3)

11:067:493,494 Research in Animal Science (BA, BA)

11:902:300,301,400 SPIN (3-6)

11:554:487,488 George H. Cook Scholars Program (3-6, 3-6)

Option-specific Electives (6)

11:067:101 Careers in Animal Science (3)

11:067:322 Dairy Cattle Artificial Insemination (1)

11:067:336 Livestock Production and Management II (3)

11:067:384 Horse Management (3)

11:067:390 Equine Nutrition (3)

11:067:391 Comparative Mammalian Anatomy (3)

11:067:395 Animal Assisted Therapy (3)

11:067:398 Advanced Equine Health Care & Management (3)

11:067:401 Topics in Equine Science (3)

11:067:402 Equine Exercise Physiology (3)

11:067:406 Farm Productivity Analysis in the Animal Sciences (3)

11:067:410 Neuroendocrinology (3)

11:067:416 *In Vivo* Lab Animal Techniques (3)

11:067:450 Endocrinology (4)

11:067:490 Pathophysiology (3)

4. Equine and Production Animal Science (50)

Required courses (33)

01:640:111,112 Precalculus Pts1, 2 (2,2) or 01:640:115 Precalculus College Mathematics (4) or 01:640:135 Calculus I (4) or 01:640:151 Calculus for Mathematical and Physical Sciences (4)

11:960:285 Introductory Statistics for Business (3)

11:067:336 Production Animal Management (3)

11:067:384 Horse Management (3)

11:067:406 Farm Productivity Analysis (3)

11:373:121,122 Principles and Applications of Microeconomics/Macroeconomics (3,3) or 01:220:102,103 Introduction to Microeconomics/Macroeconomics (3,3)

11:373:231 Introduction to Marketing (3) or 11:020:305 Starting and Managing a Small Farm (3)

11:373:241 Introduction to Management (3)

33:010:272 Introduction to Financial Accounting (3) or 11:373:200 Agricultural Accounting (3)

Experiential Learning courses (7); no more than 6 credits from practicum or research courses.

01:090:320 Peer Instructor Education (3)

11:067:150 Introduction to Animal Handling (P/NC 1)

11:067:175 Animal Handling, Fitting, and Exhibition, Section HO (P/NC 1)

11:067:176 Animal Handling, Fitting, and Exhibition Supervisor (P/NC 1)

11:067:201 Cattle Practicum (2)

11:067:202 Small Ruminant Practicum (2)

11:067:203 Swine Practicum (2)

11:067:205 Laboratory Animal Practicum (2)

11:067:207 Horse Practicum (2)

11:067:210 Introduction to Veterinary Technology (3)

11:067:260 Animal Evaluation and Selection (3) 11:067:275 Laboratory Animal Science: Management and Techniques (3)

11:067:322 Dairy Cattle Artificial Insemination (1)

11:067:350 Canine Behavior and Training (3)

11:067:411 Studies in Animal Science (BA), with equine research faculty

11:067:414 Teaching in Animal Science (BA)

11:067:415 Leadership in Animal Science (BA)

11:067:416 *In Vivo* Lab Animal Techniques (3)

11:067:493,494 Research in Animal Science (BA,BA), with equine research faculty

11:902:300,301,400 SPIN (3-6), in equine-related field

11:554:487,488 George H. Cook Scholars Program (3-6, 3-6)

Option-specific Electives (6)

11:067:310 Domestic Animal Behavior and Welfare (3)

11:067:389 Companion Animal Nutrition (3)

11:067:390 Equine Nutrition (3)

11:067:391 Comparative Mammalian Anatomy (3)

11:067:398 Advanced Equine Health Care and Management (3)

11:067:401 Topics in Equine Science (3)

11:067:402 Equine Exercise Physiology (3)

11:067:404 Animal Diseases (3)

11:216:360 Animal Physiological Ecology (3)

11:373:321 Economics of Production (3)

11:375:453 Soil Ecology (3)

11:776:301 The Grain Crops (3)

11:776:440 Soil Fertility (3)

Animal Science Electives

At least 6 additional credits approved by the adviser, depending on the student's interests and career goals. See additional courses listed in the Animal Science (067) section of the Course Listings chapter. Suggested courses are:

11:020:210 Introduction to Agriculture and Food Systems (3)

11:067:101 Careers in Animal Science (3)

11:067:260 Animal Evaluation and Selection (3), also EL

11:067:250 Companion Animal Science (3)

11:067:275 Lab Animal Science: Management and Techniques (3)

11:067:295 Biosecurity in Animal Agriculture (3)

11:067:296 Honors Seminar (3)

11:067:310 Domestic Animal Behavior and Welfare (3)

11:067:322 Dairy Cattle Artificial Insemination (1)

11:067:391 Comparative Mammalian Anatomy (3)

11:067:410 Neuroendocrinology (3)

11:067:430 Animal Microtechniques and Tissue Culture (4)

11:067:450 Endocrinology (4)

11:067:490 Pathophysiology (3)

11:067:491 Reproductive and Developmental Toxicology (3)

11:067:492 Molecular and Cellular Physiology (3)

11:373:205 Small Business Essentials (3)

11:776:200 Modern Crop Production (3)

11:776:221 Principles of Organic Crop Production (3)

C. UNSPECIFIED ELECTIVES

In addition to courses meeting the above requirements, students can take other courses offered by the university, for which they meet the course eligibility requirements, to bring their total number of credits to the minimum of 120 (matriculated 2018 or later) or 128 (matriculated prior to 2018) required for graduation.

Biochemistry 115 (SEBS)

BIOCHEMISTRY 115

Degree: B.S.

Director: Lori A. White (lori.white@rutgers.edu)

Undergraduate Program Website: Here

Department Managing the Undergraduate Program in Biochemistry: Biochemistry and Microbiology

Department Chair: Max Haggblom

Department Website: Here

The biochemistry major provides students with an integrated education in biochemistry that brings together the basics of biochemistry and its application to biological systems. The major takes advantage of the diversity of molecular/biochemical research and coursework that is offered at Rutgers School of Environmental and Biological Sciences (SEBS) and the other schools. Students will apply their basic understanding of biochemistry to a specific area of interest, ranging from toxicology/pharmacology to food and nutritional sciences, microbiology, animal science, and plant biology. This redesigned and enhanced curriculum follows the recommendations of the American Society for Biochemistry and Molecular Biology (ASBMB) and has components of both a traditional course-centered approach to teaching and the more current content- and outcome-centered approach. The purpose of the major is to prepare students for futures in science, either through obtaining advanced degrees or through entering the workforce in the pharmaceutical, biotechnological and chemical industries, government service, communications, law, and many other fields.

Learning Goals

Learning Goals

Upon graduation, students will have an understanding of the following:

1. Biochemistry graduates will be able to describe and discuss the basic concepts of biochemistry, including metabolism, enzymatic structure and function, and regulation of gene and protein expression.
2. Biochemistry Major graduates will be able to apply the scientific method, stating and testing a hypothesis, and will be able to design experiments to solve problems in biochemistry.

3. Graduates will gain hands-on experience in current biochemical techniques and be able to evaluate and present scientific data.
4. Upon completion, students will be able to critically analyze scientific data and scientific papers and be able to be effective science communicators
5. Graduates will be able to discuss and communicate a fundamental understanding of ethical and current issues in biochemistry and demonstrate an understanding of the importance of ethics in scientific research.

Biochemistry 115 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

Students matriculating prior to the fall semester 2015 in the School of Environmental and Biological Sciences (SEBS) must complete the SEBS general education requirements. In addition, students majoring in biochemistry must complete the major requirements described below.

Students matriculating fall 2015 or after and transfer students matriculating in 2016 and after must complete a goal-based Core Curriculum in place of general education requirements. The goal-based core is described here. Courses are certified for the Core Curriculum by a faculty committee. A current list of certified courses can be found here. Biochemistry major requirements are as described below.

For an up-to-date description of biochemistry major requirements, courses, and course sequences please refer to the program webpage.

Proficiency in Biochemistry (90 credits)

The major in Integrated biochemistry consists of the six parts listed immediately below. They are described briefly here; the specific requirements are listed below.

- **Life and Physical Sciences Core**
  These courses prepare students to enter the major. These courses are normally completed in the first two years of college.
- **Quantitative Methods**
  Quantitative reasoning, computational facility, and a grasp of calculus are essential skills for people to be well educated in molecular biosciences. As with the life and physical sciences core, students should normally complete this requirement within the first two years of college.
- **Biochemistry Core**
  This set of courses is required for all majors and prepares the student for both advanced coursework and research experience.
- **Professional Ethics**
  Ethical conduct has at least two components: general ethical behavior and the ethical implications for society at large as a consequence of advances in biochemistry. Although Contemporary Issues in Biochemistry will meet the formal requirement, all courses within the major will include ethical components and examples. In addition, all students in the major and in any of our courses will be required to adhere to a strict honor code.

- **Major-Related Experiential Learning**
  It is important that students be able to apply their knowledge of biochemistry in a laboratory setting. Therefore, all students will be required to take 6 credits of Experiential Learning. The School of Environmental and Biological Sciences requires 3 cr for graduation; therefore, Biochemistry Majors take an additional 3 cr. This can be accomplished through working in an academic laboratory at Rutgers, either at SEBS or the other campuses. This requirement can also be met through the George H. Cook Honors program, the General Honors Program, the Aresty Program, summer research opportunities (RISE or SURF), or through research experience through the Student Professional Internship Network (SPIN). The Research Experience may be structured to satisfy the college's experiential learning requirement.

- **Biochemistry Options**
  - **Biochemistry of Microbial Systems**
    This option blends biochemistry with microbiology, allowing students to become proficient in the biochemistry of microbial organisms and systems. This will include aspects of clinical microbiology and infection, as well as environmental microbiology. Microbial infections of higher organisms are of continuing importance in human and animal health. Microorganisms also have profound environmental implications. Microbial systems detoxify toxic substances and contribute to nutrient cycling in the ecosphere. Another area of study is the use of microbial organisms to synthesize useful materials and to convert biomass to fuels.
  - **Biochemical Toxicology**
    This option will allow the student to gain specific understanding of the study of toxic compounds. Toxicology is of critical importance in food and nutrition, the environment, and in pharmacological science. Understanding the biochemical effects allows one to design appropriate treatments of illness, and to learn what exposures must be avoided. An equally important second purpose, the study of how biochemical systems are made to go awry by toxic substances, illuminates normal functioning and development of organisms. This understanding applies equally to all animals, including humans, as well as to plants and microorganisms. It applies also to ecological communities of organisms, as toxic substances alter the interactions within ecosystems.
  - **Biochemistry of Plant Systems**
    Plants are not only at the root of the human and animal food chains, they are one of the dominant components of the planet's ecosphere. Understanding their biochemistry is a large and growing area of basic and applied research and public policy development.
  - **Protein and Structural Biochemistry**
    Biochemistry stands on two legs: structure and function. Neither can be understood without the other. The principles that confer thermodynamic stability--or the lack of it--on proteins, nucleic acids, and other biomolecules are universal to all forms of life as are the principles by which enzyme catalysis and other functions arise from three-dimensional structure. Evolution drives the formation of structure based on the functional needs of the organism and on the prior constraints imposed by the species' evolutionary history. In addition to basic understanding, study in this area develops the bases for protein design to solve practical problems.
- **Detailed Requirements**

I. Life and Physical Sciences Core
The following are required
01:119:115/116 General Biology I, II (4,4)

01:119:117 Biological Research Laboratory (2)
01:160:161,162 General Chemistry I, II (4,4) or equivalent
01:160:171 Introduction to Experimentation (1)
01:750:193,194 Physics for the Sciences* (4,4) or
01:750:201,202 Extended General Physics (5,5) or
01:750:203,204 General Physics I, II (3,3)
01:160: 307,308 or 315,316 Honors Organic Chemistry I, II (4,4)
01:160:309 (2.5) or 311 Organic Chemistry Laboratory (2)
01:447:380 Genetics (4)

II. Quantitative Core
01:640:135 Calculus I for the Life & Social Sciences (4) OR
01:640:151 Calculus I for Mathematical & Physical Science (4)
01:640:136 Calculus II for the Life & Social Sciences (4) OR
01:640:152 Calculus II for Mathematical & Physical Science (4) OR
01:960:401) Basic Stats for Research (4) OR
01:960:211 Statistics I (4) and 01:960:212 Statistics II (4)
**FOR PROTEIN AND STRUCTURAL BIOLOGY OPTION Calc II is Required.

III. Biochemistry Core
11:115:201 Contemporary Issues in Biochemistry** (2)
11:115:403/404 General Biochemistry I, II (4,3)
Note: To enroll in 11:115:403,404 General Biochemistry (4,3), students, be they majors in biochemistry or not, must have completed 01:160:307-308 Organic Chemistry (4,4) or 160:315-316 Honors Organic Chemistry with grades of C or higher.
11:115:413/414 Experimental Biochemistry I, II (3,3)
11:115:409 Principles of Biophysical Chemistry (3) or
01:160:341Phys Chem Bio System (3)
11:115:491 Biochemical Communications (3)

***Normally taken in the sophomore year. Transfer students entering in the fall of the junior year will take it in the fall of that year. Among other matters included in it, this class will satisfy the ethics requirement for biochemistry majors.*

IV. Upper Level Lab Courses(two of the following courses)
11:115:436 Molecular Toxicology (3)
11:680:494 Applied Microbiology (4)
11:126:383 Nucleotide Sequence Analysis (3)
11:126:482 Molecular Genetics Laboratory (4)
11:126:484 Tools for Bioinformatic Analysis (3)
11:126:485 Bioinformatics (3)
11:776:452 Plant Tissue Culture (3)
01:146:357 Systems Physiology Lab (1)
01:160:251 Analytical Chemistry (3)
11:115:493/494 Research Problems in Biochemistry (3)
01:198:111 Intro to Comp Sci (3)
01:198:142 Data 100 Data Literacy (3)

V. Ethics
11:115:201 Contemporary Issues in Biochemistry (3)
11:115:321 Ethical Issues in Biochemical Research (3)
11:015:405 Ethics in Science (3)
11:015:433 Critical Scientific Thinking (3)
01:730:249 Bioethics (3)

VI. Research Experience (3 cr)
The curriculum is designed to provide students with the basics of laboratory experimentation followed by independent research experience in a research lab. A minimum of two semesters of research is required. With the approval of the undergraduate program director, Experiential Learning may be accepted to meet this requirement. Biochemical Communications provides the opportunity for students to present their own research, in both written and oral formats, as well as research from the biochemical literature.

11:115:493,494 (Research Problems in Biochemistry May be replaced by 11:015:497, 498 George H. Cook Honors Research,11:554:302 Aresty Research Assistantship

VII. Options:
Requires four classes from the specific lists below. Biochemistry electives, including option requirements, must equal at least 12 credits.
*Course(s) indicated by an * in each option is(are) required.*

Biochemistry of Microbial Systems
11:115:423 Fundamentals of Genomics (3)
11:680:390 General Microbiology (4)*
11:680:494 Applied Microbiology (4)
11:680:475 Microbiomes and Health (3)
11:680:480 Microbial Genetics and Genomics (3)
11:680:481 Microbial Physiology (3)
11:067:490 Pathophysiology (3)
11:126:486 Analytical Methods in Microbiology (3)
11:126:407 Comparative Virology (3)
11:126:481 Molecular Genetics (3)
01:146:481 Virology (3)
01:146:474 Immunology (3)
11:216:405 Evolution in Infectious Disease (3)
11:400:423 Food Microbiology

Biochemical Toxicology
11:115:421 Biochemistry of Cancer (3)
11:115:422 Biochemical Mechanisms of Toxicology (3)*
11:115:436 Molecular Toxicology Laboratory (3)
11:067:450 Endocrinology (4)
11:067:300 Integrative Physiology (4)
11:067:301 Integrative Physiology Lab (1)
11:067:490 Pathophysiology (3)

11:067:491 Reproductive and Developmental Toxicology (3)
01:146:356 Systems Physiology (3)
01:146:474 Immunology (3)
11:126:481 Molecular Genetics (3)
01:146:245 Fundamentals Of Neurobiology (3)
01:146:270 Fundamentals of Cell and Developmental Biology (3)
01:146:295 Essentials of Cell Biology and Neurobiology (3)
01:146:445 Advanced Neurobiology I (3)
01:146:447 Advanced Neurobiology II (3)

Biochemistry of Plant Systems
11:115:423 Fundamentals of Genomics (3)
16:765:520 Plant Biochemistry and Metabolism (3)*
11:776:382 Plant Physiology (4)
11:776:302 General Plant Pathology (3)
11:776:312 Medicinal Plants (3)
11:776:242 Plant Science (3)
11:776:305 Plant Genetics (4)
11:776:312 Medicinal Plants (3)
11:776:415 Hemp and Medical Cannabis (3)
11:776:403 Plant Science Techniques (3)
11:776:415 Fungi and Human Health (3)
11:776:438 Plants and Human Health (3)
11:776:452 Plant Tissue Culture & Engineering (3)

Protein and Structural Biochemistry
11:115:423 Fundamentals of Genomics (3)
11:115:485 Advanced Methods for 3D Structure Determination of Biomolecules (3)
11:216:405 Evolution in Infectious Diseases (3)
01:160:344 Introduction to Molecular Biophysics Research (3)
01:160:410 Introduction to Molecular Modeling (3)
01:160:418 Bioorganic Mechanisms (3)
01:160:480 Structural Biology, Structural Biophysics, and Chemical Biology of Transcription (3)01:640:251 Multivariable Calculus III (4)
01:694:412 Proteomics and Functional Genomics (3)
01:694:413 Chromatin and Epigenomics: The Science of Chromatin Modifications in Development and Disease (3)
01:160:480 Structural Biology, Structural Biophysics, and Chemical Biology (3)
11:115:485 Structural Biochemistry (3)

General Option (12 cr total)
12 credits of classes taken from any of the above lists

Unspecified Electives
In addition to courses meeting the above requirements, students can take other courses offered by the university, for which they meet the course eligibility requirements, to bring their total number of credits to the minimum of 120 (matriculated 2018 or later) or 128 (matriculated prior to 2018) required for graduation.

Bioenvironmental Engineering 117 (SEBS)

BIOENVIRONMENTAL ENGINEERING 117

Degrees: B.S., School of Engineering; B.S., School of Environmental and Biological Sciences

Department Managing the Undergraduate Program: Department of Environmental Sciences

Department Chair: Donna Fennell

Departmental Website: Here

Undergraduate Program Director: A.J. Both

Undergraduate Program Website: Here

Program Description

Beginning in fall 2020, Bioenvironmental Engineering 116 (4-year) and Bioenvironmental 117 (5-year) will be replaced by Environmental Engineering 366, a joint SEBS and SoE program.

Bioenvironmental engineering utilizes engineering principles and the physical, chemical, and biological sciences to prevent and solve environmental problems related to human activities. This program prepares students for immediate employment as practicing engineers with engineering consulting firms; drinking water, wastewater, solid waste, and air pollution treatment facilities; manufacturing industries; environmental regulatory and planning agencies; research laboratories; international development agencies, and public-interest groups. The undergraduate program in BioEnvironmental Engineering is accredited by the Engineering Accreditation Commission of ABET, under the commission's General Criteria and Program Criteria for Environmental Engineering. This enables graduates to take examinations leading to a professional engineering license. The bioenvironmental engineering curriculum provides a strong foundation in engineering and physical, chemical, and biological sciences during the first two years. In the upper-level major courses of the program, these fundamentals are applied to multidisciplinary problem solving in various environmental fields.

Bachelor of science degrees from the School of Engineering and the School of Environmental and Biological Sciences are awarded upon completion of the five-year curriculum. A four-year program of study in bioenvironmental engineering is offered jointly by the School of Engineering and the School of Environmental and Biological Sciences starting in fall 2020.

Bioenvironmental Engineering 117 (SEBS)

Learning Goals

Learning Goals

Website: Here

Program Educational Objectives

- Graduates will meet the expectations of employers of environmental engineers.
- Qualified graduates will pursue advanced study if they so desire.
- Graduates will pursue leadership positions in their profession and/or communities.

Student Outcomes

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Bioenvironmental Engineering 117 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

Students must complete both, the SEBS Undergraduate Core Curriculum and the graduation requirements for the major as described below.

For an up-to-date description of the bioenvironmental engineering major requirements, courses, and course sequences please refer to the program webpage here.

SEBS UNDERGRADUATE CORE CURRICULUM (39 credits)

Contemporary Challenges(6 credits)*Two courses, one in each of the Contemporary Challenges areas: Diversities and Social Inequalities*[CC-D] *and Our Common Future*[CC-O]

Experiential Learning (3 credits) *Students must participate in a certified experience that meets this goal* [EL]

Natural Sciences (6 credits)*Students must take two courses, one each in two of the following areas: physical, biological, or environmental sciences*[NS]

Historical Analysis (3 credits)*Students must take one course* [HST]

Social Analysis (6 credits) *SEBS students must complete two courses, one in either social/cultural analysis or economic analysis, and one in governmental and regulatory analysis*[SCL]

Arts and Humanities(3 credits)*Students must complete one course* [AH]

Writing and Communication(6 credits)*Students must take 01:355:101 or its equivalent [WC] and one course that fulfills the learning goal to communicate effectively in modes appropriate to a discipline or area of inquiry*[WCD]

Quantitative and Formal Reasoning (6 credits) *Students must take two courses* [QQ; QR]

Graduation Requirements for the Major (129 credits)

A. REQUIRED COURSES (117 credits)

01:119:103 Principles of Biology (4) a)
01:160:159-160 General Chemistry for Engineers (3,3) a)
01:160:171 Introduction to Experimentation (1)
01:160:209 Elementary Organic Chemistry (3)
01:160:211 Elementary Organic Chemistry Laboratory (1)
01:640:151-152 Calculus for Mathematical and Physical Sciences (4,4) b)
01:640:244 Differential Equations for Engineering and Physics (4)
01:640:251 Multivariable Calculus (4)
01:750:123-124 Analytical Physics I (2,2)
01:750:227 Analytical Physics IIA (3) a)
01:750:229 Analytical Physics IIA Laboratory (1)
11:117:100 Introduction to Bioenvironmental Engineering (1)
11:117:333 Environmental Engineering Tools (3)
11:117:413,414 Unit Processes in Environmental Engineering I, II (3,3)
11:117:423,424 Environmental Unit Processes Laboratory I, II (1,1)
11:117:462 Design of Solid Waste Treatment Systems (3)
11:117:468 Hazardous Waste Treatment Engineering (3)
11:117:474 Air Pollution Engineering (3)
11:117:488,489 Environmental Engineering Design I, II (2,2) c)
11:216:351 Principles of Ecology (3)
11:374:279 Politics of Environmental Issues (3) d)
11:374:460 Environmental Law and Policy I (3)
11:375:201 Biological Principles of Environmental Sciences (3)
11:375:202 Chemical Principles of Environmental Sciences (3)
11:375:203 Physical Principles of Environmental Sciences (3)
11:375:303 Numerical Methods in Environmental Science (3) (or 300+ level statistics course)
11:375:423 Environmental Fate and Transport (3)
11:670:453 Air Quality Modeling (3) (or 11:375:322 Energy Technology and Its Environmental Impact)
11:680:201 Introduction to Microbiology (3)
14:180:215 Engineering Graphics (1)
14:180:243 Mechanics of Solids (3)
14:180:387 Fluid Mechanics (3)

14:180:389 Fluid Mechanics Laboratory (1)
14:440:127 Introduction to Computers for Engineers (3)
14:440:221-222 Engineering Mechanics (3,3)
14:540:343 Engineering Economics (3)
14:650:351 Thermodynamics (3)

B. ELECTIVES (12 credits must be fulfilled)

01:460:414 Hydrologic Processes (3)
01:460:428 Hydrogeology (3)
01:640:250 Introductory Linear Algebra (3)
01:640:350 Linear Algebra (3)
01:750:326 Computer-Based Experiments (4)
01:750:327 Modern Instrumentation (3)
11:117:450 Applied Instrumentation and Control (4)
11:117:494 Contaminant Hydrogeology Engineering (3)
11:117:495 Surface Water Quality Engineering (3)
11:117:496 Planning and Design of Land Treatment Systems (3)
11:117:497,498 Special Problems in Environmental Engineering (Up to 6 credits count toward technical electives)
11:375:312 Environmental Microbiology Laboratory (3)
11:375:322 Energy Technology and its Environmental Impacts (3)
11:375:340 Environmental Applications of Organic Chemistry (3)
11:375:346 Introduction to Atmospheric Chemistry (3)
11:375:360 Soils and Water (4)
11:375:407 Environmental Toxicology (3)
11:375:411 Environmental Microbiology (3)
11:375:421 Fundamentals of Air Pollution (3)
11:375:424 Air Sampling and Analysis Techniques (3)
11:375:430 Hazardous Wastes (3)
11:375:434 Principles of Industrial Hygiene (3)
11:375:444 Water Chemistry (3)
11:375:453 Soil Ecology (3)
11:573:232, 233 Fundamentals of Environmental Geomatics (3) and Laboratory (1) (4)
11:670:102 Introduction to Climate Science (3)
11:670:323 Thermodynamics of the Atmosphere (3)
11:670:324 Dynamics of the Atmosphere (3)
11:670:453 Air Quality Modeling (3)
11:680:390 General Microbiology (4)
14:180:372,374 Soil Mechanics (3) and Laboratory (1) (4)
14:180:382 Hydraulic and Environmental Engineering (3)
14:180:443 Advanced Hydraulics (3)
14:180:448 Elements of Hydrology (3)
14:650:462 Power Plants (3)
14:650:481 Heat Transfer (3)
14:xxx:2xx/3xx/4xx 200+ level engineering courses

Notes:

a) Fulfills Natural Sciences [NS] requirement of SEBS Core Curriculum (6 credits).
b) Fulfills Quantitative and Formal Reasoning [QQ, QR] requirement of SEBS Core Curriculum (6 credits).
c) Fulfills Experiential Learning [EL] requirement of SEBS Core Curriculum (3 credits).
d) Partially fulfills Social Analysis [SCL] and Contemporary Challenges [CC-O] requirements of SEBS Core Curriculum (6 credits).

Unspecified Electives
In addition to courses meeting the above requirements, students can take any other courses offered by the university, for which they meet the course eligibility requirements, to bring their total number of credits to the minimum of 159 required for graduation in bioenvironmental engineering.

Biological Sciences 119 (SEBS)

BIOLOGICAL SCIENCES 119

Degree: B.A.

Program Director: Martha Haviland (haviland@biology.rutgers.edu)

Director of Advising: Anne Carr-Schmid (schmid@biology.rutgers.edu)

Adviser: Joseph Ventola (ventola@rutgers.edu)

Students in the School of Environmental and Biological Sciences (SEBS) may choose the major in biological sciences, which is offered by the School of Arts and Sciences (SAS). Completion of the major prepares students for graduate study; for careers in government, industry, or secondary school teaching; and also satisfies the entrance requirements for medical and dental schools.

Students interested in more specialized majors in the life/biological sciences (such as agriculture and food systems; animal science; biochemistry; biotechnology; cell biology and neuroscience; ecology, evolution, and natural resources; exercise science; food science; genetics; marine sciences; microbiology; molecular biology and biochemistry; nutritional sciences; or plant biology) should refer to the relevant sections of the catalog and should also contact the program coordinator or adviser for the specific major of interest.

Learning Goals

Learning Goals

Our overarching goal for educating our students majoring in biological sciences is to inspire them to want to discover and understand the natural world. In the process of achieving this goal, we expect our students to acquire

not only facts and concepts but also skills and perspectives. We hope that our learning goals will both prepare our students for a variety of career objectives and supply them with the tools to become lifelong learners in the ever-evolving world of biological sciences.

Learning Goals

I. To acquire the appropriate factual and conceptual knowledge that provides students with a foundation to further their education and career in the areas of life science or health science. Students will be able to demonstrate basic knowledge (e.g., identify, define, explain, etc.) of the concepts, practices, and principles that comprise the biological sciences.

II. To develop data analysis and statistical reasoning skills that prepare students for a society increasing reliant on the use of data and information. Students will be able to interpret/evaluate patterns in data presented in tables, figures, and graphs as well as be able to organize, summarize, and present data.

III. To develop the ability to use scientific reasoning as embodied by the structured process commonly known as the scientific method to empower students with the ability to generate and refine knowledge. Students will be able to evaluate and apply the practice of science.

IV. To develop critical thinking and problem-solving skills appropriate to prepare students to evaluate, synthesize, and generate knowledge that provides them with a competitive advantage to adapt to an evolving, global, and knowledge-based society. Students will be able to demonstrate application of higher order thinking (e.g., classify, diagnose, evaluate, synthesize, hypothesize, etc.). Students will develop an understanding of not only the connections within biology but also the connections between biology and other scientific disciplines.

Biological Sciences 119 (SEBS)

Entry Requirements for the Major

Entry Requirements for the Major

Students wishing to major in biological sciences must have completed two semesters of General Biology and the Biological Research Laboratory with a grade of C or better in each course. Both semesters of General Biology must have been completed at the same institution or on the same campus at Rutgers. No more than two courses with a grade of D may be used to fulfill the requirements of the major. A 2.0 GPA must be maintained in the life sciences core and elective courses applied toward the major. Students must meet with an adviser before they can successfully declare their major.

Biological Sciences 119 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

A. Major Requirements (73 credits)

The major in biological sciences is offered by the School of Arts and Sciences (SAS). It involves 49 credits of required life science core courses, and 24 credits of approved life science electives. No more than two courses with a grade of D may be used to fulfill the requirements of the major. Please refer to the SAS section of the catalog for the Life Sciences for a full description of the requirements of the major.

B. Additional SEBS Requirements for Students Majoring in Biological Sciences

School of Environmental and Biological Sciences (SEBS) biological sciences majors matriculating fall 2015 or after and transfer students matriculating in 2016 must complete a goal-based Core Curriculum. A current list of certified courses can be found here.

SEBS biological sciences majors matriculating prior to the fall semester 2015 must complete major requirements as described in the SAS section of the catalog for the Life Sciences as well as the general education requirements.

Biotechnology 126 (SEBS)

BIOTECHNOLOGY 126

Degree: B.S.

Director: Paul Meers (paul.meers@rutgers.edu)

Program Website: Here

The field of biotechnology has emerged as a major contributor to the advancement of agriculture, medicine, and environmental sciences. Recent developments in biotechnology, particularly molecular biology, promise major improvements in agricultural productivity, breakthroughs in human health care, and new solutions to environmental problems.

The biotechnology curriculum is designed to provide students with fundamental knowledge and laboratory skills in biotechnology, including applied genetics, molecular biology, biochemistry and a firm foundation in biology and the physical sciences. The primary objectives of the program are to broadly educate students for positions in the rapidly developing biotechnology industry and to prepare students for graduate and graduate/professional study in the life sciences. The strong life and physical sciences foundation of the curriculum involves extensive laboratory and coursework and research experience, as well as specializations in the following fields: animal biotechnology, microbial biotechnology, plant biotechnology, bioinformatics, and bioscience policy and management.

Biotechnology 126 (SEBS)

Learning Goals

Learning Goals

As a biotechnology major, each student will:

1. be able to describe the basic molecular concepts essential for understanding the field of biotechnology and the applications of biotechnology;

2. demonstrate proficiency in using the tools of biotechnology in an applied laboratory setting;
3. be able to find and read published scientific research in biotechnology and summarize and communicate that research effectively and critically;
4. acquire knowledge of ethical aspects of biotechnology and be able to analyze alternate viewpoints; and
5. learn to work as a team in the laboratory setting or group presentations.

By achieving these goals the student will have the knowledge base, technical proficiency, and communication skills for postbaccalaureate employment in the biotechnology field or for graduate/professional advanced education.

Biotechnology 126 (SEBS)

Entry Requirements for the Major

Entry Requirements for the Major

To take biotechnology (11:126) courses, students must have completed 01:119:115 General Biology and 01:160:161 General Chemistry with grades of C or better and achieved a cumulative grade-point average of 2.0 or higher. Students whose cumulative grade-point average falls below 2.0 will be allowed one semester to restore the average to 2.0 or higher.

Biotechnology 126 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

For an up-to-date description of biotechnology major requirements, courses, and course sequences please refer to the program webpage.

SEBS UNDERGRADUATE CORE CURRICULUM (39 credits)

Contemporary Challenges (6 credits) *Two courses, one in each of the Contemporary Challenges areas: Diversities and Social Inequalities* [CC-D] *and Our Common Future* [CC-O]

Experiential Learning (3 credits) *Students must participate in a certified experience that meets this goal* [EBE]

Natural Sciences (6 credits) *Students must take two courses, one each in two of the following areas: physical, biological, or environmental sciences* [NS]

Historical Analysis (3 credits) *Students must take one course* [HST]

Social Analysis (6 credits) *SEBS students must complete two courses, one in either social/cultural analysis or economic analysis, and one in governmental and regulatory analysis* [SCL]

Arts and Humanities (3 credits) *Students must complete one course* [AH]

Writing and Communication (6 credits) *Students must take 01:355:101 or its equivalent [WC] and one course that fulfills the learning goal, communicate effectively in modes appropriate to a discipline or area of inquiry* [WCD].

Quantitative and Formal Reasoning (6 credits) *Students must take two courses* [QQ; QR]

Major Requirements for All Students Regardless of Matriculation Date

Proficiency in Biotechnology (70-74 credits)

Courses usually taken first year that are prerequisites for many required biotechnology courses (22):

- 01:355:101 Expository Writing (3) - required before or concurrently with General Biology 1
- 01:119:115 General Biology 1 (4) and 01:119:116 General Biology 2 (4)
- 01:119:117 General Biology Laboratory (2)
- 01:160:161 General Chemistry 1 (4) and 01:160:162 General Chemistry 2 (4)
- 01:160:170 Introduction to Experimentation (1)

Further courses for proficiency in biotechnology:

Quantitative Skills (7-8)

- 01:640:135 Calculus 1 (4)
- 01:960:401 Basic Statistics for Research (3)* or 01:640:136 Calculus 2 (4) or 01:960:212 Statistics II (3) (this course has prereqs)

*Basic Statistics for Research 01:960:401 (or equivalent - 01:960:212) required for bioinformatics option (see below)

Computer and information technology competence (3)

- 11:126:383 Nucleotide Sequence Analysis (3)

Professional Ethics (1.5)

- 11:126:111 Ethical and Scientific Challenges in Biotechnology (3)** or with approval,11:126:110 Concepts and Issues in Biotechnology (1.5)

***11:126:111 is certified in SEBS core curriculum categories NS-1 and -2 (natural science) and CCO-2 (contemporary challenges)*

Other biotechnology required courses:

- 01:447:380 Genetics (4) or 11:776:305 Plant Genetics (4) (only for plant biotechnology option)
- 11:680:390 General Microbiology (4)
- 01:750:193-194 Physics for the Sciences (4,4) or equivalent**
- 01:160:307-308 Organic Chemistry (4,4)**
- 11:115:403-404 General Biochemistry (4,3) or equivalent
- 11:115:313 Introductory Biochemistry Laboratory (1)

- 11:126:481 Molecular Genetics (3)
- 11:126:482 Molecular Genetics Laboratory (4)
- 11:126:401 Seminar in Biotechnology (1.5)
- 11:126:427 Methods and Applications in Molecular Biology (4)

**If Basic Statistics for Research is chosen to satisfy the Quantitative Skills requirement, it cannot also be used as an option elective.*

***Physics for the Sciences requires coregistration in a 0-credit laboratory section. If students opt for the 01:750:203-204 General Physics 1 and 2 sequence instead, they must also take a corresponding lab section in 01:750:205 and 206. Students intending to apply to medical or dental school and certain Ph.D. programs should be aware that many professional schools and some graduate schools require two semesters of calculus and 01:160:311 Organic Chemistry Laboratory and a physics laboratory.*

B. OPTIONS (14-18)

General Biotechnology (15-17)

Required Courses
Choose one of the following:
11:067:430 Animal Microtechniques and Tissue Culture (4)
or
11:776:452 Plant Tissue Culture (3)

Choose one of the following courses (3):
01:146:474 Immunology (3)
11:115:421 Biochemistry of Cancer (3)
11:115:422 Biochemical Mechanisms of Toxicology (3)
11:115:436 Molecular Toxicology Lab (3)
11:115:452 Biochemical Separations (3)
11:126:407 Comparative Virology (3)
11:126:484 Tools for Bioinformatic Analysis (3)
11:126:485 Bioinformatics (3)
11:126:486 Analytical Methods in Microbiology (3)
11:680:480 Microbial Genomics (3)
11:776:410 Plants for Bioenergy (3)
11:776:486 Functional Genomics for Research (3)

Electives (9-10)
Three additional electives from the required and elective courses listed in each of the
six biotechnology curriculum options. One to three credits of Research in Biotechnology may be substituted for an equal number of credits of elective work.

Animal Biotechnology (16-17)

Required Courses (7)
Two courses:
11:067:300 Integrative Physiology (3) or
11:067:492 Molecular and Cellular Physiology (3)
11:067:430 Animal Microtechniques and Tissue Culture (4)

Electives (9-10) - Choose from the following courses:
11:067:327 Animal Reproduction (3)
11:067:450 Endocrinology (3)
11:067:492 Molecular and Cellular Physiology (3)
11:126:407 Comparative Virology (3)
11:126:410 Process Biotechnology (3)
11:126:484 Tools for Bioinformatic Analysis (3)
11:126:485 Bioinformatics (3)
11:709:400 Advanced Nutrition I (3)
11:709:401 Advanced Nutrition II (3)
11:146:474 Immunology (3) with or without 01:146:475 Immunology Lab (1)
01:447:451 Genomes (3)
01:447:481 Topics in Human Genetics (3)
01:447:486 Evolutionary Genetics (3)
01:447:495 Cancer (3)
01:694:412 Proteomics and Functional Genomics (3)
01:694:492 Gene Regulation of Cancer and Development (3)
01:960:401 Basic Statistics for Research (3)
11:115:421 Biochemistry of Cancer (3)
11:115:422 Biochemical Mechanisms of Toxicology (3)
11:115:436 Molecular Toxicology Lab (3)
11:115:452 Biochemical Separations (3)
11:776:486 Functional Genomics for Research (3)

One to three additional credits of research in biotechnology may be substituted for an equal number of credits of elective work.

Bioinformatics (17)

Bioinformatics option students should take 01:640:135 Calculus 1 and 01:960:401 Basic Statistics for Research to satisfy their quantitative skills requirement.

Required Courses (17)
01:198:111 Introduction to Computer Science (4) or equivalent
01:198:112 Data Structures (4)
11:126:484 Tools for Bioinformatic Analysis (3) or 11:776:486 Functional Genomics for Research (3)
11:126:485 Bioinformatics (3)

Elective (3)
Choose from the general biotechnology electives or one approved programming course (suggested). Students in the option who would like to take Calculus 2 to meet medical school or graduate school requirements may use that course for this elective.

Bioscience Policy and Management (18)

Required Courses (15)
11:373:121 Principles and Applications of Microeconomics (3)
11:373:231 Introduction to Marketing (3)
11:373:241 Introduction to Management (3)
11:373:403 Innovation and Entrepreneurship (3)
11:373:404 Bioscience Policy (3) or suitable alternative

Electives (3)
One course from **either** of the following areas of concentration:

Business Management Concentration:
11:373:351 Business Finance I (3)
11:373:352 Economics of Futures Markets (3)
11:373:402 Global Marketing (3)
11:373:451 Business Finance II (3)
OR
Bioscience Policy Concentration:
11:373:323 Public Policy toward the Food Industry (3)
11:374:341 Social and Ecological Aspects of Health and Disease (3)
11:373:371 Food Health and Safety Policy (3)

Microbial Biotechnology (15.5-17)

Required courses (7)
11:680:494 Applied Microbiology (4)
and at least one from the list:
11:680:480 Microbial Genetics and Genomics (3)
or
11:680:481 Microbial Physiology (3)
or
11:680:491 Microbial Ecology and Diversity (3)

Electives (8.5-10)
01:146:328 Human Parasitology (3)
01:146:329 Human Parasitology Laboratory (1)
01:146:470 Advanced Cell Biology (3)
01:146:474 Immunology (3)
01:146:475 Laboratory in Immunology (1)
01:447:495 Cancer (3)
11:067:430 Animal Microtechniques and Tissue Culture (4)

11:067:492 Molecular and Cellular Physiology (3)
11:115:452 Biochemical Separations (3)
11:126:407 Comparative Virology (3)
11:126:410 Process Biotechnology (3)
11:126:486 Analytical Methods in Microbiology (4)
11:375:411 Environmental Microbiology (3)
11:400:419 Food Physical Systems (3)
11:400:423 Food Microbiology (3)
11:400:424 Food Microbiology Laboratory (1)
11:680:480 Microbial Genomics (3)
11:680:481 Microbial Physiology (3)
11:680:491 Microbial Ecology and Diversity (3)
11:680:492 Microbial Ecology and Diversity Laboratory (2)
11:126:484 Tools for Bioinformatic Analysis (3)
11:126:485 Bioinformatics (3)
11:776:486 Functional Genomics for Research (3)

One to three additional credits of research in biotechnology may be substituted for an equal number of credits of elective work.

Plant Biotechnology (15-16)

Required courses (6)
11:776:242 Plant Science (3)
11:776:452 Plant Tissue Culture and Engineering (3)

Electives, three courses (9-10):
01:146:470 Advanced Cell Biology (3)
01:694:492 Gene Regulation of Cancer and Development (3)
01:960:401 Basic Statistics for Research (3)
11:115:452 Biochemical Separations (3)
11:126:407 Comparative Virology (3)
11:126:410 Process Biotechnology (3)
11:126:413 Plant Molecular Biology (3)
11:400:419 Food Physical Systems (3)
11:680:486 Analytical Methods in Microbiology (3)
11:680:491 Microbial Ecology and Diversity (3)
11:776:310 Plant Propagation (3)
11:776:312 Medicinal Plants (3)
11:776:406 Plant Physiology (4)
11:776:405 Plant Biosecurity (3)
11:776:406 Plant Breeding (3)
11:776:410 Plants for Bioenergy (3)
11:776:452 Plant Tissue Culture and Engineering (3)
11:776:486 Functional Genomics for Research (3)

One to three additional credits of research in biotechnology may be substituted for an equal number of credits of elective work.

Ecology, Evolution, and Natural Resources 216 (SEBS)

ECOLOGY, EVOLUTION, AND NATURAL RESOURCES 216

(Formerly 704)

Degree: B.S.

Director: Kimberly N. Russell; 124 ENR Building, 848-932-9383, (Kimberly.russell@rutgers.edu)

Program Webpage: Here

Department of Ecology, Evolution, and Natural Resources Webpage: Here

The ecology, evolution, and natural resources curriculum provides an understanding of how natural living systems function and evolve, and how they can be managed to conserve biodiversity while providing benefits to people. Students may pursue coursework that prepares them for traditional careers in resource management or they may take a broader array of courses that meets interests related to the conservation of natural resources and the ecology and evolution of natural systems. Graduates may pursue further study at the graduate level or find career opportunities in academia and in public or private organizations involved in the management of natural resources. The major provides a broad general understanding of the functioning, significance, and conservation of living systems. In addition to the general major curriculum, we offer two specialized disciplinary tracks with a more focused sequence of courses in 1) Natural Resources and Ecosystem Management, or 2) Urban Forestry. The flexibility of this major is intended to meet a variety of student interests and needs. Students are encouraged to organize curricular and elective courses to fulfill simultaneously the requirements of a minor or certificate program. Particularly appropriate are the Minor in Sustainability; the Certificate in Environmental Geomatics; and the Certificate in Evolutionary Medicine.

Ecology, Evolution, and Natural Resources 216 (SEBS)

Learning Goals

Learning Goals

Goal 1: Explain basic population, community ecology, and ecosystem-level concepts.

Goal 2: Describe the evolutionary origins, processes, and patterns over geologic time.

Goal 3: Create a natural resource management plan demonstrating an understanding of societal values and interests.

Goal 4: Effectively utilize software, hardware, field, and laboratory techniques commonly used in the study of ecology, evolution, and natural resource management.

Goal 5: Use quantitative methods to analyze and understand ecological systems, including interpretation of numeric and graphical data.

Goal 6: Communicate effectively orally and through written text and graphics.

Goal 7: Evaluate ecology, evolution, and natural resource management concepts in a global context.

Natural Resources and Ecosystem Management Track Specific Learning Goals:

Goal 3a: Utilize common forestry inventory methods and apply a fundamental knowledge of silviculture and ecology to create a forestry management plan that fosters the long-term capacity of the land and demonstrates an understanding of societal values and interests.

Goal 8: Evaluate conflicts and dilemmas through a lens of professional ethics.

Goal 9: Describe natural resource relevant laws and policies in New Jersey and at the national level.

Urban Forestry Track Specific Learning Goals:

Goal 3b: Utilize common urban forestry analysis tools to create a community forestry management plan demonstrating an understanding of societal values and interests as well as the long-term capacity of the urban forest.

Goal 10: Apply a fundamental knowledge of tree biology and professional ethics to tree care management and practice.

Goal 11: Describe urban forestry relevant laws and policies in New Jersey and at the national level.

The department has publicly posted mission statement and curricular learning goals on its website.

Ecology, Evolution, and Natural Resources 216 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

EENR General Track

Biology: Required
01:119:115 Gen Bio I
01:119:116 Gen Bio 2
01:119:117 Bio Res. Lab

Chemistry & Physics - Choice of: 1 Year of Chemistry (with lab) OR 1 Year of Physics (with lab) OR 1 Semester of Each (with labs)
01:160:161 Gen Chem 1
01:160:162 Gen Chem 2
01:160:171 Intro to Exp.
01:750:203 Gen Physics 1

01:750:204 Gen Physics 2
01:750:205 Gen Physics 1 Lab
01:750:206 Gen Physics 2 Lab
01:750:193 Phys for the Sci. 1
01:750:194 Phys for the Sci. 2

Experienced Based Education: Required (3 cr)
11:216:440 Pract Exp in EENR
11:216:484 Res. Probl in EENR
11:216:376 Pract Fish.
11:216:377 Pract Forestry
11:554:488 GHCook
11:902:300 SEBS Internship I
11:902:301 SEBS Internship II
01:556:221/2 or 301/302 Aresty

Math - Choice of 1
01:640:135 Calculus 1 for Life/SS
01:640:151 Calculus 1 for Math/Phy

Core Courses: Required
11:216:104 Topics in EENR
11:216:217 Principles of Natural Resource Management
11:216:351 Principles of Ecology
11:216:352 Principles of Ecology lab
11:216:369 Analytical Methods (SEBS Core QQ)
11:216:431 FEEM
11:216:499 Capstone in EENR

Evolution Core: Choice of 1
11:216:486 Principles of Evolution
11:216:251 Fundamentals of Evolution
Required
11:216:252 Fundamentals of Evol. Lab

Ecology Electives: Choice of 2
11:216:272 Dendrology
11:216:317 Conservation Ecology (SEBS Core CCO/WCd)
11:216:332 Plant Ecology
11:216:360 Anim Phys. Ecol
11:216:450 Landscape Ecology
11:216:451 Global Change Ecology
11:216:487 Urban Ecology
11:216:296 Honors Seminar
11:216:435 Freshwater and Wetland Ecosystems

Evolution Electives: Choice of 2
11:216:240 Behavioral Biology
11:216:269 Evol of Animal Behavior
11:216:296 Honors Seminar
11:216:323 Ornithology
11:216:324 Invertebrate Zoology
11:216:325 Vertebrate Zoology
11:216:405 Evolution of Infec. Dis.
11:216:441 Animal Behavior
11:216:411 & 412 Plant Diversity & Evol

Natural Resources/Techniques Electives: Choice of 2
11:216:314 Forest Measurements
11:216:274 Field Techniques
11:216:371 Introduction to Remote Sensing
11:216:464 Wildlife Ecology & Cons
11:216:471 Silviculture
11:216:477 Forest Management Applications
11:573:232 & 233 Fund. of Geom. & lab
11:216:403 Urban Forestry
11:573:362 Intem. Envi. Geom.
11:573:462 Advan. Envi. Geom.
11:216:210 Nature Journaling
11:216:315 Conservation Techniques
11:216:320 Controversies in Sustainability
11:216:365 Arboriculture
11:216:474 Adv. Remote Sensing
11:216:475 Winter Field Ecology

Additional Courses: Choice of 4
Any 216 or 573 course listed above and/or:
11:216:101 Intro to Ecol & Evol (SEBS Core NS)
11:216:110 Evol Disease and Med (SEBS Core NS)
11:216:115 Evol Sex & Gender (SEBS Core NS/CCO)
11:216:199 Trees in the Environment (SEBS Core NS) Fall Only
Non-216 (approval possible for 200+ level courses)
11:067:300 Integrative Physiology
11:067:328 Animal Genetics
11:067:404 Animal Diseases
11:115:301 Introductory Biochemistry
11:115:423 Fundamentals of Genomics
11:370:300 Insects & The Environment
11:370:320 Insect Ecology and Evolution
11:370:308 Apiculture
11:370:355 Applied Acarology

11:370:380 Insect Biotechnology
11:370:381 Insect Biology
11:370:402 Aquatic Entomology
11:370:403 Insect Structure and Function
11:370:404 Insect Structure and Function II
11:370:406 Medical and Veterinary Entomology
11:370:409 Insect Classification
11:370:430 Urban Entomology
11:573:231 Fundamentals of Environmental Planning
11:573:322 Land Measurement and Mapping
11:573:371 Air-Photo Interpretation
11:373:362 Natural Resource Economics
11:373:363 Environmental Economics
11:374:313 U.S. Environmental Policy
11:374:314 Natural Resource Policy
11:374:325 Environmental Communication
11:375:346 Introduction to Atmospheric Chemistry
11:375:360 Soils and Water
11:375:407 Environmental Toxicology
11:375:411 Environmental Microbiology
11:375:421 Air Pollution
11:375:444 Water Chemistry
11:375:450 Terrestrial Carbon Cycle
11:375:453 Soil Ecology
11:628:309 Fishery Science
11:628:320 Dynamics of Marine Ecosystems
11:628:342 Marine Conservation
11:670:201 Elements of Meteorology
11:670:202 Elements of Climatology
11:680:491 Microbial Ecology and Diversity
11:776:210 Principles of Botany
11:776:242 Plant Science
11:776:305 Plant Genetics
11:776:306 Weed Science and Management
11:776:382 Plant Physiology
11:776:400 Fungi in the Environment
01:460:101 Introductory Geology
01:460:303 Paleontology
01:070:212 Life of Primates
01:070:348 Primate Behavioral Ecology
01:070:402 Primate Conservation
01:070:409 Primate Nutritional Ecology
01:160:209 Elementary Organic Chemistry
01:160:307 Organic Chemistry
01:160:308 Organic Chemistry

01:447:380 Genetics
01:640:136 Calculus II for the Life and Social Sciences
01:640:138 Calculus II for the Biological Sciences

EENR Urban Forestry Track

Biology: Required
01:119:115 Gen Bio I
01:119:116 Gen Bio 2
01:119:117 Bio Res. Lab

Chemistry: Required
01:160:161 Gen Chem 1
01:160:171 Intro to Exp.

Physics: Choice of 1
01:750:203 Gen Physics 1 & 01:750:205 Gen Physics 1 Lab
01:750:193 Phys for the Sci. 1

Experienced Based Education: Choice (3 cr)
11:216:440 Pract Exp in EENR
11:216:484 Res. Probl in EENR
11:216:377 Pract Forestry
11:554:488 GHCook
11:902:300 SEBS Internship I
11:902:301 SEBS Internship II

Math: Choice of 1
01:640:135 Calculus 1 for Life/SS
01:640:151 Calculus 1 for Math/Phy

Core Courses: Required
11:216:104 Topics in EENR
11:216:217 Principles of Natural Resource Management
11:216:351 Principles of Ecology
11:216:352 Principles of Ecology lab
11:216:369 Analytical Methods (SEBS Core QQ)
11:216:431 FEEM
11:216:499 Capstone in EENR

Ecology: Required
11:216:272 Dendrology
11:216:487 Urban Ecology

Evolution: Required
11:216:411 & 412 Plant Diversity & Evol

Natural Resources/Techniques: Required
11:216:371 Introduction to Remote Sensing
11:216:471 Silviculture
11:573:232 & 233 Fund. of Geom. & lab
11:216:403 Urban Forestry
11:216:365 Arboriculture

Additional Courses: Required
11:373:101 Economics, People, and the Environment (SEBS Core CCO/ECN/SCL)
11:573:202 Environmental Issues in US (SEBS Core CCO/WCd)
11:776:302 General Plant Pathology
11:374:250 Environmental Justice (SEBS Core CCD)
Additional Courses: Choice of 2
11:370:350 Agricultural Entomology and Pest Management
11:373:362 Natural Resource Economics (SEBS Core GVT/SCL)
11:375:360 Soils and Water
11:573:231 Fundamentals of Environmental Planning
11:776:202 Applied Physiology of Horticultural Crops
11:776:404 Soil Management for Sport and Landscapes
11:550:230 Environmental Design Analysis
11:216:199 Trees in the Environment
11:573:413 Open Space Planning

EENR: Natural Resources and Ecosystem Management Track

Biology: Required
01:119:115 Gen Bio I
01:119:116 Gen Bio 2
01:119:117 Bio Res. Lab

Chemistry: Required
01:160:161 Gen Chem 1
01:160:171 Intro to Exp.

Physics: Choice of 1
01:750:203 Gen Physics 1 & 01:750:205 Gen Physics 1 Lab
01:750:193 Phys for the Sci. 1

Experienced Based Education: Choice (3 cr)
11:216:440 Pract Exp in EENR
11:216:484 Res. Probl in EENR
11:216:377 Pract Forestry
11:554:488 GHCook
11:902:300 SEBS Internship I
11:902:301 SEBS Internship II

Math: Choice of 1
01:640:135 Calculus 1 for Life/SS
01:640:151 Calculus 1 for Math/Phy

Core Courses: Required
11:216:104 Topics in EENR
11:216:217 Principles of Natural Resource Management
11:216:351 Principles of Ecology
11:216:352 Principles of Ecology lab
11:216:369 Analytical Methods (SEBS Core QQ)
11:216:431 FEEM
11:216:499 Capstone in EENR

Ecology: Required
11:216:272 Dendrology
Ecology: Choice of 1
11:216:317 Conservation Ecology
11:216:332 Plant Ecology
11:216:360 Animal Physiological Ecology
11:216:450 Landscape Ecology
11:216:451 Climate Change Ecology
11:216:487 Urban Ecology
11:216:296 Honors Seminar

Evolution: Required
11:216:411 & 412 Plant Diversity & Evol

Natural Resources/Techniques (Required)
11:216:371 Introduction to Remote Sensing
11:216:471 Silviculture
11:573:232 & 233 Fund. of Geom. & lab
11:216:314 Forest Measurements
11:216:274 Field Techniques
11:216:464 Wildlife Ecology & Conservation
11:216:477 Forest Management Applications

Additional Courses: Required
11:373:101 Economics, People, and the Environment (SEBS Core CCO/ECN/SCL)
11:573:202 Environmental Issues in US (SEBS Core CCO/WCd)
11:776:302 General Plant Pathology
11:374:250 Environmental Justice (SEBS Core CCD)
Additional Courses: Choice of 2
11:370:350 Agricultural Entomology and Pest Management
11:373:362 Natural Resource Economics (SEBS Core GVT/SCL)
11:375:360 Soils and Water
11:573:231 Fundamentals of Environmental Planning

11:776:202 Applied Physiology of Horticultural Crops
11:776:404 Soil Management for Sport and Landscapes
11:374:201 Research Methods in Human Ecology
11:216:199 Trees in the Environment
11:375:453 Soil Ecology

Entomology 370 (SEBS)

ENTOMOLOGY 370

Degree: B.S.

Director: Chloe Hawkings (c.hawkings@rutgers.edu)

Program Webpage: Here

Managing Department Webpage: Here

The entomology major is the study of insects and their arthropod relatives. Insects are one of the most diverse and abundant organisms on the planet and play important roles in their ecosystems. Insects are exceptional models for understanding fundamental aspects of genetics, ecology, and evolution. Society benefits from diverse roles of insects as critical pollinators, sources of food in agricultural and wildlife food chains, as well as decomposers; on the flip side, many insects as well as ticks pose a danger to human health, our structures, and agriculture. Students in the Entomology major gain career opportunities in corporate and private agribusiness, urban pest management companies, scientific and technical organizations, public health agencies, local, state, and federal governments, and international organizations. Employment also exists in conservation biology, scientific policy, and environmental quality assurance. Our curriculum is flexible so students may expand their knowledge to interdisciplinary areas to meet their career goals. Students interested in the major or a double major should contact an academic advisor for additional information.

In addition to offering a major in entomology, the School of Environmental and Biological Sciences offers a minor in entomology.

Entomology 370 (SEBS)

Learning Goals

Learning Goals

Graduates of the undergraduate entomology major will have demonstrated:

1. Broad knowledge of the systematics, anatomy, physiology, ecology, and biochemistry of insects
2. Ability to explain and assess the detrimental and beneficial impacts that insects have on plants, animals, and humanity
3. Ability to design, implement, and analyze experiments or pest management programs and interpret data
4. Communication of entomological information to the scientific community and to the general public

5. Ethical principles required in professional fields

Entomology 370 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

For an up-to-date description of the entomology program major requirements, courses, and course sequences, please refer to the program website here.

SEBS UNDERGRADUATE CORE CURRICULUM (39 credits)

Options are chosen from lists of courses certified in each learning goal: Here.

Note: The SEBS Core Curriculum requirements differ slightly from SAS Core Curriculum requirements

I. Contemporary Challenges (total 6 credits, 3 in CCO and 3 in CCD)
Suggested Course: 11:373:101 Economics, People, and Environment (CCO)
Suggested Course: 11:550:371 Agriculture and the Landscape (CCD)

II. Natural Sciences (total 6 credits, 3 in A and 3 in B)
A. Life Sciences (3 credits)
Required: 01:119:115 or 116 General Biology (4)

B. **Physical Sciences** (3 credits)
Required 01:750:193 Physics for the Sciences (4)

III. Historical Analysis (3 credits)
Suggested Course: 01:070:102 Introduction to Human Evolution

IV. Social Analysis (6 credits)
Suggested Course: 11:373:362 Natural Resource Economics
Suggested Course: 11:372:202 Environmental Issues in the USA
Suggested Course: 11:373:101 Economics, People, and Environment*
**also counted under Contemporary Challenge.*

V. Arts and the Humanities (3 credits)
Suggested Course: 01:190:101 Word Power
Suggested Course: 01:730:103 Introduction to Philosophy

VI. Writing and Communication (6 credits)
One from 01:355:101 Expository Writing (3) or 01:355:103 Exposition and Argument (3)
One from 01:355:302 Scientific and Technical Writing (3), 01:355:312 Writing for Biology and Natural Science (3), or 01:355:342 Science Writing (3)

VII. Quantitative and Formal Reasoning (6 credits)
Major required: 01:640:135 Calculus I (4)
One from 01:960:211 Statistics I (3), or 01:640:136 Calculus II for the Quantitative Social and Life Sciences (3)

VIII. Experiential Learning (3 credits)
All students are required to obtain practical experience in an area of entomology. Students can demonstrate appropriate employment or volunteer service with a public agency, private industry, nonprofit organization, or fulfill the requirement by research or field experience in suitable courses. Before starting an experienced-based course students must get the approval of their adviser. Possible courses include:
11:370:493, 494 Research problems in Entomology
11:015:497, 498 George H. Cook Scholars Program
11:902:300 and 400 SPIN Student to Professional Internship Network

Required: Entomology Major
Total 44-45 credits

01:119:115-116, 117 General Biology and Lab (4,4,2).
Note: 4 credits can be counted as SEBS core - Natural Sciences

01:160:161-162, 171 General Chemistry & Lab (4,4,1)
Note: 4 credits can be counted as SEBS core - Natural Sciences

01:640:135 Calculus I (4) or 01:960:211 Statistics I (3)
or 11:216:369 Analytical Methods in EENR (3)

11:216:351 Principles of Ecology (3)

11:370:350 Agricultural Entomology & Pest Management (3)
11:370:381 Insect Biology (4)
11:370:409 Insect Classification (4)
11:370:403 Insect Structure and Function (4)
11:370:407 Careers and Professional Development in Entomology (1)
11:370:495, 496 Seminar in Entomology (3)

Note: Seminar in Entomology is 1 credit per semester. Students are required to take a total of three times to equal 3 credits
Note: Juniors and seniors may, with the permission of the instructor and the graduate dean, register for appropriate graduate courses in entomology for elective credits.

Entomology Electives
At least 5 (15+ credits)

11:370:308 Apiculture (3)
11:370:355 Applied Acarology (3)
11:370:414 Forensic Entomology (3)
11:370:352 Toxicology of Insecticides (3)
11:776:408 Turfgrass Pest Science (4)
11:370:406 Medical & Veterinary Entomology (3)
11:370:430 Urban Entomology (3)
11:370:404 Insect Structure & Function (4)
11:370:415 Decomposition Ecology (3)
11:370:380 Insect Biotechnology (3)

Note: Additional entomology electives can be taken and counted for approved elective credits

Note: For Careers in Pest Management, the following entomology elective courses are recommended:
11:370:430 Urban Entomology (3)
11:370:352 Toxicology of Pesticides (3)
11:776:408 Turfgrass Pest Science (4)
11:370:380 Insect Biotechnology (3)

Approved General Electives
At least 8 (24+ credits)

11:573:232 Fundamentals of Environmental Geomatics (4)
11:216:371 Intro to Remote Sensing Image Analysis (3)
11:776:302 General Plant Pathology (3)
11:776:402 Principles of Weed Science (3)
11:776:405 Plant Biosecurity Issues & Technologies (3)
01:160:209 Elementary Organic Chemistry (4)
01:160:307-308 Organic Chemistry (4,4)
01:447:380 Genetics (4)
11:115:301 Introductory Biochemistry (3)
11:115:403 Biochemistry (4)
11:115:404 Biochemistry (4)
11:776:305 Plant Genetics (4)
11:216:302 Parasite Ecology (4)
11:216:317 Conservation Ecology (3)
11:216:324 Invertebrate Zoology (4)
11:216:332 Plant Ecology (4)
11:216:411 Plant Diversity & Evolution (3)
11:216:421 Wetland Ecology (3)
11:216:441 Animal Behavior (3)
11:216:464 Wildlife Ecology & Conservation (3)
11:375:407 Environmental Toxicology (3)
11:776:210 Principles of Botany (4)

11:776:382 Plant Physiology (4)
11:680:390 General Microbiology (4)
11:216:269 Evolution of Animal Behavior (3)
11:067:328 Animal Genetics (3)
11:126:481 Molecular Genetics (3)
11:126:484 Tools for Bioinformatic Analysis (3)
11:776:485 Functional Genomics for Research (3)
11:776:391 Weeds, Disease, and Insects of Plants (3)
11:020:436 Sustainable Agriculture (3)
11:020:321 Principles and Practices of Organic Farming (3)
11:375:453 Soil Ecology (3)

Note: For Careers in Pest Management, the following courses nonentomology elective courses are recommended:
11:115:301 Introductory Biochemistry (3)
11:115:403 Biochemistry (4)
11:115:404 Biochemistry (4)
11:375:407 Environmental Toxicology (3)

Environmental and Business Economics 373 (SEBS)

ENVIRONMENTAL AND BUSINESS ECONOMICS 373

Degree: B.S.

Director: Isaac Vellangany; Cook Office Building Room 112, 848-932-9131, isaacv@sebs.rutgers.edu

Program Webpage: Here

Department of Environmental and Business Economics Webpage: Here

The environmental and business economics program provides students with a foundation in the principles of economics, a knowledge of practical economic and analytical problem-solving techniques, an ability to apply economic concepts to the analysis of public and private policy issues, and an understanding of the institutional factors underlying and influencing policy decisions. The program qualifies students for a broad spectrum of positions in business and government, or for continued study at the graduate level.

To encourage students to develop depth in their understanding of the applications of economics, the curriculum offers the following four options:

Business Economics. This option includes all of the same foundation courses required in traditional business school curricula plus the additional analytical tools provided in the program's economic courses. It is this rich blend of courses such as Finance, Management, Marketing, Demand and Price Analysis, and Economics of Production that make graduates of this option so attractive to employers in business and industry as well as to those in government agencies and nonprofit organizations. Indeed, many of the graduates from this option are among the ranking economists, analysts, financial advisers, managers, marketing specialists, consultants, and policy directors in

agencies and companies ranging from biotechnology and pharmaceutical industries on Wall Street to smaller organizations including small business and entrepreneurial ventures. The option familiarizes students both with analytical and decision-making techniques used in the business world and with the public and private institutional framework within which businesses operate. It is also appropriate for students who are interested in graduate studies in business management or economics.

Environmental and Natural Resource Economics. This option emphasizes the application of economics to policy issues associated with environmental problems and the utilization of natural resources. It familiarizes students both with analytical and decision-making techniques used in assessing problems of the environment and natural resources and with the institutional framework within which environmental policy must be developed. It is appropriate for students interested in employment either by private organizations concerned with environmental policies or by government agencies responsible for policies relating to the environment and natural resources and for students interested in graduate study in environmental or natural resource economics.

Food Industry Economics. This option emphasizes the application of economics in the areas of food policy, marketing, and finance. It is appropriate for students interested in employment in the food industry or by federal or state departments of agriculture and for students interested in graduate study in agricultural economics.

Food Science and Management Economics. This option, offered in cooperation with the food science curriculum, is designed for students with a strong interest in the management aspects of food science, process, production, and product development. While the option requirements of both programs are similar, students seeking degrees in environmental and business economics take additional courses in economics. This option is appropriate for students interested in employment in the food industry or in graduate study in agricultural economics, economics, or business administration.

Environmental and Business Economics 373 (SEBS)

Learning Goals

Learning Goals

After completing the program in environmental and business economics students will be able to:

1. utilize and explain core economic, management, financial, and accounting concepts;

2. apply economic theories and concepts to contemporary social issues, as well as the formulation of policy;

3. demonstrate quantitative reasoning skills;

4. recognize the role of ethical values in economic decisions; and

5. demonstrate critical and effective communication skills.

Environmental and Business Economics 373 (SEBS)

Entry Requirements for the Major

Entry Requirements for the Major

Official admission to the major requires completion of introductory courses in micro- and macroeconomics, a semester of calculus, and a semester of statistics, with grades of C or better. These four courses are prerequisites to junior- and senior-level courses in the required option areas. Students may, however, declare the major before completing these four courses.

Environmental and Business Economics 373 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

For an up-to-date description of environmental and business economics major requirements, courses, and course sequences please refer to the program webpage.

SEBS UNDERGRADUATE CORE CURRICULUM (39 credits)

Contemporary Challenges (6 credits) *Two courses, one in each of the Contemporary Challenges areas: Diversities and Social Inequalities* [CC-D] *and Our Common Future* [CC-O]

Experiential Learning (3 credits) *Students must participate in a certified experience that meets this goal* [EL]

Natural Sciences (6 credits) *Students must take two courses, one each in two of the following areas: physical, biological, or environmental sciences* [NS]

Historical Analysis (3 credits) *Students must take one course* [HST]

Social Analysis (6 credits) *SEBS students must complete two courses, one in either social/cultural analysis or economic analysis, and one in governmental and regulatory analysis* [SCL]

Arts and Humanities (3 credits) *Students must complete one course* [AH]

Writing and Communication (6 credits) *Students must take 01:355:101 or its equivalent [WC] and one course that fulfills the learning goal, communicate effectively in modes appropriate to a discipline or area of inquiry* [WCD].

Quantitative and Formal Reasoning (6 credits) *Students must take two courses* [QQ; QR]

Major Requirements for All Students Regardless of Matriculation Date

Proficiency in Environmental and Business Economics (55-70 credits)

A. REQUIRED COURSES (22-23)

Quantitative Skills (10)

11:373:211 Applied Mathematical Concepts in Ag Economics I (4) or 01:640:1__ CALC1 (4)

11:373:215 Applications of Statistics in Business Economics (3) or 01:960:285 Introductory Statistics for Business (3) or 01:960:211 Statistics I (3)

11:373:200 Agricultural Accounting (3) or 33:010:272 Introduction to Financial Accounting (3)

Computer and Information Technology Competence (3)

11:373:210 Business Decision Computer Tools (4) or 01:198:170 Computer Applications for Business (3)

Professional Ethics

11:373:201 Corporate Social Responsibility (3)

Additional Requirements (9)

11:373:241 Introduction to Management (3)

11:373:321 Economics of Production (3)

11:373:422 Demand and Price Analysis (3)

B. OPTIONS (33-44)

Majors must complete all option-required courses with a grade of C or better. No more than one grade of D is allowed in the remaining option elective courses.

1. Business Economics (33-35)

Required courses (12)

11:373:201 Corporate Social Responsibility (3) or equivalent

11:373:231 Introduction to Marketing (3)

11:373:341 Organizational Dynamics (3)

11:373:351 Business Finance I (3)

Electives (21-23)

At least three of the following business/economics courses:

01:220:300 International Economics (3)

01:220:301 Money and Banking (3)

01:220:302 Labor Economics (3)

01:220:308 Introduction to Managerial Economics (3)

01:220:311 Methods of Cost Benefit Analysis (3)

01:220:322 Econometrics (3)

01:220:394 Economics of Capital Markets (3)

01:220:415 Portfolio Theory (3)

11:373:331 Economics of Food Marketing Systems (3)

11:373:352 Economics of Futures Markets (3)

11:373:402 Global Marketing (3)*

11:373:403 Innovation and Entrepreneurship (3)*

11:373:425 Econometric Applications (3)

11:373:451 Business Finance II (3)

11:373:465 Business Research (4)*

At least two of the following policy courses:

11:373:202 Sustainability Decision Tools (3)

11:373:218 Sustainable Food Policy for Developing Countries (3)

11:373:323 Agricultural and Food Policy (3)

11:373:335 Energy Economics and Policy (3)

11:373:361 Land Economics (3)

11:373:362 Natural Resource Economics (3)

11:373:363 Environmental Economics (3)

11:373:371 Food, Nutrition, and Health (3)

11:373:404 Bioscience Policy (3)

11:373:431 International Trade Policy (3)

11:374:313 Environmental Policy and Institutions (3)

11:374:314 Human Dimensions of Natural Resource Management (3)

01:790:237 Political Economy and Society (3)

01:790:305 Public Policy Formation (3)

01:790:327 International Political Economy (3)

01:790:337 American Political Economy (3)

01:790:338 Government and Business (3)

11:374:315 International Environmental Policy (3)

At least two additional courses in environmental and business economics (373), economics (220), or Calculus II.

2. Environmental and Natural Resource Economics (33-34)

Required courses (12)

11:373:201 Corporate Social Responsibility (3) or equivalent

11:373:361 Land Economics (3)

11:373:362 Natural Resource Economics (3)

11:373:363 Environmental Economics (3) or 01:220:332 Environmental Economics (3)

Electives (21-22)

At least three of the following courses in problem solving or policy analysis:

01:220:311 Methods of Cost Benefit Analysis (3)

01:220:386 Operations Research I (3)

01:220:395 Law and Economics (3)

01:790:305 Public Policy Formation (3)

01:960:337 Managerial Statistics (3)

11:372:232 Fundamentals of Environmental Geomatics (3)

11:373:351 Business Finance I (3)

11:373:425 Application of Econometrics in Agricultural Economics (3)

11:375:333 Environmental Law I (3)

11:375:409 Environmental Statement and Impact (3)

At least one of the following courses in policy applications:

01:450:140 The Greenhouse Effect (3)

01:450:370 Global and Regional Climate Change (3)

11:373:231 Introduction to Marketing (3)

11:373:335 Energy Economics and Policy (3)

11:373:404 Bioscience Policy (3)

11:374:315 International Environmental Policy (3)

11:375:301 Environment and Health (3)

11:375:410 Workshop in Environmental Assessment and Impact (3)

11:375:421 Air Pollution (3)

11:628:401 Science in Shoreline Management (3)

11:704:451 Ecosystems Ecology and Global Change (3)

At least one of the following interdisciplinary courses:

01:512:323,324 History of the North American Environment (3,3)

10:975:315 Theory and Methods of Land-Use Planning (3)

11:372:231 Fundamentals of Environmental Planning (3)

11:372:384 A Systems Approach to Environmental and Agricultural Issues (3)

11:373:431 International Trade Policy (3)

11:375:333,334 Environmental Law I,II (3,3)

11:704:351 Principles of Ecology (3)

Two additional courses in environmental and business economics (373), economics (220), or Calculus II.

3. Food Industry Economics (33-35)

Required courses (12)

11:373:201 Corporate Social Responsibility (3) or equivalent

11:373:231 Introduction to Marketing (3)

11:373:331 Economics of Food Marketing Systems (3)

11:373:341 Management: Human Systems Development (3)

Electives (21-23)

Four of the following courses, of which at least three must come from group A:

A. Courses in business strategy/policy

11:373:205 Small Business Essentials (3)

11:373:323 Agriculture and Food Policy (3)

11:373:351 Business Finance I (3)

11:373:352 Economics of Futures Markets (3)

11:373:371 Food, Nutrition, and Health (3)

11:373:402 Global Marketing (3)*

11:373:403 Innovation and Entrepreneurship (3)*

11:373:425 Econometric Applications (3) *or* 01:220:322 Econometrics (3)

11:373:451 Business Finance II (3)

11:373:465 Business Research (4)*

B. Courses in environmental/resource economics

11:373:335 Energy Economics and Policy (3)

11:373:361 Land Economics (3)

11:373:362 Natural Resource Economics (3)

11:373:363 Environmental Economics (3)

At least 3 credits of courses in one of the following areas: animal science (067), soils (in environmental sciences 375), food science (400), nutritional sciences (709), or plant biology (776).

At least two additional courses in environmental and business economics (373), economics (220) or Calculus II.

4. Food Science and Management Economics (43-44)

Required courses in the sciences (26)

01:160:209 Elementary Organic Chemistry (3)

11:400:201 Principles of Food Science (3)

11:400:301 Food Processing Technologies (4)

11:400:405 Sensory Evaluation of Foods (3)

11:400:411 Food Chemistry (3)

11:400:412 Food Product Development (3)

11:400:423 Food Microbiology (3)

11:680:390 General Microbiology (4)

Required courses related to business management (17-18)

11:373:201 Corporate Social Responsibility (3) or 11:400:314 Current Issues in Food Science (2) or equivalent

11:373:231 Introduction to Marketing (3)

11:373:321 Economics of Production (3)

11:373:323 Agricultural and Food Policy (3) or 11:373:371 Food, Nutrition, and Health (3)

11:373:351 Business Finance I (3)

11:373:422 Demand and Price Analysis (3)

**Fulfills SEBS Experience-Based Education requirement.*

Unspecified Electives

In addition to courses meeting the above requirements, students can take other courses offered by the university, for which they meet the course eligibility requirements, to bring their total number of credits to the minimum of 120 (matriculated 2018 or later) or 128 (matriculated prior to 2018) required for graduation.

Environmental Engineering 366 (ENG)

Environmental Engineering 366 (ENG)

Field of Study

Field of Study

Environmental engineers utilize engineering principles and physical, chemical, and biological science fundamentals to devise effective solutions for current and emerging environmental problems related to human activities. Environmental engineers practice in many areas: green infrastructure for urban stormwater and flood management; air pollution prevention and control; safe drinking water production and supply; sustainable treatment of wastewater and solid wastes; remediation of contaminated sites; ensuring industry compliance with environmental regulations; environmental health and safety in the workplace; alternative energy technologies; design of green buildings; and analysis and modeling of big data to guide societal responses to global environmental change.

This program prepares students for immediate employment as practicing engineers with engineering consulting firms; green energy and sustainable development companies; drinking water, wastewater, solid waste, and air pollution treatment facilities; manufacturing industries; environmental regulatory and planning agencies; industry and academic research laboratories; international development agencies; and public-interest groups.

The environmental engineering curriculum provides a strong foundation in engineering and the physical, chemical, and biological sciences during the freshman and sophomore years. In the upper-level major courses these fundamentals are applied to multidisciplinary problem solving in various environmental engineering fields. The faculty has extensive experience in teaching, research, and consulting with private firms and government agencies, and close ties to our strong alumni network.

The environmental engineering program is a unique joint program between the School of Engineering and the School of Environmental and Biological Sciences. Students matriculate into the environmental engineering program through the School of Engineering. The Bachelor of Science program in Environmental Engineering is accredited by the Engineering Accreditation Commission of ABET under the commission's General Criteria and Program Criteria for Environmental Engineering. The program prepares graduates for taking the Fundamentals of Engineering (FE) examination pursuant to becoming a licensed professional engineer (PE).

Environmental Engineering 366 (ENG)

Four-Year Undergraduate Curriculum

Four-Year Undergraduate Curriculum

Four-Year Curriculum Code 366

The undergraduate program in Environmental Engineering is accredited by the Engineering Accreditation Commission of ABET under the commission's General Criteria and Program Criteria for Environmental Engineering.

First Year

See First-Year Program (35)

Sophomore Year

First Semester

01:119:103 Principles of Biology (4)

01:640:251 Multivariable Calculus (4)

01:750:227 Analytical Physics IIA (3)

01:750:229 Analytical Physics II Laboratory (1)

14:180:215 Engineering Graphics (1)

14:440:222 Engineering Mechanics: Dynamics (3)

Second Semester

01:160:209 Elementary Organic Chemistry (3)

01:640:244 Differential Equations for Engineering and Physics (4)

11:117:333 Environmental Engineering Tools (3)

14:180:243 Mechanics of Solids (3)

General elective (3)

Junior Year

First Semester

01:160:211 Elementary Organic Chemistry Laboratory (1)

11:375:201 Biological Principles of Environmental Sciences (3)

11:375:202 Chemical Principles of Environmental Sciences (3)

11:375:303 Numerical Methods in Environmental Sciences or 300-400 level statistics (3)

14:180:387 Fluid Mechanics (3)

14:180:389 Fluid Mechanics Laboratory (1)

Second Semester

11:117:462 Design of Solid Waste Treatment Systems (3)

11:375:423 Environmental Fate and Transport (3)

14:180:448 Elements of Hydrology (3)

14:540:343 Engineering Economics (3)

14:650:351 Thermodynamics (3)

Humanities/social sciences elective (3)

Senior Year

First Semester

11:117:413 Unit Processes in Environmental Engineering I (3)

11:117:423 Environmental Engineering Unit Processes Laboratory I (1)

11:117:474 Air Pollution Engineering (3)

11:117:488 Environmental Engineering Design I (2)*

11:375:322 Energy Technology and its Environmental Impact (3)

Option elective (3)

Second Semester

11:117:414 Unit Processes in Environmental Engineering II (3)

11:117:424 Environmental Engineering Unit Processes Laboratory II (1)

11:117:489 Environmental Engineering Design II (2) or 14:180:431 Design of Environmental Engineering Facilities (4)*

Humanities/social sciences elective (3)

Option elective (3)

Option elective (3)

Total Credits = 129

Notes

*For the water resources concentration, it is optional to take 14:180:431 instead of 11:117:488/489.

Option electives may be selected for one of four concentrations from the following:

Water Resources: 11:117:494, 11:117:495, 11:117:497, 11:117:498, 11:372:232 and 233, 11:375:434, 14:180:372 and 374, 14:180:382, 14:180:443; 11:682:451; 11:628:425

Environmental Unit Processes and Remediation: 11:117:468, 11:117:494, 11:117:497, 11:117:498, 11:375:340, 11:375:407, 11:375:411, 11:375:434, 11:375:444, 11:375:453, 11:680:201

Air Quality: 11:117:497, 11:117:498, 11:375:346; 11:375:407, 11:375:424, 11:375:434, 11:670:453, 14:650:461

Sustainable Environmental Systems: 11:117:468, 11:117:497, 11:117:498, 11:375:360; 11:375:430, 11:375:434, 11:375:450, 11:375:474; 11:776:382; 14:332:443; 14:635:405; 14:440:378: 10:971:202: 11:020:340

Environmental Planning 573 (SEBS)

ENVIRONMENTAL PLANNING 573

Degree: B.S.

Director: Frank Gallagher (gallagher@sebs.rutgers.edu)

Program Webpage: Here

Managing Department Webpage: Here

The Environmental Planning curriculum provides a broad educational experience emphasizing an understanding of planning and management of the physical and cultural environments. The program strives to consider our relationship with the land, in an effort to foster ethical planning solutions. A program that promotes sustainability regardless of location, strives for social equity, and envisions a post-industrial landscape that provides ecological services.

Environmental Planning Major: The environmental planning curriculum provides a broad educational experience emphasizing an understanding of planning and management of the physical and cultural environments. The program strives to consider our relationship with the land, in an effort to foster ethical planning solutions. The program promotes sustainability regardless of location, strives for social equity, and envisions a postindustrial landscape that provides ecological services.

Environmental Planning Minor: Environmental planning requires the integration of environmental information into the planning process and is concerned with the protection and enhancement of environmental systems while meeting demands for growth and development. This minor is intended for students from any discipline, who are interested in pursuing professional careers in environmental planning and related areas. It also provides a basis for graduate and professional studies. An environmental planning certificate program is also available for students in other programs of study as well as all minors of this major. View course requirements for minor.

Environmental Geomatics Minor: Environmental geomatics synthesizes a number of concepts and techniques, including remote sensing, spatial analysis, geographic information systems (GIS), and global positioning systems (GPS) that are used to improve the planning and management of natural resource systems. These techniques include the development of complex spatial databases from a wide range of data sources and the application of this information to solve environmental problems. The minor is intended for students interested in pursuing professional careers in environmental planning/management, remote sensing, and geomatics, and provides a basis for graduate and professional studies. An environmental geomatics certificate program also is available for students in other programs of study as well as all minors of this major. View course requirements for minor.

Green Technologies Minor: As individuals, businesses, and communities seek solutions to pressing environmental concerns, the green technology minor is positioned as an emerging source of innovation, entrepreneurialism, and action towards the development of sustainable land use practices. This minor seeks to provide students with a broad-based education in preparation for careers in landscape-related industries such as contracting, maintenance, nursery production, and garden-center operations. While covering pragmatic issues associated with the maintenance and management of gardens and properties, the curriculum also gives students opportunities to study best practices and new approaches to on-site stormwater management, energy production, and healthy ecological systems. View course requirements for minor.

Urban Forestry Minor: Urban and community forestry is the fastest growing segment of the forestry profession, especially in the northeast, where the total expenditure of time and money on community forestry (nursery, planting, pruning, removals, and line clearance) exceeds that spent on woodlands. This certificate is designed to provide students with the necessary credentials for employment by providing the fundamental knowledge and expertise required for this field. View course requirements for minor.

Environmental Planning 573 (SEBS)

Learning Goals

Learning Goals

1) Understand, analyze, and incorporate natural features and systems in planning and land management practices.

2) Analyze and incorporate social, cultural, and behavioral factors in planning.

3) Understand the history of environmental planning and policy, including contemporary and sustainable practices and their impact on people and the land.

4) Evaluate implications of institutions and policy in terms of their ability to shape sustainable regions.

5) Effectively communicate with the public, communities, and policy makers on issues of land stewardship, environmental justice, and social well-being.

Environmental Planning 573 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

For an up-to-date description of environmental planning major requirements, courses, and course sequences, please refer to the program website here.

SEBS UNDERGRADUATE CORE CURRICULUM (39 credits)

Contemporary Challenges (6 credits) *Two courses, one in each of the Contemporary Challenges areas: Diversities and Social Inequalities* [CC-D] *and Our Common Future* [CC-O]

Experiential Learning(3 credits)*Students must participate in a certified experience that meets this goal*[EL]

Natural Sciences(6 credits)*Students must take two courses, one each in two of the following areas: physical, biological, or environmental sciences*[NS]

Historical Analysis(3 credits)*Students must take one course*[HST]

Social Analysis(6 credits)*SEBS students must complete two courses, one in either social/cultural analysis or economic analysis, and one in governmental and regulatory analysis*[SCL]

Arts and Humanities(3 credits)*Students must complete one course*[AH]

Writing and Communication(6 credits)*Students must take 01:355:101 or its equivalent [WC] and one course that fulfills the learning goal, communicate effectively in modes appropriate to a discipline or area of inquiry*[WCD].

Quantitative and Formal Reasoning (6 credits) *Students must take two courses* [QQ; QR]

Graduation Requirements: Major in Environmental Planning (573)

The environmental planning curriculum provides a broad educational experience emphasizing an understanding of planning and management of the physical and cultural environments. The program strives to consider our relationship with the land, in an effort to foster ethical planning solutions. A program that that promotes sustainability regardless of location, strives for social equity and envisions a post-industrial landscape that provides ecological services.

Course Number	Credits	Name	SEBS
Requirement I	***9***	***Physical Sciences***	***Core***
01:119:103	3	Principles Biology	
Plus 3 credits from:			
01:450:101	3	Earth Systems *or*	
01:460:100	3	Planet Earth *or*	NS
11:776:102	3	Soil and Society	
Plus 3 credits from:			
11:670:102	3	Intro. Climate Science *or*	
11:670:101	3	Intro. Meteorology	
Requirement II	***4***	***Quantitative Methods***	
01:640:115	4	Pre-calculus College Math	
01:640:111	2	Pre-calculus I *plus*	QQ
01:640:112	2	Pre-calculus II	
Requirement III	***34***	***Environmental Planning Core***	
11:573:202	3	Environmental Issues	
11:573:231	3	Fundamentals of Environmental Planning	
11:550:231	5	Intro. Environmental Design	
11:573:232	3	Fundamentals of Environmental Geomatics	
11:573:233	1	Fundamentals of Environmental Geomatics Laboratory	
11:550:237	3	Visualization I-Drawing and Drafting	
11:573:413	3	Open Space Planning and Management	
11:550:241	4	Construction I: Mapping and Engineering	
Plus 5-6 credits from:			
11:573:232	3	Intro. Geomatics	
11:372:462	3	Adv. Geomatics	
11:573:409	3	Challenges and Opportunities	

11:550:301	3	Social and Cultural Aspects of Design	EBE
11:550:331	5	Environmental Planning Studio	
Plus 3 credits from:			
11:550:442	3	Planting Design	
11:373:202	3	Sustainability Decision Tools	
11:216:101	3	Intro. Ecology	
Requirement IV	***9***	***Environmental Sequence***	
3 credits from:			
11:375:360	4	Soils and Water	
11:776:440	3	Soil Fertility	
11:776:102	3	Soils and Society	
Plus 3 credits from:			
11:216:272	4	Dendrology	
11:550:233	3	Landscape Plants I	
Plus 3 credits from:			
11:375:101	3	Intro. Environmental Science	
11:573:445	3	Ecological Design and Stewardship	
11:216:332	3	Plant Ecology	
11:216:351	3	Principles of Ecology	
Requirement V	***6***	***History/Theory Sequence***	
11:550:230	3	Environmental Design Analysis	
11:550:250	3	History of Landscape Architecture	AH/ CC
11:573:302	3	Ecological History of North America	
Requirement VI	***9***	***Planning Electives***	
3 credits from:			
11:375:202	3	Water and Wastewater Treatment	
11:375:307	3	Solid Waste Management and Treatment	

10:762:335	3	Gender, Family, and Public Policy	
10:762/832/971:202	3	Designing Healthy Cities (studio format)	
11:373:362	3	Natural Resource Economics	
11:373:363	3	Environmental Economics	
11:573:437	3	Sustainability Decision Tools	
Plus 3 credits from:			
11:573:444	3	Watershed Planning and Management	
10:762:233	3	Urban World	
10:762/833/843:210	3	Principles of Public Policy	
10:762/971:201, 10:762:306	3	Intro. Urban Planning and Design	
10:762:413	3	Urban Revitalization	
Plus 3 credits from:			
11:550:332	5	Praxis Studio I (Junior) Section CD	EBE
11:550:332	5	Praxis Studio I (Junior) Section EC	EBE
11:550:332	5	Praxis Studio I (Junior) Section OD	EBE
11:550:234	3	Landscape Plants II	
11:550:235	3	Herbaceous Plants in the Landscape	
11:573:437	3	Spatial Data Visualization	
16:550:545	3	Intro. Geomatics	
11:216:474	3	Adv. Geomatics	
TOTAL	**71**		
Cannot use planning electives twice within the major.			

List of suggested but not required certificates/minors and required number of credits:

Certificate Programs:
Environmental Geomatics (19)

Minor Programs:
Agroecology (21-24)
Ecology, Evolution, and Natural Resources (20-23)
Environmental and Business Economics (21-23)
Entomology (19-26)
Environmental Policy, Institutions, and Behavior (21)
Environmental Sciences (21)
Marine Sciences (18)
Meteorology (18)
Plant Science (18-20)
Urban Forestry (21)

Environmental Policy, Institutions, and Behavior 374 (SEBS)

ENVIRONMENTAL POLICY, INSTITUTIONS, AND BEHAVIOR 374

Degree: B.S.

Director: Rachael Shwom (shwomrac@sebs.rutgers.edu)

Program Website: Here

Managing Department (Department of Human Ecology): Here

Program Description

Environmental policy, institutions, and behavior (EPIB) examines the human dimensions of environmental problems. It addresses such issues as how human actions affect the environment; how societies adapt to changes in natural resource availability; and how individuals, nations, and international agencies respond to environmental hazards. Courses in the program deal with local, regional, and national differences in the use of resources; social and environmental aspects of health and illness; alternative strategies for environmental management; ethical, moral, and legal dimensions of environmental and resource issues; and the roles of governmental and nongovernmental agencies in environmental affairs.

To understand these topics, students are exposed to a multidisciplinary view of the environment and draw upon concepts from a variety of fields, including anthropology, ecology, economics, geography, sociology, political science, and psychology.

The objectives of the curriculum are to teach basic concepts and methods from the social, biological, and physical sciences as they relate to the interactions among people and the environment; to train students in the techniques of empirical research; to provide opportunities for experiences in real-world situations; to guide students in acquiring practical skills such as environmental assessment, professional writing, data analysis, and demographic analysis; and to broaden students' knowledge regarding environmental problems and how people cope with them.

Graduates are prepared for careers in health and environmental agencies at all levels of government, nonprofit organizations in the United States and internationally, and private companies, including environmental consulting firms, pharmaceutical companies, and green businesses. Some students also pursue graduate or professional studies in the social sciences, public health and medicine, public administration, law, and international development.

Environmental Policy, Institutions, and Behavior 374 (SEBS)

Learning Goals

Learning Goals

Learning goals for the environmental policy, institutions, and behavior major:

Goal 1

Students graduating from the major will understand and analyze the varied perspectives offered by the social and natural sciences regarding the causes and consequences of social, ecological, and environmental change. This includes interactions among natural resources, climate, population, energy use and technology, health, forces of globalization, social institutions, and cultural values.

Graduates should be able to:

1.1 Describe major patterns and drivers of natural resource use, pollution, and climate and environmental change.

1.2 Identify different approaches to the governance and management of human activities that affect the environment, both in the United States and abroad, including institutions, property relations, management regimes, politics, and policies.

1.3 Explain characteristics of human populations, including population growth, demographic transitions, social stratification, consumption, and indicators of human welfare.

1.4 Describe technological trends affecting human well-being and the environment including energy use and development, biotechnology, and geospatial and communication technologies.

1.5 Evaluate major issues in health, including race, gender, and socioeconomic position, food and nutrition access and policies, cultural factors, and understanding of risk and vulnerability.

1.6 Discuss the dynamics of development and globalization, including historical antecedents, current trends and pathways, and local responses to global forces.

1.7 Explain how social forces, cultural values, and behavior affect human environmental interactions, including issues such as political and economic relations, inequality, access to resources, and interactions between human diversity and biological diversity.

Goal 2

Students will acquire the skills to use appropriate conceptual and methodological tools to structure inquiries about human-environment interactions.

Graduates should be able to:

2.1. Assess the relevant contexts for addressing environmental problems at the appropriate spatial, temporal, and organizational scale(s).

2.2. Identify the relevant biological, historical, sociocultural, governance, and political issues that need to be addressed.

2.3. Identify what constitutes valid and relevant evidence to address the question and demonstrate an ability to understand and work with quantitative information.

2.4. Conduct ethical primary and secondary research using appropriate methods and considering relevant community norms.

2.5. Analyze and interpret evidence.

2.6. Identify appropriate governance tools to manage human-environment impacts and be capable of engaging with regulatory, legislative, and other democratic processes.

2.7. Apply this understanding to identify policies and plans that address the problem.

2.8. Identify different decision-making processes and criteria for selecting from among alternatives.

2.9. Evaluate the alternatives' environmental and differentiated social consequences.

2.10. Identify relevant audiences, determine communication goals, and communicate the results in oral and/or written form in a manner effective for each targeted audience.

2.11. Work effectively in team settings.

Goal 3

Students will undertake their work guided by ethical considerations. They will identify their own values with respect to environmental, health, and food issues. They will evaluate and address the ethical dimensions and implications of related problems, assessments, plans, and communication, including their differentiated social impacts.

Environmental Policy, Institutions, and Behavior 374 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

For an up-to-date description of environmental policy, institutions, and behavior major requirements, courses, and course sequences please refer to the program website here.

SEBS UNDERGRADUATE CORE CURRICULUM (39 credits)

Contemporary Challenges (6 credits) *Two courses, one in each of the Contemporary Challenges areas: Diversities and Social Inequalities* [CC-D] *and Our Common Future* [CC-O]

Experiential Learning (3 credits) *Students must participate in a certified experience that meets this goal* [EL]

Natural Sciences (6 credits) *Students must take two courses, one each in two of the following areas: physical, biological, or environmental sciences* [NS]

Historical Analysis (3 credits) *Students must take one course* [HST]

Social Analysis (6 credits) *SEBS students must complete two courses, one in either social/cultural analysis or economic analysis, and one in governmental and regulatory analysis* [SCL]

Arts and Humanities (3 credits) *Students must complete one course* [AH]

Writing and Communication (6 credits) *Students must take 01:355:101 or its equivalent* [WC] *and one course that fulfills the learning goal, communicate effectively in modes appropriate to a discipline or area of inquiry* [WCD].

Quantitative and Formal Reasoning (6 credits) *Students must take two courses* [QQ; QR]

Major Requirements for All Students Regardless of Matriculation Date

Requirement V8: Foundation courses (15 credits)

11:374:101 Introduction to Human Ecology
11:374:279 Politics of Environmental Issues
11:374:305 Globalization, Development, and Environment
11:374:312 Environmental History
11:374:460 Environmental Law and Policy

Requirement V9: Methods (9 credits)

Statistics (choose one):
01:960:211 Statistics I
01:960:401 Basic Statistics for Research
10:762:205 Basic Statistical Methods for Policy, Planning, and Health
11:374:302 Data Analysis in Human Ecology

Required:
11:374:110 Theories and Reasoning in Human Ecology
11:374:201 Research Methods

Requirement V10: Math Proficiency

Notes: All students must place in Precalculus or higher or complete Intermediate Algebra (01:640:026)

Requirement V11: Skills (9 credits)

Required:
11:374:220 Environmental Solutions
11:374:280 Careers in EPIB

Communication, choose one:
11:374:225 Environment in Society and Mass Media
11:374:240 Visualizing Information: Storytelling with Data
11:374:310 Storytelling About Science
11:374:311 Environmental Writing
11:374:325 Environmental Communication

Requirement V12: Experiential Learning Requirement (3 credits)

Choose one:
11:374:399 Practicum in Sustainability
11:374:481 Watershed Management Internship
11:374:482 Climate Action Internship
11:374:483 Science and Communication Internship
11:374:490 Readings and Practicum in Human Ecology
11:374:492 Environmental Studies Internship

Requirement V13: Policy, Governance, and Management Cluster (3 credits)

Choose one:
11:374:175 Energy and Society
11:374:115 Water and Society
11:374:313 U.S. Environmental Policy
11:374:314 Natural Resource Policy
11:374:428 Marine Fisheries Policy
11:374:462 International Environmental Law

Requirement V14: Food, Health, and Disease Cluster (3 credits)

Choose one:
11:374:141 Health and Society
11:374:430 Risk, Health, and Safety
11:374:436 Segregation and Health
11:374:437 Culture and Health
11:374:438 Health in the Latino Community

Requirement V15: Globalization, Development, and Sustainability Cluster (3 credits)

Choose one:
11:374:289 Sustainable Food: Politics, Policy, and Ethics
11:374:299 Introduction to Sustainability
11:374:426 Climate Change Policy
11:374:429 Agrarian Landscapes

Requirement V16: People, Communities, and the Environment Cluster (3 credits)

Choose one:
11:374:223 Urban Society and Environment
11:374:322 Environmental Behavior
11:374:335 Communities and Environmental Change
11:374:440 Race and the Environment
11:374:416 Environmental Education
11:374:433 Environmental Justice

Requirement V17: Upper-Level Classes (6 credits)

Choose two additional 374 courses at the 300-400 level that are not being counted to fulfill other requirements. **Please note: 11:374:490, 11:374:491, and 11:374:492 cannot count toward this requirement.**

Requirement V18: Capstone (3 credits)

Choose one:
11:374:499 Capstone in Human Ecology
11:015:497 George H. Cook Honors
11:015:498 George H. Cook Honors
11:374:491 Capstone Independent Study

Unspecified Electives

In addition to courses meeting the above requirements, students can take other courses offered by the university, for which they meet the course eligibility requirements, to bring their total number of credits to the minimum of 120 (matriculated 2018 or later) or 128 (matriculated prior to 2018) required for graduation.

Environmental Sciences 375 (SEBS)

ENVIRONMENTAL SCIENCES 375

Degree: B.S.

Department: Environmental Sciences

Department Chair: Donna Fennell

Department Website: Here

Undergraduate Program Director: Jeffra Schaefer

The environmental sciences program is designed to provide students with an understanding of the application of the biological, chemical, and physical sciences to problems in the environment. The core emphasizes the chemical, physical, and biological principles, and options and electives allow specialization in the study of air, water, or soils, as well as pollution and treatment sciences, and environmental health.

With the consultation of a faculty adviser, students can design a program to meet the requirements for graduate study or to provide the basis for a professional career in government, education, consulting, or industry.

The program offers a bachelor of science (B.S.) in environmental sciences, as well as a minor in environmental sciences. Within the B.S. program, we offer three options: environmental science, applied environmental science, and environmental health. The differences between the options are not large, but generally the environmental science option is more theoretical and is preferred by students considering graduate school, while the applied option is more practical and is intended to prepare students for careers in the environmental field. The environmental health option is geared toward careers in health, such as the occupational health and safety arena.

Environmental science offers a co-terminal 4+1 BS+MS program where students can pursue a 5-year joint Bachelor of Science (B.S.) and Master of Science (M.S.) degree in environmental science (website: here). Likewise, students can apply for the Accelerated Bachelors and Masters of Public Health degrees (BS/MPH) at Rutgers (website: here). Students interested in this either opportunity should discuss specific course requirements with their adviser or the undergraduate program director of environmental science.

Students can meet the requirements for the 40-hour OSHA Hazardous Waste Operations and Emergency Response certification by including the following course in their program:

11:375:434 Principles of Industrial Hygiene (3)

Environmental Sciences 375 (SEBS)

Learning Goals

Learning Goals

Students completing this program will be able to:

1. Apply knowledge, skills, and techniques from the sciences and mathematics to identify, characterize and provide solutions to environmental problems
2. Design and conduct experiments, analyze, and interpret data to draw informed conclusions
3. Communicate technical information effectively (orally, in writing, and through electronic media)
4. Function effectively on teams to accomplish collaborative tasks
5. Recognize and discuss the ethical and professional responsibilities of environmental scientists in addressing contemporary environmental science issues and the impact of environmental science in a global and societal context

Environmental Sciences 375 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

For an up-to-date description of the environmental science major requirements, courses and course sequences please refer to the program website here.

SEBS UNDERGRADUATE CORE CURRICULUM (39 credits)

Options are chosen from lists of courses certified in each learning goal: Here.

Note: The SEBS Core Curriculum requirements differ slightly from SAS Core Curriculum requirements

Contemporary Challenges (6 credits) *Two courses, one in each of the Contemporary Challenges areas: Diversities and Social Inequalities* [CC-D] *and Our Common Future [CC-O]*

Experiential Learning (3 credits) *Students must participate in a certified experience that meets this goal* [EL]

Natural Sciences (6 credits) *Two courses, one each in two of the following areas: physical, biological, or environmental sciences* [NS]

Historical Analysis (3 credits) *One course* [HST]

Social Analysis (6 credits) *Two courses, one in either social/cultural analysis or economic analysis, and one in governmental and regulatory analysis* [SCL]

Arts and Humanities (3 credits) *One course* [AH]

Writing and Communication (6 credits) *01:355:101 or its equivalent* [WC] *and one course in communicating effectively in modes appropriate to a discipline or area of inquiry* [WCD]

Quantitative and Formal Reasoning (6 credits) *Two courses* [QQ; QR]

Graduation Requirements for the Major

Students matriculating prior to the fall semester 2015 in the School of Environmental and Biological Sciences (SEBS) must complete the SEBS general education requirements. In addition, students majoring in environmental sciences must complete the major requirements described below.

Students matriculating fall 2015 or after and transfer students matriculating in 2016 and after must complete a goal-based Core Curriculum in place of general education requirements. The goal-based core is described here. Courses are certified for the Core Curriculum by a faculty committee. A current list of certified courses can be found here. Environmental sciences major requirements are as described below.

For an up-to-date description of environmental sciences major requirements, courses, and course sequences please refer to the program website here.

PROFICIENCY IN THE ENVIRONMENTAL SCIENCES (63-82 credits)

1. **Biological and Physical Sciences (24-34)**

01:119:103 Principles of Biology (3) or 01:119:115-116 General Biology I & II (3,3)1
01:160:161-162 General Chemistry (4,4)1
01:160:171 Introduction to Experimentation (1)

01:160:209 Elementary Organic Chemistry (3) or 01:160:307-308 Organic Chemistry (4,4)
01:750:193-194 Physics for the Sciences (4,4) or 01:750:203-204 General Physics (3,3)1
11:216:351 Principles of Ecology (3)

2. Quantitative Skills (7)

Calculus I (4)2

11:573:232-233 Fundamentals of Geomatics (3) and Lab (1)
Choose one of the following:

i. 01:960:211 Statistics I (3)3 or equivalent
ii. 11:375:303 Numerical Methods in Environmental Science (3)

3. Environmental Sciences (12)

11:375:201 Environmental Biology (3)
11:375:202 Environmental Chemistry (3)
11:375:203 Physical Principles of Environmental Sciences (3)
11:375:310 Analytical Environmental Chemistry Laboratory (3)4

11:375:390 Careers in Environmental Science (1)

4. Environmental Science Lab Course, *choose one* (2-4)

11:375:312 Environmental Microbiology Laboratory (2)
11:375:360 Soils and Water (4)
11:375:424 Air Sampling Techniques (3)

Also choose from one of the following options:

Environmental Science Option (25)
01:640:1 Calculus 2 (4)
11:375:423 Environmental Fate and Transport (3)
Environmental Science Option Courses, choose *three* (9)
11:375:346 Introduction to Atmospheric Chemistry (3)
11:375:340 Environmental Applications of Organic Chemistry (3)
11:375:302 Water and Wastewater Treatment (3)
11:375:411 Environmental Microbiology (3)
11:375:444 Water Chemistry (3)
11:375:453 Soil Ecology (3)
Electives, *see below (9)*

Applied Environmental Option (24)
11:375:302 Water and Wastewater Treatment (3)
11:375:307 Solid Waste Management and Treatment (3)
Choose *two* (6)
11:375:322 Energy Technology & the Environment (3)

11:375:430 Hazardous Waste (3)
11:375:407 Environmental Toxicology (3)
Electives, *see below (12)*

Environmental Health Option (23-25)
11:375:302 Water and Wastewater Treatment (3)
11:375:307 Solid Waste Management and Treatment (3)
11:375:407 Environmental Toxicology (3) or ENOH 0594 Environmental and Occupational Toxicology (3)*
10:832:335 Epidemiology (3) or PHCO 0502 Principles and Methods of Epidemiology (3)*
Microbiology course, choose one (2-4):
  11:375:312 Environmental Microbiology Laboratory (2) (if not already used for other major requirement)
  11:680:201 Introduction to Microbiology (3)
  11:680:390 General Microbiology (4)
Electives, see below (9)

*School of Public Health classes for B.S./M.P.H students or B.S. students with permission.

ELECTIVES

Students can choose from any 300- or 400-level 375 course or any of the following list of non-375 courses. **Note that to satisfy as an elective course, it must not already be used to satisfy other environmental science major or option requirements.**

Possible electives:
11:680:201 Introduction to Microbiology (3)
11:680:390 General Microbiology (4)
11:374:460 Environmental Law and Policy I - Nature, Law, and Society (3)
11:375:302 Water and Wastewater Treatment (3)
11:375:303 Numerical Methods (3)
11:375:307 Solid Waste Management and Treatment (3)
11:375:322 Energy, Technology, and its Environmental Impact (3)
11:375:340 Environmental Applications of Organic Chemistry (3)
11:375:346 Introduction to Atmospheric Chemistry (3)
11:375:360 Soils and Water (4)
11:375:407 Environmental Toxicology (3)
11:375:411 Environmental Microbiology (3)
11:375:421 Principles of Air Pollution (3)
11:375:423 Environmental Fate and Transport (3)
11:375:424 Air Sampling and Analysis Techniques (3)
11:375:430 Hazardous Wastes (3)
11:375:434 Principles of Industrial Hygiene (3)
11:375:444 Water Chemistry (3)
11:375:450 The Terrestrial Carbon Cycle (3)
11:375:453 Soil Ecology (3)
11:375:474 Coastal Biogeochemical Cycles in a Changing World (3)

1Satisfies SEBS Natural Science [NS] requirement
2Satisfies SEBS Mathematical or Formal Reasoning [QR] requirement
3Satisfies SEBS Quantitative Information [QQ] requirement
4Satisfies SEBS Discipline-Based Writing and Communication [WCd] requirement

Exercise Science 377 (SEBS)

EXERCISE SCIENCE 377

Offered in cooperation with the Department of Kinesiology and Health of the School of Arts and Sciences (SAS) students from the School of Environmental and Biological Sciences (SEBS) matriculating prior to the fall semester in 2015 must complete the SEBS general education requirements. SEBS students matriculating fall 2015 or after and transfer students matriculating in 2016 and after must complete a goal-based core curriculum in place of general education requirements. The goal-based core is described here. SEBS students are advised that the SEBS core is very similar to the SAS core, but it is not identical.

In addition, SEBS students majoring in exercise science must complete major requirements as described on the SAS program catalog page. The learning goals, options, entry requirements, major, and courses are also as described on the exercise science catalog pages in the Programs of Study and Courses for Liberal Arts and Sciences Students chapter of this catalog.

SEBS students who qualify for departmental honors may undertake the George H. Cook Scholars Program in conjunction with departmental honors.

Food Science 400 (SEBS)

FOOD SCIENCE 400

Degree: B.S.

Director: Chitra Ponnusamy (chitra.ponnusamy@rutgers.edu)

Program Webpage: Here

Managing Department Webpage: Here

Food science is the study of the chemical, biological, and engineering aspects of food and its components. While this curriculum applies principles acquired in biology, chemistry, physics, and mathematics to food, there is emphasis on the development of important problem-solving skills, giving students experience in reasoning and the use of scientific and mathematical techniques. Attention also is devoted to current issues, innovations, and ethical issues in foods and food processing. Finally, students are given an opportunity to utilize their creative abilities in a course devoted to the development of new foods and food products.

All Food Science majors are required to complete basic sciences and Food Science courses, along with the current SEBS Core Curriculum. Starting Fall 2022, all Food Science majors must follow One Pathway to Food Science Major. Upon graduation, students can choose to apply for jobs in food, beverage, and related industries or pursue graduate studies.

Food Science 400 (SEBS)

Learning Goals

Learning Goals

Program Goal 1: Graduates will demonstrate and apply knowledge of the core competencies in food processing and engineering.

Program Goal 2: Graduates will demonstrate and apply knowledge of the core competencies in food chemistry and analysis.

Program Goal 3: Graduates will demonstrate and apply knowledge of the core competencies of food microbiology.

Program Goal 4: Graduates will demonstrate critical thinking and quantitative reasoning skills to solve technical and applied problems in food science.

Program Goal 5: Graduates will effectively communicate food science issues.

Program Goal 6: Graduates will demonstrate effective professional and leadership skills.

Food Science 400 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

For an up-to-date description of food science major requirements, courses, and course sequences please refer to the program website here.

SEBS UNDERGRADUATE CORE CURRICULUM (39 credits)

Contemporary Challenges(6 credits)*Two courses, one in each of the Contemporary Challenges areas: Diversities and Social Inequalities* [CC-D] *and Our Common Future* [CC-O]

Experiential Learning(3 credits)*Students must participate in a certified experience that meets this goal*[EL]

Natural Sciences(6 credits)*Students must take two courses, one each in two of the following areas: physical, biological, or environmental sciences*[NS]

Historical Analysis(3 credits)*Students must take one course*[HST]

Social Analysis(6 credits)*SEBS students must complete two courses, one in either social/cultural analysis or economic analysis, and one in governmental and regulatory analysis*[SCL]

Arts and Humanities(3 credits)*Students must complete one course*[AH]

Writing and Communication(6 credits)*Students must take 01:355:101 or its equivalent*[WC]*and one course that fulfills the learning goal, communicate effectively in modes appropriate to a discipline or area of inquiry*[WCD]

Quantitative and Formal Reasoning(6 credits)*Students must take two courses*[QQ; QR]

Graduation Requirements for One Pathway to Food Science (400) Major
Starting Fall 2022, all Food Science majors must follow One Pathway to Food Science Major. One Pathway provides all majors with a unified, comprehensive education in Food Science major. All Food Science majors are required to complete basic sciences and Food Science courses, along with the current SEBS Core Curriculum. Upon graduation, students can choose to apply for jobs in food, beverage, and related industries or pursue graduate studies.

A. CORE + FOOD SCIENCE MAJOR REQUIRED COURSES (18 Cr)

QQ - 01:640:135/151 (4) Calculus I
QR - 01:960:211/285/401/11:373:215 (3) Statistics
NS - 01:119:115 (4) General Biology I
NS - 01:160:161 (4) General Chemistry I
EL - 11:400:493/494/11:902:300 SPIN (3) Experiential Learning

B. SEBS CORE COURSES (24 cr)

WC - 01:355:101 (3) Expository Writing
CC Contemporary Challenges (6)
A & H Arts and Humanities (3)
HST, SCL Historical, Social Analysis (9)
WCD 2nd writing course (3)

C. REQUIRED FOOD SCIENCE COURSES (38 cr)

11:400:103 OR 104 (3) Science of Food/Food and Health
[Satisfies NS-core requirements]. This course satisfies Food Science Program Learning Goal: Graduates will effectively communicate food science issues.
Prerequisites: None. Need to complete only one.

11:400:201+ 202 (5) Principles of Food Science + lab
This course satisfies the Food Science Program Learning Goal: Graduates will demonstrate and apply knowledge of the core competencies in food chemistry and analysis.
Prerequisites: General Biology I and II (01:119:115-116) and General Chemistry I and II (01:160:161-162). Pre- or corequisites for 201: Organic Chemistry (01:160:209 or 307).
Co-requisite for 202: Principles of Food Science (11:400:201)

11:400:301 (4) Food Processing Technologies
This course satisfies the Food Science Program Learning Goal: Graduates will demonstrate and apply knowledge of the core competencies in food processing and engineering.
Prerequisites: Physics I (01:750:193 or 201 or 203 and 205) and Calculus I (01:640:135 or 151).

11:400:302 (3) Food Process Engineering
This course fulfills Food Science Program Learning goal: Graduates will demonstrate and apply knowledge of the core competencies in Food Processing and Engineering.
Pre-requisite: Food Processing Technologies 11:400:301

11:400:304+305 (4) Food Analysis + Laboratory
This course fulfills Food Science Program Learning Goal: Graduates will demonstrate and apply knowledge of the core competencies in Food Chemistry and analysis. Students MUST register for 304 and 305 in the same semester.
Pre-requisites for 304: Principles of Food Science (11:400:201), Organic Chemistry (01:160:209)
Co-requisite for 305: Food Analysis (11:400:304).

11:400:314 (2) Current Issues in Food Science Food Laws
This course satisfies Food Science Program Learning Goal: Graduates will effectively communicate food science issues.
Prerequisite: Principles of Food Science (11:400:201).

11:400:405 (3) Sensory Evaluation of Foods
This course satisfies Food Science Program Learning Goal: Graduates will demonstrate critical thinking and quantitative reasoning skills to solve technical and applied problems in food science.
Prerequisite: Statistics (01:960:211/285/401 or 11:373:215).

11:400:411+ 413 (4) Food Chemistry + laboratory
This course satisfies Food Science Program Learning Goal: Graduates will demonstrate and apply knowledge of the core competencies in food chemistry and analysis.
Prerequisites for 411: Principles of Food Science 11:400:201; Must have previously taken Biochemistry (11:115:301 or 403) or be registered this semester.
Co-requisite for 413: Food Chemistry 11:400:411

11:400:412 (3) Food Product Development
This course satisfies Food Science Program Learning Goal: Graduates will demonstrate effective professional and leadership skills.
Prerequisites: Food Processing Technologies (11:400:301) and Current Issues in Food Science and Food Law (11:400:314) and Food Chemistry (11:400:411) and Sensory Evaluation of Foods (11:400:405).
Pre-or corequisite: Food Microbiology (11:400:423).

11:400:419 (3) Food Physical Systems
This course satisfies Food Science Program Learning Goal: Graduates will demonstrate and apply knowledge of the core competencies in Food Chemistry and analysis.
Prerequisite: Biochemistry 11:115:301 or 403.

11:400:423+ 424 (4) Food Microbiology + laboratory
This course satisfies Food Science Program Learning Goal: Graduates will demonstrate and apply knowledge of the core competencies of food microbiology.
Prerequisite: Elementary Organic Chemistry (01:160:209) OR Orgo I (01:160:307) OR Introduction to Microbiology (11:680:201) OR General Microbiology (01:447:390/11:680:390)
Pre- or corequisite: Food Microbiology 11:400:423

D. REQUIRED SCIENCE COURSES (22 cr)

01:160:209+ 211 (4) Elementary Organic Chemistry + lab
01:750:193/201/203,205(4) Physics with lab
11:115:301 OR 01:694:301 (3) Biochemistry
01:119:116 + 117 (6) General Biology II + lab
01:160:162 + 171 (5) General Chemistry II + lab

E. ELECTIVE COURSES (18 cr)
Students can choose their area of specialization using elective course credits. There is sufficient flexibility for each student to add a minor of their choosing (although some minors will require credits beyond the 120 required for graduation.) This flexibility allows students to build expertise in a complementary field (Microbiology, Spanish, Entrepreneurship, etc.) that may enhance their career prospects in food technology (Business Economics for management positions, Sustainability for specialized positions, Animal Sciences to work within pet food industries, etc.) or even to satisfy a purely personal academic interest (philosophy, history, linguistics, etc.).

Elective Courses offered by the Food Science department

11:400:105 (1) Introduction to Food Science: The Discipline and The Major

11:400:106 (3) Food as Medicine

11:400:107 (3) Foods: from Field to Table

11:400:315 (3) Food and Sustainability: Study abroad in Thailand

11:400:316 (3) Sustainable Food Production: Study abroad in Ireland

11:400:350 (1.5) Wine Basics from Field to Glass

11:400:410 (3) Nutrigenomics and Nutraceuticals

11:400:422 (3) Food Safety: Fads, Facts, and Politics

11:400:490 (3) Applying immersive learning to rural Agro-Food issues: Study Abroad in Southern India

Landscape Architecture 550 (SEBS)

LANDSCAPE ARCHITECTURE 550

Degree: B.S.L.A.

Director: Arianna Lindberg (a.lindberg@rutgers.edu)

Program Webpage: Here

Managing Department Webpage: Here

Landscape Architecture is the planning and design of outdoor environments at the residential, city, and regional scale. The program engages students in art, science, theory, and practice with a commitment to equitable, sustainable, and resilient solutions that contribute to human and environmental health and well-being.

Our nationally accredited program prepares students for Landscape Architecture licensure through a creative, analytic, and interdisciplinary approach to stewardship of the environment. Set in the School of Environmental and Biological Sciences, the program examines the ideas shaping the interaction of people and landscape and integrates scientific knowledge creatively in the designed environment. Interdisciplinary courses with environmental planning students provide a mutual foundation for both majors, promote collaboration between programs, and sets the groundwork for professional practice where landscape architects are part of or lead interdisciplinary teams of planners, engineers, ecologists, and social scientists.

The program also has a Minor in Landscape Design for students interested in
exploring design solutions to the environmental issues of our time--climate change, demographic shifts, increasing income inequality, food scarcity, and the spread of global pandemics to make our world more sustainable, viable, just, healthy, inclusive, and beautiful.

Landscape Architecture 550 (SEBS)

Learning Goals

Learning Goals

Our Program's Learning Goals

Explore . . . the potential of space and spatial relationships to create socially vibrant and culturally inclusive design solutions.

Analyze . . . and thoughtfully incorporate natural features and systems to create enduring and ecologically sensitive design solutions.

Understand . . . social, cultural, and behavioral factors in the historical development of designed and everyday landscapes to equitably shape our public realm.

Master . . . technical and industry standards to effectively and sustainability foster safe accessible environments using the materials, methods, and technologies of site design and engineering.

Apply . . . design principles at large as well as small scales.

Demonstrate . . . knowledge of the professional practice skills required for the Landscape Architecture Accreditation licensure exam and manifest sensitivity to issues of power.

Communicate . . . creatively with the public, communities, and policymakers in graphic, written, and verbal formats to advance social justice

Landscape Architecture 550 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

For an up-to-date description of the landscape architecture major requirements, courses, and course sequences please refer to the program website here.

SEBS UNDERGRADUATE CORE CURRICULUM (39 credits)

Contemporary Challenges (6 credits) *Two courses, one in each of the Contemporary Challenges areas: Diversities and Social Inequalities* [CC-D] *and Our Common Future* [CC-O]

Experiential Learning (3 credits) *Students must participate in a certified experience that meets this goal* [EL]

Natural Sciences (6 credits) *Students must take two courses, one each in two of the following areas: physical, biological, or environmental sciences* [NS]

Historical Analysis (3 credits) *Students must take one course* [HST]

Social Analysis (6 credits) *SEBS students must complete two courses, one in either social/cultural analysis or economic analysis, and one in governmental and regulatory analysis [SCL]*

Arts and Humanities (3 credits) *Students must complete one course* [AH]

Writing and Communication (6 credits) *Students must take 01:355:101 or its equivalent* [WC] *and one course that fulfills the learning goal, communicate effectively in modes appropriate to a discipline or area of inquiry* [WCD].

Quantitative and Formal Reasoning (6 credits) *Students must take two courses* [QQ; QR]

Graduation Requirements: Major in Landscape Architecture (550)

No more than one course with a grade equal to D may be used from (landscape architecture courses) in any requirements or conditions.

Year 1

11:460:100* Planet Earth or 01:450:101 Earth Systems

01:640:115* Pre-Calculus or 11:640:111 and 11:640:112 or 11:640:135 or 11:640:139 or 11:640:151

11:573:231 Fundamentals of Environmental Planning

11:550:237* Landscape Drawing and Drafting

11:550:133* Architectural Design

Core requirements (contemporary challenges, writing, economics, social analysis). (See here for core classes met by major requirements.)

Year 2

11:550:231	11:550:232
11:550:241*	11:573:232
11:550:233	11:573:233
11:119:103*	11:550:341
	11:550:345, 11:550:347

Year 3

11:550:331	*11:550:332*
11:550:250*	11:550:340
11:216:332	11:550:301* or Theory Elective (see DN List)
or 11:216:101	
11:550:350	Plant/Ecology Elective (see DN List)

Year 4

11:550:431	11:550:432 or 11:550:333 or 11:550:443
11:550:441	11:550:435
Electives	11:550:499

*Meets core requirement

Marine Sciences 628 (SEBS)

MARINE SCIENCES 628

Marine Sciences 628

Degree: B.S.

Director: Silke Severmann, Marine and Coastal Sciences Building, Room 303D, 848-932-3488 (silke@marine.rutgers.edu)

Program Webpage: Here

Marine science is the study of the marine environment and its interactions with the Earth, the biosphere, and the atmosphere. It is, therefore, an interdisciplinary science requiring a knowledge of the principles of physics, geology and geophysics, mathematics, chemistry, and biology. A major in marine sciences provides students with a broad curriculum in the sciences, which demonstrates how the different disciplines can be brought to bear on understanding marine processes and managing ocean resources wisely.

The major prepares students for graduate work in oceanography or one of the basic disciplines, civil service careers in environmental management, employment in the many applied environmental and marine science fields, or teaching in secondary schools.

The marine science courses emphasize the improvement of oral and written communication skills, and competency in reading, understanding, and synthesizing scientific literature. Courses at all levels emphasize hands-on, experiential learning in the laboratory or the field. Students also are required to complete the experience-based education requirement with at least one semester or summer of supervised, independent research.

Options

The program includes the following options:

Marine Biology/Biological Oceanography. This option prepares students for professional opportunities or graduate study in oceanography or the biological sciences. Concentrations within the option permit students to focus on different levels of biological organization at the molecular, cellular, organismic, community, or ecosystem level. Depending on their choice of electives, students also may fulfill the requirements of a major in the biological sciences or ecology and natural resources.

Marine Chemistry. This option prepares students for professional opportunities or graduate study in oceanography or chemistry. Depending on their choice of electives, students may also fulfill the requirements of a major in chemistry.

Marine Geology. This option prepares students for graduate study in oceanography, geology, environmental science, or an allied field, as well as for immediate employment. Depending on their choice of electives, students may also fulfill the requirements of a major in geological sciences.

Physical Oceanography. This option prepares students for graduate study in physical oceanography, meteorology, fluid dynamics, or a related field, as well as immediate employment in environmental agencies or consulting firms and technical positions in marine sciences.

Directed Marine Studies. This option prepares students for professional opportunities in oceanography, the biological sciences, and related fields. It differs from the other four options in requiring students to complete one of several minor and certificate programs offered by the School of Arts and Sciences or the School of Environmental and Biological Sciences, either the Professional Writing Certificate (355), the minor in Education (300), the Certificate in Environmental Geomatics (372), the minor in Environmental Policy, Institutions, and Behavior (374), the minor in Fisheries Science (392), the minor in Sustainability, or a program approved by the Undergraduate Program Director. This requirement is included in order to ensure that students in this option will acquire a focused set of knowledge and skills to complement their marine science studies and to help them find employment upon graduation. Students in this option would choose the minor or certificate program that fulfills part of their major requirements no later than in their fourth semester of study at the university.

Marine Sciences 628 (SEBS)

Learning Goals

Learning Goals

1. Master the basic biological, chemical, physical, and geological principles of marine science.

2. Analyze and interpret contemporary oceanographic datasets.

3. Show evidence of scientific literacy, and communicate the information effectively both orally and in writing.

4. Develop, conduct, and report on an applied research experience in marine science in collaboration with a scientific mentor.

5. Evaluate contemporary global issues and the ethics of how the ocean's resources are used.

Marine Sciences 628 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

For an up-to-date description of marine sciences major requirements, courses, and course sequences please refer to the program website here.

SEBS UNDERGRADUATE CORE CURRICULUM (39 credits)

Contemporary Challenges (6 credits) *Two courses, one in each of the Contemporary Challenges areas: Diversities and Social Inequalities* [CC-D] *and Our Common Future* [CC-O]

Experiential Learning (3 credits) *Students must participate in a certified experience that meets this goal* [EL]

Natural Sciences (6 credits) *Students must take two courses, one each in two of the following areas: physical, biological, or environmental sciences* [NS]

Historical Analysis (3 credits) *Students must take one course* [HST]

Social Analysis (6 credits) *SEBS students must complete two courses, one in either social/cultural analysis or economic analysis, and one in governmental and regulatory analysis* [SCL]

Arts and Humanities (3 credits) *Students must complete one course* [AH]

Writing and Communication (6 credits) *Students must take 01:355:101 or its equivalent [WC] and one course that fulfills the learning goal, communicate effectively in modes appropriate to a discipline or area of inquiry* [WCD].

Quantitative and Formal Reasoning (6 credits) *Students must take two courses* [QQ; QR]

Major Requirements For All Students Regardless of Matriculation Date

A. REQUIRED COURSES (12)

Professional Ethics
Ethical issues in marine sciences are addressed throughout the program in both introductory and advanced courses, especially within the framework of the experience-based education requirement.

- 01:960:401 Basic Statistics for Research (3)
- 11:628:120 Introduction to Oceanography (3)
- 11:628:320 Dynamics of Marine Ecosystems (3)
- 11:628:363 Oceanographic Methods and Data Analysis: Biol/Chem (3) OR 11:628:364 Oceanographic Methods and Data Analysis: Biol/Physical (3)

B. OPTIONS (63-78)

1. Marine Biology/Biological Oceanography (70-74)
Required Courses (58-59)

- 01:119:115-116 General Biology I&II (4+4)
- 01:119:117 Biological Research Lab (2)
- 01:447:380 Genetics (4) OR 11:776:305 Plant Genetics (4)
- 01:160:161-162 General Chemistry I&II (4+4)
- 01:160:171 Introduction to Experimentation (1)
- 01:160:307-308 Organic Chemistry I&II (4+4) OR
    - 01:160:209 Elementary Organic Chemistry (3) AND 01:694:301/11:115:301 Introductory Biochemistry (3) AND 01:694:313/11:115:313 Introductory Biochemistry Laboratory (1)
- 01:640:135-136 Calculus I&II (4+4)
- 01:750:193-194 Physics for the Sciences I&II (4+4)
- 11:628:461 Biology of Living in the Ocean: Water Column Ecosystems (3)
- 11:628:462 Biology of Living in the Ocean: Boundary Ecosystems (3)
- Experiential Learning (6)

One of the following (3-4):

- 01:146:356 Systems Physiology (3) AND 01:146:357 Systems Physiology Lab. (1)
- 11:216:360 Animal Physiological Ecology (3)
- 11:680:481 Microbial Physiology (3)
- 11:776:382 Plant Physiology (4)

One of the following (3-4):

- 11:628:321 Ichthyology (4)
- 11:680:390 General Microbiology (4)
- 11:216:323 Ornithology (4)
- 11:216:324 Invertebrate Zoology (4)

- 11:216:325 Vertebrate Zoology (4)
- 11:776:400 Fungi in the Environment (3)

One of the following (3-4):

- 11:628:405 Molecular Microbial Oceanography (3)
- 11:628:410 Biophysical Interactions: Barnacles to Jellyfish (3)
- 11:628:476 History of the Earth System (3)
- 11:670:451 Remote Sensing of the Ocean and Atmosphere (3)
- 11:216:240 Behavioral Biology (4)
- 11:216:351 Principles of Ecology (3)
- 11:216:486 Principles of Evolution (3)

At least 3 credits from the following:

- 11:628:201-203, 205-210 Topics in Marine Science (1.5)
- 11:628:309 Fishery Science (3)
- 11:628:317 Aquaculture (3)
- 11:628:340 Identification of Marine Invertebrates (2)
- 11:628:341 Hydrothermal Vents (3)
- 11:628:451 Physical Oceanography (4)
- 11:628:472 Chemical Oceanography (3)
- 11:628:402 The Role of Polar Regions in the Earth System
- 11:628:474 Coastal Biogeochemical Cycles in a Changing World

2. Marine Chemistry (66-68)

Required courses (60)

- 01:119:115-116 General Biology I&II (4+4)
- 01:119:117 Biological Research Lab (2)
- 01:160:161-162 General Chemistry I&II (4+4)
- 01:160:171 Introduction to Experimentation (1)
- 01:160:251 Analytical Chemistry (3)
- 01:160:307-308 Organic Chemistry I&II (4+4)
- 01:160:311 Organic Chemistry Laboratory (2)
- 01:160:348 Instrumental Analysis (3)
- 01:640:151-152 Calculus for Mathematical and Physical Sciences I&II (4+4)
- 01:750:203-204 General Physics I&II (3+3)
- 01:750:205-206 General Physics Laboratory I&II (1+1)
- 11:628:472 Chemical Oceanography (3)
- Experiential Learning (6)

One of the following (3-4)

- 01:460:101 Introductory Geology (3)

- 01:460:304 Introduction to Geochemistry (4)
- 01:460:417 Environmental Geochemistry (3)
- 11:375:202 Chemical Principles Environmental Science (3)
- 11:375:340 Environmental Applications of Organic Chemistry (3)
- 11:375:360 Soils and Water (4)
- 11:375:444 Water Chemistry (3)
- 11:670:323 Thermodynamics of the Atmosphere (3)
- 11:670:451 Remote Sensing of the Ocean and Atmosphere (3)

At least 3 credits from the following (3-4):

- 11:628:201-203, 205-210 Topics in Marine Science (1.5)
- 11:628:309 Fishery Science (3)
- 11:628:317 Aquaculture (3)
- 11:628:340 Identification of Marine Invertebrates (2)
- 11:628:341 Hydrothermal Vents (3)
- 11:628:402 The Role of Polar Regions in the Earth System
- 11:628:405 Molecular Microbial Oceanography (3)
- 11:628:410 Biophysical Interactions: from Barnacles to Jellyfish (3)
- 11:628:451 Physical Oceanography (4)
- 11:628:461 Biology of Living in the Ocean: Water Column Ecosystems (3)
- 11:628:462 Biology of Living in the Ocean: Boundary Ecosystems (3)
- 11:628:474 Coastal Biogeochemical Cycles in a Changing World

3. Marine Geology (71-74)

Required Courses (59)

- 01:119:115-116 General Biology I&II (4+4)
- 01:119:117 Biological Research Lab (2)
- 01:160:161-162 General Chemistry I&II (4+4)
- 01:160:171 Introduction to Experimentation (1)
- 01:460:101 Intro Geology (3)
- 01:460:330 Sedimentary Geology (4)
- 01:460:451 Marine Geology (3)
- 01:750:203-206 General Physics I+II and Lab I+II (4+4)
- 01:640:151-152 Calculus for Mathematical and Physical Sciences I&II (4+4)
- 01:750:203-204 General Physics I&II (3+3)
- 01:750:205-206 General Physics Laboratory I&II (1+1)
- Experiential Learning (6)

One of the following (3-4)

- 11:628:402 The Role of Polar Regions in the Earth System
- 11:628:451 Physical Oceanography (4)

- 11:628:461 Biology of Living in the Ocean: Water Column Ecosystems (3)
- 11:628:462 Biology of Living in the Ocean: Boundary Ecosystems (3)
- 11:628:472 Chemical Oceanography (3)
- 11:628:474 Coastal Biogeochemical Cycles in a Changing World

One of the following (3-4)

- 01:450:321 Geographic Information System (3)
- 01:460:303 Paleontology (4)
- 01:460:304 Introduction to Geochemistry (4)
- 01:460:407 Structural Geology (4)
- 01:460:414 Hydrological Processes (3)
- 01:460:453 Paleoecology (3)

One of the following (3-4)

- 01:450:403 Advanced Physical Geography (3)
- 01:460:306 Introduction to Geophysics (4)
- 01:460:417 Environmental Geochemistry (3)
- 11:628:476 History of the Earth Systems (3)
- 11:670:451 Remote Sensing of the Ocean & Atmosphere (3)

4. Physical Oceanography (63-64)

Required Courses (51-52)

- 01:119:103 Principles of Biology (3)
- 01:160:161-162 General Chemistry I&II (4+4)
- 01:160:171 Introduction to Experimentation (1)
- 01:640:151-152 Calculus for Mathematical and Physical Sciences I&II (4+4)
- 01:640:251 Multivariable Calculus (4)
- 01:640:252 Differential Equations (3) OR 01:640:244 Differential Equations/Engineers & Physics (4)
- 14:440:127 Intro Computers/Engineers (3) OR 11:670:212 Computational Methods Meteorology (3)
- 01:640:373 Numerical Analysis (3) OR 01:198:323 Numerical Analysis & Computing (3)
- 01:750:203-204 General Physics I&II (3+3)
- 01:750:205-206 General Physics Laboratory I&II (1+1)
- 11:628:451 Physical Oceanography (4)
- Experiential Learning (6)

Four of the following with at least one from Group A and at least one from Group B:

Group A

- 01:640:250 Introduction Linear Algebra (3)
- 01:640:421 Advanced Calculus/Engineers (3)
- 14:650:312 Fluid Mechanics (3)

Group B

- 11:628:402 The Role of Polar Regions in the Earth System
- 11:628:410 Biophysical Interactions: from Barnacles to Jellyfish (3)
- 11:628:461 Biology of Living in the Ocean: Water Column Ecosystems (3)
- 11:628:462 Biology of Living in the Ocean: Boundary Ecosystems (3)
- 11:628:472 Chemical Oceanography (3)
- 11:628:474 Coastal Biogeochemical Cycles in a Changing World
- 11:670:324 Atmospheric Thermodynamics (3)
- 11:670:451 Remote Sensing of the Ocean & Atmosphere (3)

5. Directed Marine Studies (74-78)

Required Courses (44)

- 01:119:115-116 General Biology I&II (4+4)
- 01:119:117 Biological Research Lab (2)
- 01:447:380 Genetics (4) OR 11:776:305 Plant Genetics (4)
- 01:160:161-162 General Chemistry I&II (4+4)
- 01:160:171 Introduction to Experimentation (1)
- 01:640:135 Calculus I (4)
- 01:750:193-194 Physics for the Sciences I&II (4+4)
- 11:628:461 Biology of Living in the Ocean: Water Column Ecosystems (3)
- 11:628:462 Biology of Living in the Ocean: Boundary Ecosystems (3)
- Experiential Learning (3)

One of the following (3-4):

- 01:146:356 Systems Physiology (3) AND 01:146:357 Systems Physiology Lab. (1)
- 11:216:360 Animal Physiological Ecology (3)
- 11:680:481 Microbial Physiology (3)
- 11:776:382 Plant Physiology (4)

One of the following (3-4):

- 11:628:321 Ichthyology (4)
- 11:680:390 General Microbiology (4)
- 11:216:323 Ornithology (4)
- 11:216:324 Invertebrate Zoology (4)
- 11:216:325 Vertebrate Zoology (4)
- 11:776:400 Fungi in the Environment (3)

One of the following (3-4):

- 11:628:405 Molecular Microbial Oceanography (3)
- 11:628:410 Biophysical Interactions: Barnacles to Jellyfish (3)

- 11:628:476 History of the Earth System (3)
- 11:670:451 Remote Sensing of the Ocean and Atmosphere (3)
- 11:216:240 Behavioral Biology (4)
- 11:216:351 Principles of Ecology (3)
- 11:216:486 Principles of Evolution (3)

At least 3 credits from the following:

- 11:628:201-203, 205-210 Topics in Marine Science (1.5)
- 11:628:309 Fishery Science (3)
- 11:628:317 Aquaculture (3)
- 11:628:340 Identification of Marine Invertebrates (2)
- 11:628:341 Hydrothermal Vents (3)
- 11:628:402 The Role of Polar Regions in the Earth System
- 11:628:451 Physical Oceanography (4)
- 11:628:472 Chemical Oceanography (3)
- 11:628:474 Coastal Biogeochemical Cycles in a Changing World

Completion of an approved Minor or Certificate Program (~ 18 credits)

Professional Writing Certificate (355), the minor in Education (300), the Certificate in Environmental Geomatics (372), the minor in Environmental Policy, Institutions, and Behavior (374), the minor in Fisheries Science (392), the minor in Sustainability (374), or a program approved by the Undergraduate Program Director.

Meteorology 670 (SEBS)

METEOROLOGY 670

Degree: B.S.

Director: Steven Decker (decker@envsci.rutgers.edu)

Program Webpage: Here

Meteorology is the study of weather and climate, of the characteristics, structure, and processes of the atmosphere. Students learn how to forecast the weather and how to understand climate change. The emphasis of the bachelor of science degree program is on developing a broad understanding of the fundamental physical and dynamic processes governing the motions and behavior of the atmosphere, and its interactions with the underlying land and ocean surfaces. Basic courses in chemistry, physics, and mathematics are the prerequisite foundation on which the meteorology program is built. Students who wish to pursue an undergraduate meteorology degree should have a strong high school or equivalent background in mathematics and the sciences prior to enrollment. This program meets all the U.S. federal government civil service requirements for classification as a meteorologist and the American Meteorological Society recommendations for undergraduate meteorology programs.

Learning Goals

Learning Goals

A successful meteorology graduate will be able to:

1. Conduct a weather discussion and apply diagnostic, prognostic, and technological tools to evaluate atmospheric processes across a multitude of scales.

2. Demonstrate integrated understanding of the linked Earth-atmosphere-ocean-cryosphere-biosphere system, including the roles of atmospheric chemistry and human impacts on the system.

3. Apply critical and analytical thinking to solve relevant scientific problems in both individual and collaborative settings.

4. Effectively communicate scientific information orally and in writing, including by electronic means, at an appropriate level for their audience.

5. Demonstrate mastery of the mathematical and physical foundations of meteorology and climatology as well as key atmospheric processes that occur at a variety of spatial and temporal scales.

6. Understand and utilize the principles of proper ethical behavior within the atmospheric sciences and be aware of the scientific limits of prediction.

Entry Requirements for the Major

Entry Requirements for the Major

To enter meteorology courses at the 300 and 400 level and to satisfy the major requirements, students must achieve a grade of C or better in the following courses:

01:640:151-152 Calculus for Mathematical and Physical Sciences

01:640:251 Multivariable Calculus

01:750:203-204 General Physics *and* 01:760:205-206 General Physics Laboratory

11:670:101 Introduction to Meteorology

11:670:102 Introduction to Climate Science

Graduation Requirements for the Major

Graduation Requirements for the Major

SEBS UNDERGRADUATE CORE CURRICULUM (39 credits)

Parts of the SEBS core are satisfied by the major requirements.

Contemporary Challenges(6 credits)*Two courses, one in each of the Contemporary Challenges areas: Diversities and Social Inequalities*[CC-D]*and Our Common Future*[CC-O]

Experiential Learning(3 credits)*Students must participate in a certified experience that meets this goal*[EL]

Natural Sciences(6 credits)*Students must take two courses, one each in two of the following areas: physical, biological, or environmental sciences*[NS]

Historical Analysis(3 credits)*Students must take one course*[HST]

Social Analysis(6 credits)*SEBS students must complete two courses, one in either social/cultural analysis or economic analysis, and one in governmental and regulatory analysis*[SCL]

Arts and Humanities(3 credits)*Students must complete one course*[AH]

Writing and Communication (6 credits) Students must complete two courses, one in [WC], and the other in [WCD]. For Meteorology majors, the [WCD] course must be one of the following:

01:355:302 Scientific and Technical Writing (3) or
01:355:201 Research in the Disciplines (3) or
01:355:301 College Writing and Research (3)

Quantitative and Formal Reasoning (6 credits) Students must take two courses [QQ; QR]

Graduation Requirements for the Meteorology Major (75 or 76 credits)

For an up-to-date description of meteorology major requirements, courses, and course sequences please refer to the program website here.

Quantitative Skills(22 credits)
01:640:151-152 Calculus for Mathematical and Physical Sciences (4,4)*
01:640:244 Differential Equations for Engineering and Physics (4)
01:640:251 Multivariable Calculus (4)
11:670:212 Computational Methods for Meteorology (3)
11:375:303 Numerical Methods in Environmental Science (3) or
01:960:401 Basic Statistics for Research (3) or
01:960:379 Basic Probability and Statistics (3)

*Calculus courses satisfy SEBS Quantitative [QQ] and Formal Reasoning [QR] requirements.

Physical Sciences (13 credits)
01:160:161 General Chemistry (4)
01:160:171 Introduction to Experimentation (1)
01:750:203-204 General Physics (3,3)
01:750:205-206 General Physics Laboratory (1,1)

Meteorology (37 or 38 credits)
11:670:101 Introduction to Meteorology (3)**
11:670:102 Earth's Changing Climate (3)***
11:670:211 Meteorological Analysis (3)
11:670:323 Thermodynamics of the Atmosphere (3)
11:670:324 Dynamics of the Atmosphere (3)
11:670:431 Physical Meteorology (3)
11:670:433 Weather Analysis and Forecasting I: Synoptic Meteorology (4)****
11:670:434 Weather Analysis and Forecasting II: Mesoscale Meteorology (3)
11:670:451 Remote Sensing of the Ocean and Atmosphere (3)
11:670:461 Climate Dynamics (3)

**Satisfies SEBS Natural Sciences [NS] (Physical) requirement
***Satisfies SEBS Natural Sciences [NS] (Environmental) requirement
****Satisfies SEBS Experiential Learning [EL] requirement

Also choose two courses from the following list:
11:375:346 Introduction to Atmospheric Chemistry (3)
11:628:451 Physical Oceanography (4)
11:670:414 Hydrologic Processes (3)
11:670:444 Tropical Meteorology (3)
11:670:453 Air Quality Modeling (3)

Capstone Experience (3 credits)
Complete at least three credits from among the following courses:
11:554:298 Honors Tutorial II (1)
11:554:301/2 Aresty Research Assistantship (1.5)
11:554:397/8 Honors Tutorial III/IV (arr)
11:554:487/8 G. H. Cook Honors Program (arr)
11:670:334 Severe Weather Forecasting Field Trip (3)
11:670:493/4 Research Problems in Meteorology (arr)
11:902:300 SEBS Internship I (arr)

ELECTIVES (20-21 credits or more)
In addition to courses meeting the above requirements, students must take enough other courses offered by the university to bring their total number of credits to the minimum of 120 required for graduation. Although not required, many meteorology students use these electives to complete a minor. A minor in mathematics, requiring only four more mathematics courses, is the most popular. Students also consider other fields, including

oceanography, physics, environmental sciences, and environmental and business economics. Students are strongly encouraged to do internships, which provide valuable career-related experience and contacts, and to pursue research with faculty members. Both can be taken for academic credit.

A student must achieve a grade of C or better in the following courses:

Physics 1 (01:750:203 and 205)
Physics 2 (01:750:204 and 206)
Calculus 1 (01:640:151)
Calculus 2 (01:640:152)
Multivariate Calculus (01:640:251)
Introduction to Meteorology (11:670:101)
Earth's Changing Climate (11:670:102)

Students preparing for graduate study in meteorology or atmospheric science are encouraged to consider additional meteorology elective courses, as well as courses in computer science, mathematics, and statistics such as:

01:198:323 Numerical Analysis and Computing (4)
01:640:250 Introduction to Linear Algebra (3)
01:640:423 Elementary Partial Differential Equations (3)
01:640:477 Mathematical Theory of Probability (3)
01:960:463 Regression Methods (3)
01:960:467 Applied Multivariate Analysis (3)
01:960:486 Applied Statistical Learning (3)

Microbiology 680 (SEBS)

MICROBIOLOGY 680

Degree: B.S.

Director: Ines Rauschenbach (inesrau@sebs.rutgers.edu)

Program Webpage: Here

Microorganisms are the smallest living things, the oldest form of life on earth, ubiquitous in the biosphere and central to the essential life processes on earth. The microbiology curriculum emphasizes the uniqueness of microbial biology, its enormous diversity, and the biochemical basis of microbial life.

The curriculum examines the diverse roles of microorganisms and covers the fundamentals of microbial diversity, physiology, and genetics. The focus is on the examination of microorganisms; microbial processes in natural and managed environments; and their effects on human, animal, plant, and environmental health. The nature and activity of microbial populations in aquatic and terrestrial ecosystems, the interactions within microbial communities, and biogeochemical cycles and energy flows are explored. The curriculum provides students with a fundamental understanding of the applications of microbes in biotechnology, the food industry, agriculture, and medicine. Recent advances in microbial molecular biology and biotechnology have led to an in-depth understanding

of the physiology, genetics, and taxonomy of microbes. Microbes are central to the food, biotechnology, and pharmaceutical industries and are broadly utilized ranging from food fermentations and biosynthetic processes to waste treatment and biodegradation of toxic chemicals. The field of microbiology is a major contributor toward industrial development; human, animal, and plant health; environmental integrity; and agricultural productivity.

The primary objectives of the curriculum are to broadly educate students regarding the biology of microorganisms. The curriculum prepares students for positions in industry, government, and graduate/professional study in life sciences through extensive coursework combined with laboratory and research experience.

Microbiology 680 (SEBS)

Learning Goals

Learning Goals

1. Graduates will be able to illustrate and describe the biology of microorganisms, focusing on microbial processes and their effects on other organisms and the environment, microbial communities, and biogeochemical cycles.

2. Graduates will be able to apply the scientific method to formulate questions and hypotheses, design experiments, employ appropriate methodology to solve problems in microbiology, and be able to analyze, interpret, and present scientific data in microbiology.

3. Graduates will be able to critically evaluate scientific literature and explain their findings in written and oral format.

4. Graduates will be able to summarize ethical and current issues in microbiology and apply a code of ethics for microbiologists including ethical conduct, scientific integrity, and the dignity of the profession and practice of microbiology.

Microbiology 680 (SEBS)

Entry Requirements for the Major

Entry Requirements for the Major

To enter upper-level microbiology (11:680) courses, students must have completed 01:119:115-116,117 General Biology (formerly 01:119:101-102) and 01:160:161-162 General Chemistry with grades of C or better.

Microbiology 680 (SEBS)

Residency Requirements for the Major

Residency Requirements for the Major

A minimum of 20 credits of coursework from among the required and elective courses. Proficiency in microbiology, not including quantitative skills (8), must be completed in residence. Of these 20 credits, at least 12 credits must be completed from 680 courses.

This rule is intended to assure that students receiving degrees from Rutgers University-New Brunswick have taken a minimum number of courses in their major with New Brunswick faculty. Please keep in mind that although a course may transfer from another institution into one of the Rutgers-New Brunswick schools, it will not necessarily be accepted toward the major in microbiology. Therefore, transfer courses must be evaluated and accepted by the program director in order to count toward the major.

Microbiology 680 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

All students, regardless of matriculation date must complete a minimum of 20 credits of microbiology major coursework from among the required and elective courses (Area VIII). Proficiency in microbiology, not including quantitative skills (8 credits), must be completed in residence. Of these 20 credits, at least 12 credits must be completed from 680 courses. This rule is intended to assure that students receiving degrees from Rutgers University-New Brunswick have taken a minimum number of courses in their major with New Brunswick faculty. Please keep in mind that although a course may transfer from another institution into one of the Rutgers-New Brunswick schools, it will not necessarily be accepted toward the major in microbiology. Therefore, transfer courses must be evaluated and accepted by the undergraduate program director in order to count toward the major.

For an up-to-date description of microbiology major requirements, courses, and course sequences please refer to the program website here.

GRADUATION REQUIREMENTS - SEBS UNDERGRADUATE CORE CURRICULUM (39 credits)

Options are chosen from lists of courses certified in each learning goal: Here.

Note: The SEBS Core Curriculum requirements differ slightly from SAS Core Curriculum requirements.

Contemporary Challenges (6 credits) *Two courses, one in each of the Contemporary Challenges areas: Diversities and Social Inequalities* [CC-D] *and Our Common Future* [CC-O]

Experiential Learning (3 credits) *Students must participate in a certified experience that meets this goal* [EL]

Natural Sciences (6 credits)*Two courses, one each in two of the following areas: physical, biological, or environmental sciences* [NS]

Historical Analysis (3 credits) *One course* [HST]

Social Analysis (6 credits) *Two courses, one in either social/cultural analysis or economic analysis, and one in governmental and regulatory analysis* [SCL]

Arts and Humanities (3 credits) *One course* [AH]

Writing and Communication (6 credits) *01:355:101 or its equivalent* [WC] *and one course in communicating effectively in modes appropriate to a discipline or area of inquiry* [WCD]

Quantitative and Formal Reasoning (6 credits) *Two courses* [QQ; QR]

GRADUATION REQUIREMENTS FOR THE MAJOR

A. Introductory Life and Physical Sciences (44 credits)

- 01:119:115-116 General Biology (4,4)*
- 01:119:117 Biological Research Laboratory (2)
- 01:160:161-162 General Chemistry (4,4)*
- 01:160:171 Introduction to Experimentation (1)
- 01:640:151 Calculus for Mathematics and Physical Sciences (4)**
- 01:960:401 Basic Stats for Research (3)** (other calculus courses may be substituted)
- 01:160:370 - 308 Organic Chemistry (4,4)*** OR 01:160:315 - 316 Principles of Organic Chemistry (4,4)
- 01:447:380 Genetics (4)
- 01:750:193-194 Physics for the Sciences (4,4)* or equivalent

**Up to 6 credits can be applied to the SEBS Core-Natural Sciences*

***Up to 6 credits can be applied to the SEBS Core-Quantitative and Formal Reasoning*

****Students intending to apply to medical school should be aware that many schools require laboratories in organic chemistry and physics.*

B. Core Microbiology (44 Credits, including electives)

- 11:680:390 General Microbiology (*Must pass General Microbiology with a minimum grade of C to satisfy prerequisite requirement for: 11:680:401, 11:680:491, 11:680:492, 11:680:494, 11:680:480, and 11:680:481.)
- 11:680:480 Microbial Genetics and Genomics or 11:126:481 Molecular Genetics (3)
- 11:680:481 Microbial Physiology (3)
- 11:680:491 Microbial Ecology and Diversity (3)
- 11:680:494 Applied Microbiology (4)
- 11:680:401 Ethics and Issues in Microbiology (1)
- 11:680:495 Seminar in Microbiology (1)

- 11:115:403-404 General Biochemistry (4,3)
- 11:115:413 Experimental Biochemistry (3)

Microbiology Electives (15) (Semesters Taught)*

**Please note that no more than one course with a grade of D may be used to fulfill the core microbiology requirements of the major.*

- 11:126:407 Comparative Virology (3) (fall every other year)
- 11:126:427 Methods in Applications in Molecular Biology (4) (fall)
- 11:126:482 Molecular Genetics Laboratory (3) (spring)
- 11:126:484 Tools for Bioinformatic Analysis (3) (spring)
- 11:126:485 Bioinformatics (fall)
- 01:146:328 Human Parasitology (3) (fall)
- 01:146:340 Virology (3) (fall, even years only)
- 01:146:474 Immunology (3) (fall)
- 01:146:475 Laboratory in Immunology (1) (spring)
- 11:216:405 Evolution in Infectious Diseases (3) (spring)
- 11:375:302 Water and Wastewater Treatment (3) (fall)
- 11:375:312 Environmental Microbiology Laboratory (2) (fall)
- 11:375:411 Environmental Microbiology (3) (spring)
- 11:375:453 Soil Ecology (3) (fall)
- 11:400:423 Food Microbiology (3) (spring)
- 01:447:392 Pathogenic Microbiology (3) (fall)
- 01:447:480 Topics in Molecular Genetics (3) (spring)
- 11:680:410 Microbiology and Culture of Cheese and Wine (3) (summer)
- 11:680:486 Analytical Methods in Microbiology (3) (spring, even years)
- 11:680:492 Microbial Ecology Laboratory (3) (spring, odd years)
- 11:680:475 Microbiomes and Health (3) (spring)
- 11:776:302 General Plant Pathology (3) (fall)
- 11:776:400 Fungi in the Environment (3) (fall)
- 11:680:497, 498 Research in Microbiology (fall/spring/summer) - One to three credits of research may be substituted for an equal number of credits of elective courses, with the approval of the curriculum coordinator.

C. Unspecified Electives (up to 3)

Nutritional Sciences 709 (SEBS)

NUTRITIONAL SCIENCES 709

Degree: B.S.

Director: Virginia Quick (vquick@njaes.rutgers.edu)

Program Webpage: Here

Managing Department Webpage: Here

The undergraduate program in nutritional sciences provides students with a strong background in the biological, biochemical, physiological, clinical, behavioral, sociological, and psychological dimensions of human nutrition. Students must maintain a cumulative grade-point average of 2.0 or better in all required courses.

The program offers four options:

Dietetics. The dietetics option is accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND) as a Didactic Program in Dietetics. Upon completion of this option, students are eligible to apply for an accredited-supervised practice program, including our MS-Dietetics program at Rutgers-New Brunswick, in preparation for the registration examination for Registered Dietitian Nutritionists (RDN). Since a master's degree is now required to be eligible to take the RDN exam, students in this option are at an advantage in being able to apply to our accredited Rutgers MS-Dietetics program during their senior year. Completing this option also can lead to work in the food business & industry, positions in cooperative extension, WIC, EFNEP, nutrition education, or clinical research.

Food Service Management. The option in food service administration emphasizes the managerial aspects of food service operation. Entry-level employment opportunities include food service marketing, or managing food services in schools, hotels, restaurants, industrial cafeterias, corporations, hospitals, and child or long-term care facilities.

Biomedical Nutrition. The option in nutrition emphasizes research and prepares students for graduate study for medical and dental schools, and other allied health professions (e.g., physician assistant, occupational therapy, physical therapy), as well as for immediate employment in the biomedical industry.

Community Nutrition. This option addresses the growing need for nutrition professionals to work with youth in structured organizations at the local, state, and national level such as 4-H, WIC, cooperative extension, after-school care, day care, environmental education, and programs for homeless children. This option meets the subject matter requirements needed to become an Family and Consumer Sciences teacher (grades 5 to 12) of Nutrition/Food in New Jersey. This option can feed into the Master of Arts in Teaching (MAT) in Secondary Education from Rutgers-Camden. The MAT degree requires 30 graduate credits—12 of which can be taken while still an undergraduate, or the summer after graduating with a B.S. The remaining courses are taken while doing student teaching the year after graduation. MAT courses are virtual, so no need to travel.

Nutritional Sciences 709 (SEBS)

Learning Goals

Learning Goals

Through completion of the program in nutritional sciences, graduates will be prepared for supervised practice in dietetics, graduate school, or employment by focusing upon the biological, social science, and community principles of food and nutrition coursework.

For overall nutritional sciences program learning goals as well as learning goals specific to each of the five options, see the program website here.

Nutritional Sciences 709 (SEBS)

Entry Requirements for the Major

Entry Requirements for the Major

For Biomedical Nutrition option, students start in the Pre-Nutrition option and must complete following courses listed below before acceptance.

- General Chemistry I, II and Lab (01:160:161, 162, 171)
- General Biology I & II with Lab (01:119:115-116, 117)
- Nutrition & Health (11:709:255)
- GPA of 2.5 or higher in the above courses

For the Dietetics Option, students start in Pre-Dietetics option and must complete the following courses listed below before acceptance.

- General Chemistry I, II and Lab (01:160:161; 01:160:162; 01:160:171)
- Anatomy and Physiology I and II (01:119:127; 01:119:128)
- Principles of Biology (01:119:103)
- Nutrition & Health (11:709:255)
- GPA of 2.5 or higher in the above courses

For the Food Service Management and Community Nutrition Options, students may declare after completing Nutrition & Health (11:709:255).

Nutritional Sciences 709 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

For an up-to-date description of nutritional sciences major requirements, courses, and course sequences, please refer to the program webpage here.

SEBS UNDERGRADUATE CORE CURRICULUM (39 credits)

Contemporary Challenges (6 credits) *Two courses, one in each of the Contemporary Challenges areas: Diversities and Social Inequalities* [CC-D] *and Our Common Future* [CC-O]

Experiential Learning (3 credits) *Students must participate in a certified experience that meets this goal* [EL]

Natural Sciences (6 credits) *Students must take two courses, one each in two of the following areas: physical, biological, or environmental sciences* [NS]

Historical Analysis (3 credits) *Students must take one course* [HST]

Social Analysis (6 credits) *SEBS students must complete two courses, one in either social/cultural analysis or economic analysis, and one in governmental and regulatory analysis* [SCL]

Arts and Humanities (3 credits) *Students must complete one course* [AH]

Writing and Communication (6 credits) *Students must take 01:355:101 or its equivalent* [WC] *and one course that fulfills the learning goal, communicate effectively in modes appropriate to a discipline or area of inquiry* [WCD].

Quantitative and Formal Reasoning (6 credits) *Students must take two courses* [QQ; QR]

Graduation Requirements for the Major (61 - 77)

A. OPTIONS IN NUTRITIONAL SCIENCES

1. Dietetics (76-77)

11:709:102 Careers in Nutrition (1)
11:709:201 Culinary Nutrition (3)
11:709:202 Culinary Nutrition Lab (1)
11:709:255 Nutrition and Health (3)
11:709:301 Food Safety & Sanitation in Food Service (2)
11:709:345 Nutrition through the Lifespan (3)
11:373:341 Organizational Dynamics (3) or equivalent
11:709:400 Advanced Nutrition: Macronutrients (3)
11:709:401 Advanced Nutrition: Energy & Micronutrients (3)
11:709:404 Advanced Nutrition: Clinical Research Practicum (1)
11:709:410 Dietetics Professional Practice (3)
11:709:441 Community Nutrition (3)
11:709:442 Nutrition Education & Communication (3)
11:709:448 Food Production & Management (3) [EL]
11:709:449 Food Service Lab (1) [EL]
11:709:483 Medical Nutrition Therapy I (3)
11:709:484 Nutrition Therapy Lab (1)
11:709:485 Medical Nutrition Therapy II (3)
11:709:489 Experimental Foods (4) or
11:709:493/494 Research in Nutrition (3)
01:960:401 Basic Statistics for Research or Equivalent (3)
01:119:103 Principles of Biology (4)
01:119:127 Anatomy and Physiology I (4)
01:119:128 Anatomy and Physiology II (4)
01:160:161 General Chemistry I (4)

01:160:162 General Chemistry II (4)
01:160:171 Introduction to Experimentation Lab (1)
01:160:209 Elementary Organic Chemistry (3)
11:115:301 Introduction to Biochemistry (3) or 01:694:395 Biochemistry for Life Sciences (3)

Many of the science courses have prerequisites. Please see catalog descriptions.

2. Biomedical Nutrition (74.5)

11:709:255 Nutrition and Health (3)
11:709:400 Advanced Nutrition I (3)
11:709:401 Advanced Nutrition II (3)
11:709:443 Methods in Sensory Analysis (3) or 11:709:475 Nutrition and Fitness (3) or 11:709:245 Food Customs and Nutrition Equity
11:709:481 Seminar in Nutrition (1.5)
11:709:493 or 494 Research in Nutrition (3) [EL]
11:067:300 Integrative Physiology (4) or 01:146:356, 357 Systems Physiology, Lab (3,1)
01:160:161 General Chemistry I (4)
01:160:162 General Chemistry II (4)
01:160:171 Introduction to Experimentation Lab (1)

01:160:307-308, 311 Organic Chemistry, Lab (4,4,2)
01:119:115-116 General Biology I, II (4,4) [NS]
01:116:117 Biological Research Laboratory (2)
01:447:380 Genetics (4)
01:640:135 Calculus I (4) or equivalent [QQ]
11:115:301 Introductory Biochemistry (3) or 11:694:395 Biochemistry for the Life Sciences (3) or equivalent
01:750:193-194 Physics for the Sciences (4,4) or 01:750:203-204 General Physics (3,3) and 01:750:205-206 General Physics Lab (1,1)
01:960:401 Basic Statistics for Research (3) or equivalent [QR]
01/11:300 or 400 Advanced Life Sciences course (3)

Many of the science courses have prerequisites. Please see catalog descriptions.

3. Food Service Management (61-68)

11:709:201,202 Culinary Nutrition, Lab (3,1)

11:709:245 Food Customs & Nutrition Equity (3)

11:709:255 Nutrition and Health (3)

11:709:301 Food Safety and Sanitation in Food Service (2)
11:709:345 Nutrition through the Lifespan (3)

11:709:441 Community Nutrition (3)

11:709:448 Food Production & Management (3) [EL]
11:709:449 Food Service Lab (1) [EL]
01:640:115 Precalculus or equivalent (4) (QQ)

01:160:128 Chemistry of Life (3) or 01:160:161 General Chemistry I (4)
01:119:103 Principles of Biology (4) or 01:119:115-117 General Biology I, II & Lab (4,4,2) [NS]
11:373:121 Principles and Applications of Microeconomics (3) or equivalent [SCL]
11:373:121 Principles and Applications of Macroeconomics (3) or equivalent [SCL]
33:010:272 Introduction to Financial Accounting (3)
11:680:201,202 Introduction to Microbiology, Lab (3,1) or equivalent
11:373:341 Organizational Dynamics (3) or equivalent

12 Credits selected from:
11:709:442 Nutrition Communication (3)
11:709:443 Methods in Sensory Analysis (3)
11:020:210 Agriculture and Food Systems (3)
11:020:337 Sustainability: Tackling Food Waste (3)

11:373:231 Introduction to Marketing (3)
11:373:331 Economics of Food Marketing Systems (3)
11:373:241 Introduction to Management (3)
11:373:371 Food, Health, and Safety Policy (3)
11:375:403 Principles of Epidemiology (3)
11:400:107 Food: From Farm to Table (3)

11:400:422 Food Safety: Fads, Facts and Politics (3)
11:400:423 Food Microbiology (3)
33:011:201 Introduction to Management for Nonbusiness Majors (3)
33:011:202 Introduction to Marketing for Nonbusiness Majors (3)
33:011:203 Introduction to Finance for Nonbusiness Majors (3)
33:011:204 Principles of Business Law for Nonbusiness Majors (3)

4. Community Nutrition (66-70)

11:709:102 Careers in Nutrition (1)
11:709:201 Culinary Nutrition (3)
11:709:202 Culinary Nutrition Lab (1)
11:709:235 Introduction to Sports Nutrition or 11:709:475 Nutrition & Fitness (3)
11:709:245 Food Customs & Nutrition Equity (3)
11:709:255 Nutrition & Health (3)
11:709:301 Food Safety & Sanitation (2)
11:709:448 Food Production & Management (3) [EL]
11:709:449 Food Service Lab (1) [EL]
11:709:345 Nutrition through the Lifespan (3)
11:709:441 Community Nutrition (3)
11:709:442 Nutrition Education and Communication (3)

11:709:489 Experimental Foods (4)
01:640:115 Precalculus (4) or Calculus
01:119:103 Principles of Bio (4) (or 01:119:115-117)
01:160:161 General Chemistry I (4)
01:160:162 General Chemistry II (4)
01:160:171 Introduction to Experimentation Lab (1)
01:160:209 Elementary Organic Chemistry (3)
01:119:127-128 Anatomy and Physiology I & II (4, 4) (or 11:067:300 or 01:146:356, 357)
01:960:401 Basic Statistics for Research (3) or equivalent
01:830:101 General Psychology (3)
01:920:272 Sociology of the Family (3)

Plant Science 776 (SEBS)

PLANT SCIENCE 776

Degree: B.S.

Director: Nrupali Patel (npatel@sebs.rutgers.edu)

Program Webpage: Here

Managing Department Webpage: Here

The Plant Science undergraduate program prepares students for careers or further study in areas related to food and plant production, turfgrass, plant pathology and pest management, plant breeding, natural products, and bioenergy.

The curriculum offers three options: *General Plant Science (Research)*, for students intending to pursue careers in research laboratories or graduate study; *Horticulture or Turfgrass Industry*, for students intending to pursue careers in the plant business industries; and *Natural Products*, for students interested in historical and cultural botany, economic botany (the study of the interaction of people and plants), and indigenous and modern medicinal plants.

The curriculum also offers minors in agroecology, horticultural therapy, medicinal and economic botany, and plant science; and certificates in horticultural therapy, medicinal and economic botany, and turfgrass science.

Learning Goals

Learning Goals

Plant Science Major: Program Learning Goals

Students completing degree requirements will be able to:

1. Describe basic knowledge about plant structure and function, fundamentals of plant growth and physiology, and principles of horticulture [technical proficiency];
2. Summarize broadly the role of plants in agriculture, society, and the environment [context];
3. Communicate, in written and oral forms, plant science knowledge to peers and others in society [communication]; and
4. Critically formulate hypotheses, interpret data, and apply basic principles and practices of plant science to solve fundamental and practical problems [critical thinking].

Plant Science 776 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

For an up-to-date description of plant biology major requirements, courses, and course sequences please refer to the program website here.

SEBS UNDERGRADUATE CORE CURRICULUM (39 credits)

Contemporary Challenges (6 credits) *Two courses, one in each of the Contemporary Challenges areas: Diversities and Social Inequalities* [CC-D] *and Our Common Future* [CC-O]

Experiential Learning (3 credits) *Students must participate in a certified experience that meets this goal* [EL]

Natural Sciences (6 credits) *Students must take two courses, one each in two of the following areas: physical, biological, or environmental sciences* [NS]

Historical Analysis (3 credits) *Students must take one course* [HST]

Social Analysis (6 credits) *SEBS students must complete two courses, one in either social/cultural analysis or economic analysis, and one in governmental and regulatory analysis* [SCL]

Arts and Humanities (3 credits) *Students must complete one course* [AH]

Writing and Communication (6 credits) *Students must take 01:355:101 or its equivalent* [WC] *and one course that fulfills the learning goal, communicate effectively in modes appropriate to a discipline or area of inquiry* [WCD].

Quantitative and Formal Reasoning (6 credits) *Students must take two courses* [QQ; QR]

Graduation Requirements for the Major: Proficiency in Plant Science

A. Plant Science Major Requirements (37-38 credits)

General Biology and Laboratory (all) (10 credits)1

01:119:115 General Biology I (4)
01:119:116 General Biology II (4)
01:119:117 Biological Research Laboratory (2)

General Chemistry and Laboratory (all) (9 credits)2

01:160:161 General Chemistry (4)
01:160:162 General Chemistry (4)
01:160:171 Introduction to Experimentation (1)

Experienced-Based Education (3 credits).3 *Choose from the following (adviser approved):*

11:776:495,496 Special Problems in Plant Science
11:554:487,488 George H. Cook Scholars Program
11:902:300,301,400 SEBS Internship I,II, Coop
11:550:240 Public Garden Management
11:020:321 Principles and Practice of Small-scale Organic Farming
Study Abroad
SEBS International Summer Study Abroad Program
ARESTY Research Assistant Program

Quantitative Skills (1-2 courses)4

All students are required to complete one to two math courses, precalculus or higher, depending on option. See option for specific requirements.

Professional Ethics (3 credits). *Choose from the following:*

01:730:107 Introduction to Ethics (3)5
01:730:249 Bioethics (3)
01:730:250 Environmental Ethics (3)
11:607:385 The Ethical Leader (3)

Soils (3-4 credits). *Choose from the following:*

11:776:102 Soil and Society (3)
11:776:404 Soil Management for Sports and Landscape Applications (3)
11:776:440 Soil Fertility (3)
11:375:360 Soils and Water (4)
11:375:453 Soil Ecology (3)

Plant Science Fundamentals (all) (9 credits)

11:776:210 Principles of Botany (3)
11:776:211 Introduction to Horticulture (3)
11:776:242 Plant Science (3)

B. Plant Science Option Requirements
One of the following three options is required:

1. General Plant Biology (research focus area) (54-59 credits)
2. Horticulture and Turfgrass Industry (53-55 credits)
3. Natural Products (54-57 credits)

B1. General Plant Biology Option (54-59 credits)

Quantitative Methods (all) (7-8 credits)

01:640:135 Calculus I (4) or equivalent
01:640:136 Calculus II (4) or equivalent or 01:960:401 Basic Statistics for Research (3)

Chemistry (all) (15 credits)

01:160:307 Organic Chemistry (4)
01:160:308 Organic Chemistry (4)
11:115:403 General Biochemistry (4)
11:115:404 General Biochemistry (3)

Physics (6-10 credits). *Choose from the following sequences of courses:*

01:750:193 Physics for the Sciences (4)
01:750:194 Physics for the Sciences (4)
or
01:750:201 Extended General Physics (5)
01:750:202 Extended General Physics (5)
or
01:750:203 General Physics (3)
01:750:204 General Physics (3)

Advanced Plant Science (all) (14 credits)

11:776:305 Plant Genetics (4) or 01:447:380 Genetics (4)
11:776:382 Plant Physiology (4)
11:776:452 Plant Tissue Culture and Engineering (3)
11:126:413 Plant Molecular Biology (3) or 11:126:481 Molecular Genetics (3)

Plant Science Electives (12 credits) (if not already used above)

A total of 12 credits from any 11:776:xxx course at the 200 level or above (see here), including:
01:960:401 Basic Statistics for Research (3)
or adviser-approved elective

B2. Horticulture and Turfgrass Industry Option (53-55 credits)

Quantitative Methods (4 credits)5

01:640:115 Precalculus (4) OR higher

Business Courses (all) (9 credits)

11:373:121 Principles and Applications of Microeconomics (3)6
11:373:231 Introduction to Marketing (3)
11:373:241 Introduction to Management (3) OR 11:373:341 Management: Human Systems Development (3)

Applied Major Requirements (all) (16-18 credits)

11:776:302 General Plant Pathology (3)
11:776:382 Plant Physiology (4) OR 11:776:202 Applied Physiology of Horticultural Crops (3)
11:776:391 Weeds, Diseases, and Insects of Plants (3)
11:776:406 Plant Breeding (4)
11:776:306 Weed Science Management (3)

Plant Science Electives (24 credits) (if not already used above)

A total of 24 credits from any 11:776:xxx course at the 200 level or above (see here), including
01:960:401 Basic Statistics for Research (3)
or adviser-approved elective

B3. Natural Products Option (54-57 credits)
Students must complete required courses below AND one area of specialization

Required courses

Quantitative Methods (all) (7-10 credits)5

01:640:115 Precalculus (4) or higher AND
01:960:401 Basic Statistics for Research (3) OR
01:960:211,212 Statistics I, II (3,3) (must take both in series)

Business Courses (3 credits)

11:373:121 Principles and Applications of Microeconomics (3)6

Geography Courses (3 credits). *Choose from the following:*

01:450:211 Environment, Society, and Social Justice (3)
01:450:306 Global Ecosystems and Biodiversity (3)

Major Option Requirements (all) (14 credits)

11:776:205 Introduction to Ethnobotany (3)
11:776:312 Medicinal Plants (3)
11:776:313 Medicinal and Aromatic Plants Laboratory (1)
11:776:382 Plant Physiology (4)
11:776:438 Plants and Human Health (3)

Areas of Specialization

One of the following areas of specialization is required:

a. Ethnobotany and Global Health (27 credits
b. Production of Medicinal and Aromatic Plants (27 credits)

a. Ethnobotany and Global Health

Required (3 credits). *Choose one of the following:*
11:776:390 Hemp and Medical Cannabis (3)
11:776:400 Fungi in the Environment (3)
11:776:410 Plants and Innovative Technologies for Bioenergy (3)

Electives (24 credits). *Choose from the following (if not used above):*
11:776:201 People-Plant Relationships (3)
11:776:221 Principles of Organic Crop Production (3)
11:776:302 General Plant Pathology (3)
11:776:305 Plant Genetics (4)
11:776:390 Hemp and Medical Cannabis (3)
11:776:400 Fungi in the Environment (3)
11:776:406 Plant Breeding (4)
11:776:410 Plants and Innovative Technologies for Bioenergy (3)
11:776:415 Fungi and Human Health (3)
11:776:439 Nursery Crop Production (3)
11:776:442 Agroecology (3)
11:776:495,496 Special Problems in Plant Science (1-3)
11:020:436 Sustainable Agriculture (3)
11:216:217 Principles of Natural Resource Management (4)
11:216:369 Analytical Methods Ecology, Evolution, and Natural Resources (3)
11:216:411 Plant Diversity and Evolution (3)
11:216:412 Plant Diversity and Evolution Lab (1)
11:370:406 Medical and Veterinary Entomology (3)
11:373:362 Natural Resource Economics (3)
11:373:363 Environmental Economics (3)
11:375:201 Biological Principles of Environmental Sciences (3)
11:400:422 Food Safety: Fads, Facts, and Politics (3)
11:709:201 Culinary Nutrition (3)
11:709:255 Nutrition and Health (3)
11:709:363 World Food Customs and Nutrition (3)
or other adviser-approved electives

b. Production of Medicinal and Aromatic Plants

Required (3 credits). *Choose one of the following:*
11:776:390 Hemp and Medical Cannabis (3)
11:776:410 Plants and Innovative Technologies for Bioenergy (3)
11:776:439 Nursery Crop Production (3)

Electives (24 credits). *Choose from the following (if not used above)*:
11:776:221 Principles of Organic Crop Production (3)
11:776:302 General Plant Pathology (3)
11:776:305 Plant Genetics (4)
11:776:310 Plant Propagation (3)
11:776:311 General Plant Pathology Laboratory (1)
11:776:321 Greenhouse Systems Management (3)
11:776:341 Fruit Production (3)
11:776:390 Hemp and Medical Cannabis (3)
11:776:406 Plant Breeding (4)
11:776:410 Plants and Innovative Technologies for Bioenergy (3)
11:776:439 Nursery Crop Production (3)
11:776:495,496 Special Problems in Plant Science (1-3)
11:020:215 Applied Practical Applications in Agriculture and Food Systems (3)
11:020:321 Principles and Practices of Small-Scale Organic Farming (3)
11:020:340 Indoor Cultivation of High Value Crops (4)
11:020:442 Entrepreneurial Agriculture (3)
11:216:274 Field Techniques (4)
11:216:332 Plant Ecology (4)
11:216:411 Plant Diversity and Evolution (3)
11:216:412 Plant Diversity and Evolution Lab (1)
11:370:350 Agricultural Entomology and Pest Management (3)
11:373:205 Small Business Essentials (3)
11:400:422 Food Safety: Fads, Facts, and Politics (3)
11:550:235 Herbaceous Plants in the Landscape (3)
or other adviser-approved electives

Unspecified Electives (2-11 credits)

In addition to courses meeting the above requirements, students can take other courses offered by the university, for which they meet the course eligibility requirements, to bring their total number of credits to the minimum of 120 (matriculated 2018 or later) or 128 (matriculated prior to 2018) required for graduation.

1 Satisfies SEBS Natural Sciences [NS] - Biological Sciences requirement
2 Satisfies SEBS Natural Sciences [NS] - Physical Sciences requirement
3 Satisfies SEBS Experience-Based Education [EBE] requirement
4 Depending on option, satisfies one to two courses of SEBS Quantitative [QQ] and/or Formal Reasoning [QR] requirements
5 11:730:107 Introduction to Ethics satisfies SEBS Arts and Humanities Human Experience [AHo] requirement
6 11:373:121 Principles and Applications of Microeconomics satisfies SEBS Social Analysis [SCL] - Economic Analysis requirement

Public Health 832 (SEBS)

PUBLIC HEALTH 832

Degree: B.S.

Contact: Christina Torian, Assistant Dean of Undergraduate Education (christina.torian@rutgers.edu)

Students in the School of Environmental and Biological Sciences (SEBS) may choose the major in public health, which is offered by the Edward J. Bloustein School of Planning and Public Policy. This major leads to a bachelor of science (B.S.) degree issued by both SEBS and the Bloustein School.

The major in Public Health (832) prepares students for entry-level careers in population health and disease prevention. Public health professionals work in a wide range of services including infectious disease control; health problems of children, older adults, and the medically underserved; chronic disease management; health monitoring and surveillance; environmental/occupational health and safety; and emergency preparedness. Students learn about the upstream factors that influence community health, particularly poverty, housing, work and unemployment, social exclusion, food security, transportation, access to health and social services, and evidence-based, data-driven decision-making.

See the Edward J. Bloustein School of Planning and Public Policy section of this catalog or visit here.

Entry Requirements for the Major

Entry Requirements for the Major

Entry Requirements for the Major

To declare a major in public health, students must apply to the Edward J. Bloustein School of Planning and Public Policy. To be accepted, a student must have a GPA of 2.00 or higher, and must have completed the following prerequisite courses with grades of C or better in each course:

- 01:355:101 Expository Writing or equivalent (3)
- 10:775:205 Basic Statistical Methods (4) or any 200-level or higher statistics course
- One human biology course (3-4) (see approved human biology courses in Degree Navigator)
- One chemistry course (3-4)
    - 160:127 Impact of Chemistry (3)
    - 160:128 Chemistry of Life (3)
    - 160:161 or 162 General Chemistry I or II (4)

Applications to the Bloustein School are available online from the website: Here.

See the Edward J. Bloustein School of Planning and Public Policy section of this catalog or visit here.

Public Health 832 (SEBS)

Graduation Requirements for the Major

Graduation Requirements for the Major

Major Requirements (58-61 credits)

The major in public health is offered by the Edward J. Bloustein School of Planning and Public Policy. It involves a total of 12-15 credits in prerequisite courses that students must complete (with grades of C or better in each of them) prior to declaring the major, plus 9 additional required courses (31 credits), plus five public health elective courses (15 credits).

The prerequisite courses for the major are as follows:

- 01:355:101 Expository Writing or equivalent (3)
- 10:775:205 Basic Statistical Methods (4) or any 200-level or higher statistics course
- One human biology course (3-4) (see approved human biology courses in Degree Navigator)
- One chemistry course (3-4)
    - 160:127 Impact of Chemistry (3)
    - 160:128 Chemistry of Life (3)
    - 160:161 or 162 General Chemistry I or II (4)

The major core requirements are as follows:

- 10:832:201 Principles of Public Health (3)
- 10:832:212 Health Disparities (3)
- 10:832:240 Global Health Perspectives (3)
- 10:832:335 Epidemiology (3)
- 10:832:339 Public Health Literature (3) or
  01:355:302 Scientific and Technical Writing (3) or
  01:355:303 Writing for Business and the Professions (3) or
  01:355:315 Writing Grant Proposals (3) or other preapproved writing course
- 10:832:356 Public Health Law & Ethics (3)
- 10:775:395 Research Methods (4)
- 10:775:450 Leadership Seminar (3)
- 10:775:499 Professional Practice Internship (6)

The five elective courses (at least three of which must be at the 300 level or above) must be public health (subject code 832) courses.

For additional information about the major in public health, please refer to the Edward J. Bloustein School section of the catalog.

Minors and Certificate Programs (SEBS)

MINORS AND CERTIFICATE PROGRAMS

The following minors and interdisciplinary certificate programs in a number of the mission areas of the School of Environmental and Biological Sciences are open to all undergraduate students at Rutgers. Options in several of the minors indicate either a subject-matter emphasis or a degree of expertise in cognate fields represented by the courses of the option. Certificates are awarded only with or subsequent to the awarding of a baccalaureate degree in an approved major. The minors are listed first (alphabetically), followed by the certificate programs.

Minor in Agriculture and Food Systems (18 credits)

Minor in Agroecology (21-24 credits)

Minor in Animal Science (22-24 credits)

Minor in Biochemistry (23-25 credits)

Minor in Community Health Outreach (22 credits)

Minor in Creative Expression and the Environment (18 credits)

Minor in Culinary Nutrition

Minor in Ecology, Evolution, and Natural Resources (20-23 credits)

Minor in Entomology (19-26 credits)

Minor in Environmental and Business Economics (21-23 credits)

Minor in Environmental Geomatics (19 credits)

Minor in Environmental Planning (18 credits)

Minor in Environmental Policy, Institutions, and Behavior (21 credits)

Minor in Environmental Sciences (21 credits)

Minor in Fisheries Science (21-22 credits)

Minor in Food Science (18-21 credits)

Minor in Green Technology (20 credits)

Minor in Health Equity

Minor in Horticultural Therapy (18 credits)

Minor in Landscape Design

Minor in Leadership Skills (21-22 credits)

Minor in Marine Sciences (18 credits)

Minor in Medicinal and Economic Botany (18-19 credits)

Minor in Meteorology (18 credits)

Minor in Microbiology (19-21 credits)

Minor in Nonprofit Leadership (23 credits)

Minor in Nutrition (20-24 credits)

Minor in Plant Science (18-20 credits)

Minor in Public Garden Management

Minor in Science Communication (18 credits)

Minor in Sustainable Global Food Systems (18 credits)

Minor in Sustainability

Minor in Urban Forestry (21 credits)

Certificate in Environmental Geomatics (19 credits)

Certificate in Environmental Planning (21 credits)

Certificate in Evolutionary Medicine

Certificate in Food Systems Education and Administration (21-22 credits)

Certificate in Horticultural Therapy (34-37 credits)

Certificate in Medicinal and Economic Botany (25 credits)

Certificate in Plant Biosecurity (25 credits)

Turfgrass Science Certificate Program (25-28 Credits)

Student to Professional Internship Network (SPIN) (SEBS)

STUDENT TO PROFESSIONAL INTERNSHIP NETWORK

Coordinator: Kristen Lester; Martin Hall, Room 109, 848-932-3620 (kaf38@rutgers.edu)

The Student to Professional Internship Network (SPIN) at the School of Environmental and Biological Sciences is an academic program designed to supplement campus-based studies through the practical application of theory in full- and part-time field experiences related to students' majors or career interests. This blending of formal study and supervised employment in areas relevant to the educational and professional goals of the student is subject to the same advice and approval by appropriate members of the faculty as is the student's choice of programs and courses.

All students in the School of Environmental and Biological Sciences who are in good academic standing may enter the program upon completion of 24 credits. Non-matriculated, part-time, readmitted, and transfer students who are in good academic standing after completing at least 24 credits, 12 of which must be taken at the School of Environmental and Biological Sciences, also are eligible. Transfers from within the university are eligible immediately if they have completed the first year and are in good academic standing. Students who fail to maintain good academic standing are declared ineligible. Students also must be registered for at least 6 credits in the semester prior to cooperative education employment.

Internships typically provide experiences that are relevant to students' career interests and salaries that are commensurate with the position held. However, the emphasis is on the learning experience provided by the job rather than on preparation for a specific job upon graduation or on any single economic factor.

A maximum of 6 credits earned through the SPIN program may be applied toward graduation. Credits earned are for the educational benefits of the experience, not for having a job. Each student is required to establish an individualized learning contract under the direction of a faculty sponsor. This memorandum of understanding outlines the student's objectives and scholarly responsibilities, the work plan, the plan for evaluation, and the number of credits to be earned (3 credits for a part-time internship or 6 credits for a full-time co-op placement per semester).

An internship is one way of fulfilling the school's Experiential Learning requirement. Credit is awarded on a Pass/No Credit basis.

Students must apply for admission to the program through the office of the coordinator of the SPIN program. Subject to the approval of the coordinator and the student's faculty sponsor, the student registers for an internship (part-time) or cooperative education (full-time) placement as follows:

11:902:300 ***SPIN Internship I (3)***
First internship registration.

11:902:301 ***SPIN Internship II (3)***
Second internship registration.

11:902:400 ***SEBS Coop (6)***
Cooperative education registration.

A maximum of 6 credits earned through participation in a cooperative education program at another institution may be accepted subject to the usual review of transfer credits.

For more information, see the website for the school's cooperative education program, here.

Military Education (SEBS)

MILITARY EDUCATION

See Military Education, Air Force 690, Military Education, Army 691 and Military Education, Naval 692 in the Programs, Faculty, and Courses chapter of this catalog.

Honors Programs (SEBS)

HONORS PROGRAMS

Students applying to the School of Environmental and Biological Sciences may be eligible for the Honors College, a residential honors program that brings together the most high-achieving students from all disciplines. The Honors College welcomed its first class of students in the fall of 2015. In addition, the School of Environmental and Biological Sciences offers two schoolwide honors programs:

1. The **General Honors Program** is a four-year program for which university Presidential Scholars and selected high school seniors who apply to the School of Environmental and Biological Sciences prior to the application deadline are invited to compete. Students who join the program are awarded supplementary merit scholarships.

2. The **George H. Cook Scholars Program** is the senior honors thesis program of the School of Environmental and Biological Sciences. Students in the top 15 percent of their class in the fall semester of the junior year are automatically invited to participate, but juniors in the School of Environmental and Biological Sciences who are nominated by a faculty member may join the program in their final three semesters.

3. The **Clearing Corporation Charitable Foundation Agribusiness Scholars Program** is a leadership program of the School of Environmental and Biological Sciences for high achieving students in any of the school's majors aimed at developing future leaders in the global agribusiness sector. Eligible students will have a cumulative GPA of at least 3.0 and will have completed at least 24 credits of coursework by the end of their sophomore year.

Additionally, several departments offer departmental honors in the major program of study to students who fulfill department requirements, which typically include honors courses and/or independent research projects.

General Honors Program of the School of Environmental and Biological Sciences

General Honors Program of the School of Environmental and Biological Sciences

Director: David Tulloch, Waller Hall, Room 104, 848-932-9162 (tulloch@crssa.rutgers.edu)

Interested students first apply for admission to SEBS through the Office of University Undergraduate Admissions. Students who have been admitted and have indicated SEBS on the Rutgers University application form as their first or second choice among the colleges qualify for consideration to the General Honors Program. Invitations to the program are based on admissions ranking within the application year, considering SAT, class rank, cumulative average and student activities. Honors students participate in the four-year program that requires a 1 credit course in the first semester, two interdisciplinary honors seminars and 11 credits of graduated research prior to graduating. In addition, students must graduate the program with a GPA of 3.4 or higher.

The program includes a variety of social and academic activities throughout the year, recommended by both faculty and students in the program. The academic requirements of the program are as follows:

1. *First Year:* In the first semester, students are registered for an honors section of Exposition and Argument and a 1-credit Readings in Biology course, in addition to the courses they request. Students register for the interdisciplinary honors seminar in the spring semester. The honors seminars are team-taught and integrate formal presentations by faculty and students, reading, discussions, and individual and/or small group research projects. The additional courses selected in the first year will depend upon the curriculum in which the student intends to major. Qualifying students also may be invited by departments to take first-year honors courses.

2. *Sophomore Year:* Each semester, sophomores register for a 1-credit honors tutorial in which they work with a faculty member on a small independent study project that introduces them to research in their areas of interest. In the spring, sophomores also register for the honors seminar.

3. *Junior Year:* Students register for at least 3 credits of honors tutorial, an independent study program in which each student works with one faculty member. The remaining courses selected for the junior and senior years are determined by the curriculum in which the student is enrolled.

4. *Senior Year:* Each semester, students register for a 3- to 6-credit Honors Tutorial (11:554:497,498) or the George H. Cook Scholars Program (11:554:487,488).

In order to remain in the school's General Honors Program and continue to receive the scholarship award that accompanies participation, honors students must (1) enroll as full-time undergraduates and (2) maintain a cumulative grade-point average of 3.4 or better.

Honors Programs (SEBS)

Clearing Corporation Charitable Foundation Agribusiness Scholars Program

Clearing Corporation Charitable Foundation Agribusiness Scholars Program

Directors: Brian Schilling, Martin Hall Room 309, 848-932-3591, brischi@sebs.rutgers.edu; and Stephen Komar, 973-948-3040, komar@njaes.rutgers.edu

The Clearing Corporation Charitable Foundation Agribusiness Scholars Program is an endowed program at the School of Environmental and Biological Sciences with the purpose of developing future leaders in the global agribusiness sector. The program is available to junior and senior students enrolled in any of the school's major programs who will have completed a minimum of 24 credits by the end of their sophomore year with a cumulative average of 3.0 or have been nominated by a faculty member at the School of Environmental and Biological Sciences.

The scholars program will provide students with the applied knowledge, analytical skills, and experiences required for successful careers in the agribusiness sector. Through an integration of coursework, experiential learning, and engagement with agribusiness leaders, students will develop in-depth understanding of the domestic and international issues driving agricultural markets and the performance of the agribusiness sector.

Students accepted into the Agribusiness Scholars Program will complete 9 credits of required coursework. Students will also participate in academic enrichment, seminars, and networking events to allow interaction with leaders in the agribusiness sector and government.

Courses Required for Program Completion: 9 credits

11:373:241 Introduction to Management (3)

11:035:300 Critical Analysis of Issues in Agribusiness I (3) fall semester

11:035:400 Critical Analysis of Issues in Agribusiness II (3) spring semester

Honors Programs (SEBS)

George H. Cook Scholars Program

George H. Cook Scholars Program

Director: John Reinfelder, Environmental Science Bldg., Room 260, 848-932-5737

The George H. Cook Scholars Program is the senior honors thesis program of the School of Environmental and Biological Sciences. Working under the mentorship of an approved advisor, students in the program conduct original basic and applied research in the natural and health sciences, economics, and public policy majors. They design or evaluate environmental infrastructure or they produce original works in other areas of scholarship. Projects are planned and initiated by at least the end of the second semester of the junior year, and students present their results in a written thesis and orally at a program-wide symposium in the second semester of the senior year. Project advisors are typically members of the Rutgers faculty, but may also include academics and appropriate professionals from other institutions.

To be eligible, students must have achieved a cumulative grade-point average to be in the top 15 percent of their class in the fall of their junior year, and completed a minimum of 24 credits at Rutgers by the end of their junior year. Students with a GPA greater than 3.0 can be recommended to the Honors Committee by a faculty member of the School of Environmental and Biological Sciences. Students must indicate their interest in the program by submitting a pre-registration form during spring of the junior year and must enroll in 11:554:487, 488 GHC Honors Program for a total of 6 to 12 credits during their senior year.

Students submit written project proposals for approval by the Honors Committee at the end of the junior year followed by a brief oral proposal describing project goals at the beginning of their senior year.

Students who successfully complete the two-semester honors course (11:554:487, 488) prepare a thesis, present their work at the program-wide symposium, and are designated as George H. Cook Scholars at graduation.

Honors Programs (SEBS)

Independent Study, Special Problems, and Departmental Honors

Independent Study, Special Problems, and Departmental Honors

Specific requirements for participating in departmental honors, special problems, or independent study courses are based upon departmental procedures and individual faculty and program of study requirements. For additional information on these honors programs, contact the Office of Academic Programs, Martin Hall, Room 109, or the specific program in which you are enrolled.

Study Abroad Programs (SEBS)

STUDY ABROAD PROGRAMS

Rutgers offers a number of academic-year, semester, and short-term study abroad programs. Information about these programs may be obtained through Rutgers Global Study Abroad located at 102 College Avenue, New Brunswick, NJ 08901-8543; or at the website. Additional information may be obtained from the SEBS Office of Global Engagement. In order to assure optimum planning toward fulfilling major and degree requirements, it is strongly recommended that students contemplating studying abroad consult with both an academic advisor and a study abroad adviser at least 9 months in advance of their planned semester-based program or one semester in advance of short-term summer or winter programs.

Educational Opportunity Fund (EOF) (SEBS)

EDUCATIONAL OPPORTUNITY FUND (EOF)

The Rutgers School of Environmental and Biological Sciences (SEBS) Educational Opportunity Fund (EOF)

EOF S.T.A.R.T. U.P. Summer Institute

Solid GEMS Summer Institutes

Prospective Students

Current Students

EOF Vision

Promoting academic excellence by cultivating an appreciation for education that transcends the classroom into local and global communities.

EOF Mission

Focused on access, academic excellence, and research, the SEBS Educational Opportunity Fund (EOF) cultivates student capacity to make adaptive changes in their educational development and overcome historic socioeconomic factors that challenge their potential for success. SEBS EOF seeks to provide services that assist students in navigating the complexities of an academic and social climate, within a global environment; and, facilitate an understanding of what is required to succeed in college as a science major at Rutgers. Seeking to produce researchers, scientists, and health professionals, SEBS EOF promotes learning outcomes that positions the program to become a leading producer of first-generation graduates and high achieving STEM professionals.

EOF Core Values: A.G.R.E.E.

Academic Research Training (A.R.T.): We promote the enhancement of individual analytical reasoning skills to encourage inquiry designed to engage each student's thoughtful approaches to addressing societal problems using scientific reasoning; with the expectation that students will enroll in graduate degree studies.

Graduation: We support each student's desire for academic success creating an environment where educationally purposeful activities focus on removing distractions that hinder graduation.

Retention: We engender an office climate that provides or directs students to resources that will assist with addressing those academic, social, and personal concerns that contribute to student attrition.

EOF History: We promote student understanding of the founding principles and ideas of EOF, hoping to instill a feeling of confidence and sense of belonging for enrolled students.

Excellence: We exude and expect honest, responsible, and ethical behavior as we develop course curriculum that supports student academic success leading to enrollment in graduate school studies.

Inquiries about the Educational Opportunity Fund (EOF) at the School of Environmental and Biological Sciences should be addressed to Jacqueline Moore, Ed.D., Assistant Dean, Educational Opportunity Fund (EOF), Rutgers, The State University of New Jersey, 88 Lipman Drive, New Brunswick, NJ 08901-8525 (848-932-3738).

Preprofessional Programs (SEBS)

PREPROFESSIONAL PROGRAMS

Preprofessional Programs (SEBS)

Health Professions

Health Professions

The Health Professions Office (HPO) is a full-time operation serving the needs of students and alumni of Rutgers University-New Brunswick who are planning to apply to schools of medicine, dentistry, and other graduate

specialties. In addition to advising students, the office provides a variety of services including coordinating several health-related academic and clinical programs; maintaining an HPO database, website, listserv, and electronic files; digitizing and submitting letters of evaluation; coordinating workshops and various events; mentoring student organizations; and generating a monthly newsletter of events and deadlines; and generating annual admission statistics. For further information, see their website or email the office at hpo@dls.rutgers.edu. The HPO is located at Nelson Biological Laboratories, 604 Allison Rd., Room A-207, Piscataway, NJ 08854.

Preprofessional Programs (SEBS)

Veterinary Medicine

Veterinary Medicine

New Jersey does not have a college of veterinary medicine. New Jersey residents who wish to become doctors of veterinary medicine and practice in the United States can obtain their professional education at one of the colleges of veterinary medicine accredited by the American Veterinary Medical Association (AVMA) after completing prerequisite course requirements. There are only 30 accredited veterinary schools in the United States, and three states have two schools: California, Tennessee, and Alabama. There are also AVMA accredited foreign veterinary schools in Canada (5), Australia (4), West Indies (2), Scotland (2), and one each in England, Mexico, the Netherlands, Ireland, and France.

Admission to veterinary school is based on a combination of grades (usually a GPA between 3.0 and 4.0 to even be considered), letters of recommendation from professors and veterinarians, experience in a veterinary practice and/or research, and performance on standardized tests (see below). To prepare for admission to a veterinary college, the student must have acquired a strong scientific and liberal arts background. Most veterinary colleges require at least one, often two, semesters of the following undergraduate subjects: biochemistry, biology, English, general chemistry, genetics, microbiology, organic chemistry and physics. In addition, some will also require courses in statistics, physiology, and even public speaking. The undergraduate program should also provide a broad and diversified background of experiential learning (practicums and internships) enabling students to achieve their full potential as an individual and a member of society. All of the colleges do require that the applicants have experience working with veterinarians in clinical and/or research settings, and some require documentation of the amount of time spent in veterinary practice and/or research. Graduate Record Examinations are required by most colleges of veterinary medicine, usually taken in the spring or summer before the student applies for admission.

Veterinary Aptitude Tests are required by a few schools. Since the prerequisites do differ among the colleges, applicants must check with the individual schools regarding specific course and test requirements. Most colleges of veterinary medicine require a minimum of three years of university-level study prior to admission. Most successful candidates for admission have completed a bachelor of science degree in biological, animal, or agricultural science programs. However, colleges of veterinary medicine do not dictate where or in what degree program applicants should be enrolled for preprofessional study. Most veterinary colleges recommend, however, that applicants pursue a baccalaureate degree in the area of their second choice of vocation. That way if the candidate is not admitted to a college of veterinary medicine, the time spent in preparatory studies may be applied to careers in related sciences, such as human medicine, animal science, biology, biotechnology, laboratory animal science, medical technology, or wildlife biology.

There is no contractual agreement between the New Jersey Higher Education Student Assistance Authority (HESAA) and out-of-state colleges of veterinary medicine for the acceptance of New Jersey residents.

However, qualified students from the School of Environmental and Biological Sciences have been admitted to veterinary medical programs at almost every AVMA-accredited college of veterinary, with many being admitted to more than one program. Further information on application procedures and the Veterinary Medical Education Contract Program are available in the Department of Animal Sciences, Bartlett Hall.

Preprofessional Programs (SEBS)

Law

Law

The prelaw advisers at the Office of Undergraduate Education counsel students interested in preparing for admission to law school. A library of law school catalogs and resource materials is available, as are statistics about applications and acceptances to law school. For further information, see here.

Combined Degree Programs (SEBS)

COMBINED DEGREE PROGRAMS

Students in the School of Environmental and Biological Sciences may participate in several programs that provide the opportunity to begin advanced degree work while completing a bachelor's degree.

Joint Bachelor/Medical Degree Programs (SEBS)

Joint Bachelor/Medical Degree Programs

These programs, offered through the Division of Life Sciences in collaboration with Rutgers Biomedical and Health Sciences, allow for specially selected premedical students early in their college career to begin medical or dental school courses while completing undergraduate courses and degrees. Students may apply to these programs in their sophomore year, and are selected and granted provisional admission into the medical or dental school at the conclusion of their fourth semester, with a second review of the student's credentials during the fourth year of the program.

Robert Wood Johnson Medical School in New Brunswick offers a joint bachelor/doctor of medicine (B.A./M.D.) program. This program is designed for high-achieving premedical students and gives them the opportunity to incorporate medical school courses into their undergraduate program of study in their junior and senior years.

New Jersey Medical School offers a seven-year bachelor/doctor of medicine (B.A./M.D.) program. This program is designed for high-achieving premedical students and gives them the opportunity to incorporate medical school courses into their undergraduate program of study in their senior year.

Rutgers School of Dental Medicine offers a joint bachelor/doctor of dental medicine (B.A./D.M.D.) degree program. This combined degree permits highly qualified students to complete the required courses for both baccalaureate and dental degrees in a seven-year sequence. It consists of three years of undergraduate study at Rutgers and four years of study in the D.M.D. degree program.

Rutgers School of Health Professions offers bachelor/master of science physician assistant program (B.A./M.S.). This program offers undergraduates an opportunity to enter the physician assistant program prior to their college graduation. This is a 3+3 program with the first three years spent as an undergraduate and the last three years spent in the professional graduate program.

For further information students may contact the Health Professions Office by emailing hpo@dls.rutgers.edu, or visiting the office a the Nelson Biological Laboratories
604 Allison Rd, Room A-207, Piscataway, NJ 08854, and visiting the website. The descriptions of combined degree programs can be found under the Special Programs tab.

Five-Year B.A. or B.S./M.B.A. Program (SEBS)

Five-Year B.A. or B.S./M.B.A. Program

Offered in cooperation with Rutgers Business School: Graduate Programs-Newark and New Brunswick, this program allows specially selected students to earn both a bachelor's degree and a master of business administration (M.B.A.) degree in five years. Students must apply for this program in the spring semester of the junior year. If accepted, students will take graduate courses in their fourth year at Rutgers Business School.

Applicants must take the Graduate School Management Admissions Test (GMAT) in their junior year and have a cumulative grade-point average of at least 3.0.

For more information please visit here.

Five-Year B.A. or B.S./M.P.P. Program (SEBS)

Five-Year B.A. or B.S./M.P.P. Program

Offered in cooperation with the Edward J. Bloustein School of Planning and Public Policy, this program allows specially selected students to earn a master of public policy (M.P.P.) degree in five years by beginning graduate courses in their senior year and undertaking a summer internship after their fourth year. Students apply for admission in the junior year and have a cumulative grade-point average of at least 3.0.

For more information, please visit here.

Articulated 3-1-1 Program B.S./M.P.H. or B.A./M.P.H. (SEBS)

Articulated 3-1-1 Program B.S./M.P.H. or B.A./M.P.H.

This option allows exceptional, well-prepared students with an interest in a public health career to take up to 15 graduate core course credits at the Rutgers School of Public Health and earn both a bachelor's degree and a master of public health (M.P.H.) degree (here). The M.P.H. provides students with a clear understanding of the roles of the core disciplines of public health and specialized skills in at least one public health discipline. The articulated program is administered through the Edward J. Bloustein School of Planning and Public Policy and is open to all majors attending Rutgers University-New Brunswick. Applicants must have at least 60 credits and a cumulative GPA of 3.2.

5-Year BS/EdM Teacher Education Programs (SEBS)

Agricultural Science Education (K-12)

Agricultural Science Education (K-12)

Program Overview

The 5-year program with teacher certification in K-12 agricultural science education, offered jointly by the GSE and Rutgers' School of Environmental and Biological Sciences (SEBS), is designed to prepare students with a comprehensive understanding of agricultural science and content-specific teaching methods appropriate for the discipline. Successful completion of the program will lead to a bachelor's degree, master's degree in science education, and initial teacher certification in agricultural education. Individuals who enjoy working with plants and animals and sharing the importance of agriculture are encouraged to apply. Through required coursework and field placements, students will become familiarized with current standards surrounding agricultural science education, including the delivery of supervised agricultural experiences, and possess the ability to successfully integrate technology into their instruction to promote student learning.

To complete the program in 5 years, Rutgers SEBS undergraduates must complete specific pre-admission coursework and field placements during their sophomore and junior years. Students then apply for the 5-year program before the Spring semester of their junior year and if admitted, enter the professional education sequence in the summer before senior year. After senior year, students qualify to have their bachelor's degree awarded by SEBS and continue with the professional sequence in the summer after graduation. Students will return in the fall to complete a full-time student-teaching internship and continue with full-time graduate study, including a field-based research project in the spring.

After the master's degree is awarded, the GSE will make a recommendation to the New Jersey State Department of Education on behalf of the graduate to receive their Certificate of Eligibility with Advanced Standing (CEAS) as a teacher.

For more information about this program: Download the program guide (includes course list and application requirements) Visit the Rutgers University Agricultural Science Education webpage, Contact the program coordinator, Dr. Thomas Leustek.

5-Year BS/EdM Teacher Education Programs (SEBS)

Biological Sciences Education (K-12)

Biological Sciences Education (K-12)

Program Overview

The 5-year program with teacher certification in K-12 biological science education is designed to help students deepen their understanding of the learning and teaching of biological sciences, with a focus on inquiry-based teaching that is aligned with the Next Generation Science Standards (NGSS). Successful completion of the program will lead to a bachelor's degree, master's degree in science education, and initial teacher certification in biological science education. The program curriculum will provide students with exposure to fundamental courses related to education, including the Urban Social Justice Core classes, as well as program-specific coursework related to teaching biology at the middle and high school levels.

To complete the program in 5 years, undergraduate students must complete specific pre-admission coursework and field placements during their sophomore and junior years. Students then apply for the 5-year program before the Spring semester of their junior year and if admitted, enter the professional education sequence in the summer before senior year. After senior year, students qualify to have their bachelor's degree awarded by the undergraduate liberal arts college and continue with the professional sequence in the summer after graduation. Students will return in the fall to complete a full-time student-teaching internship and continue with full-time graduate study, including a field-based research project in the spring.

After the master's degree is awarded, the GSE will make a recommendation to the New Jersey State Department of Education on behalf of the graduate to receive their Certificate of Eligibility with Advanced Standing (CEAS) as a teacher.

For more information about this program, download the program guide (includes course list and application requirements) or contact the program coordinator, Dr. Ravit Golan Duncan.

5-Year BS/EdM Teacher Education Programs (SEBS)

Physical Science and Physics Education (K-12)

Physical Science and Physics Education (K-12)

Program Overview

The 5-year program with teacher certification in physical science and or physics education (K-12) is designed to help students deepen their understanding of the core principles surrounding physics and chemistry while developing content-specific teaching methods appropriate for the disciplines. Successful completion of the program will lead

to a bachelor's degree, master's degree in science education, and initial teacher certification in physical science and or physics education. Research-driven coursework will provide students with a grounding in the historical and philosophical contexts of the physical sciences as well as with the practical knowledge and skills needed to develop effective student learning environments and to integrate technology into their instruction. As with all teacher preparation programs at the GSE, teacher candidates will exit this program as culturally responsive practitioners, trained to teach and advocate for diverse learners by fostering a deep understanding of students from historically underserved linguistic, economic, and cultural backgrounds and communities.

To complete the program in 5 years, undergraduate students must complete specific pre-admission coursework and field placements during their sophomore and junior years. Students then apply for the 5-year program before the Spring semester of their junior year and if admitted, enter the professional education sequence in the summer before senior year. After senior year, students qualify to have their bachelor's degree awarded by the undergraduate liberal arts college and continue with the professional sequence in the summer after graduation. Students will return in the fall to complete a full-time student-teaching internship and continue with full-time graduate study, including a field-based research project in the spring.

After the master's degree is awarded, the GSE will make a recommendation to the New Jersey State Department of Education on behalf of the graduate to receive their Certificate of Eligibility with Advanced Standing (CEAS) as a teacher.

For more information about this program, download the program guide (includes course list and application requirements) or contact the program coordinator, Dr. Robert Zisk.

4+1 BS/MBS (Master of Business and Science) Programs (SEBS)

4+1 BS/MBS (Master of Business and Science) Programs

Offered in cooperation with the Professional Science Master's Program, this option allows specially selected students to earn both a bachelor's degree and a master of business and science (M.B.S.) degree in five years. The M.B.S. is a hybrid degree combining courses from a master of science (M.S.) and a master of business administration (M.B.A.). Students choose an applied science concentration that is paired with a business curriculum. Several undergraduate programs at the School of Environmental and Biological Sciences have been paired in this way including biotechnology and genomics, food science, horticulture and turfgrass science, international agriculture, sustainability, and urban environmental analysis. Students apply to this program in their junior year, and if accepted, will complete their coursework in their fourth and fifth years of study. Applicants must have a GPA of 3.2 and must have completed 90 credits by the end of their sixth semester.

Biotechnology and Genomics

Biotechnology and Genomics

Overview

The goal of the MBS Biotechnology & Genomics concentration is to educate and equip students with the knowledge, skills, and tools necessary to successfully lead and manage technical development and commercial applications in areas of molecular biological sciences - including proteomics, biochemistry, cell biology, system biology, and nanobiotechnology. In addition to fundamental scientific principles, students will gain comprehensive knowledge of key business areas including finance and accounting, entrepreneurship, marketing, communication and leadership, management and planning, intellectual property, ethics, and regulations.

Skills Gained

Through expert instruction and experiential education, students will gain:

- Comprehensive understanding of rapidly evolving developments in structural and analytical methods
- Knowledge of state-of-the-art research methods
- Knowledge of current best practices and protocols in this field
- Computational approaches needed to handle large datasets

Recommended Experience For Admission

Academic

- Students must have a bachelor's degree in biotechnology, genomics, genetics, biochemistry, biology, or a related field.
- Prerequisite coursework includes two semesters of biology, two semesters of general chemistry, two semesters of organic chemistry, one semester of calculus, and one semester of genetics.
- For students without laboratory experience, the following course is recommended: 11:126:482 Molecular Genetics Laboratory

Professional

- All professional experience will be considered as part of the application process.

Applicants who are unsure of their eligibility for this concentration should schedule an appointment with an enrollment specialist.

Food Science

Food Science

Overview

The goal of the MBS Food Science concentration is to educate and equip students with the skills and tools necessary to successfully manage both technical developments and commercial applications in the food industry and related consumer-driven industries. Students will not only learn fundamental principles and applications of food science and technology, but will gain fundamental knowledge of key business areas including finance and accounting, entrepreneurship, marketing, communication and leadership, management and planning, intellectual property, ethics, and regulatory.

Skills Gained

Through expert instruction and experiential education, students will:

- Gain comprehensive knowledge of food science and technology as well as food safety
- Gain fundamental knowledge of key industry-related business areas
- Learn state-of-the-art scientific methods, processes, and applications
- Gain an overview of the commercialization process
- Learn about the guiding principles and best practices for product commercialization

Preferred Academic or Professional Experience

Academic

- Applicants should have a bachelor's degree in one of the following areas: food science, chemistry, biochemistry, microbiology, engineering, or related fields.
- A course in organic chemistry is preferred. Students without organic chemistry experience will be required to complete a course in their first semester.

Professional

- All professional experience will be considered as part of the application process.

Applicants who are unsure of their eligibility for this concentration should schedule an appointment with an enrollment specialist.

Geospatial Information Systems & Technology

Geospatial Information Systems & Technology

Overview

The goal of the MBS Geospatial Information Systems & Technology (GIS&T) concentration is to equip students with the knowledge, tools, and technological skills necessary to succeed in this emerging, multidisciplinary field. In addition to examining the theoretical basis and the societal and environmental impacts of GIS technology, students will gain fundamental understanding of key business areas including finance and accounting, marketing, communication and leadership, management and planning, intellectual property, ethics, and regulatory.

Skills Gained

Through expert instruction and experiential education, students will:

- Gain broad, in-depth knowledge of the diverse applications of GIS technology
- Become skilled in a variety of geospatial technologies
- Gain fundamental understating about use of GIS&T in science, government, and commerce
- Learn about guiding principles and best practices related to GIS&T

Preferred Academic or Professional Experience

Academic

- An undergraduate degree in a science-specific discipline is preferred, and applicants should have as solid background in and deep understanding of calculus and statistics. If necessary, students can take calculus and/or statistics courses while earning their MBS degree.

Professional

- All professional experience will be considered as part of the application process.

Applicants who are unsure of their eligibility for this concentration should schedule an appointment with an enrollment specialist.

4+1 BS/MBS (Master of Business and Science) Programs (SEBS)

Global Agriculture

Global Agriculture

Overview

The goal of the MBS Global Agriculture concentration is to educate and equip students with the skills, tools, and knowledge necessary to emerge as leaders within the global green industry. In addition to gaining a deep understanding of foundational aspects of agriculture including plant pathology, environmental sustainability, and crop management students will gain comprehensive knowledge of key business areas including finance and accounting, entrepreneurship, marketing, communication and leadership, management and planning, intellectual property, ethics, and regulatory.

Skills Gained

Through expert instruction and experiential education, students will:

- Gain a thorough understanding of the international agricultural industry
- Gain fundamental, working knowledge of agriculture industry production and management processes
- Gain broad-based knowledge about environmental conservation and the role agricultural enterprises play in maintaining a healthy global environment
- Gain a fundamental overview of key business areas that both impact and are impacted by the international agricultural industry

Preferred Academic or Professional Experience

Academic

- It is strongly recommended that students have a bachelor's degree in a science-related field, and that they have completed the following academic requirements: two terms/one year of general biology (with laboratory); two terms/one year of general chemistry with laboratory; two courses in Math (Statistics and Calculus). In certain cases, course requirements can be modified or waived.

Professional

- All professional experience will be considered as part of the application process.

Applicants who are unsure of their eligibility for this concentration should schedule an appointment with an enrollment specialist.

4+1 BS/MBS (Master of Business and Science) Programs (SEBS)

Global Food Technology and Innovation

Global Food Technology and Innovation

Overview

The goal of the MBS Global Food Technology & Innovation concentration is to educate and equip students with the knowledge, skills, and tools necessary to successfully understand and manage ongoing technical developments and commercial applications in the global food industry. In addition to learning fundamental principles and applications

of food science and technology, students will gain comprehensive knowledge of key business areas including finance and accounting, entrepreneurship, marketing, communication and leadership, management and planning, intellectual property, ethics, and regulatory.

Skills Gained

Through expert instruction and experiential education, students will:

- Gain comprehensive knowledge of food science and technology, as well as food safety and management
- Gain broad-based knowledge of key business skills relevant to the global food industry
- Gain in-depth understanding of end-to-end commercialization and innovation processes, as well as the guiding principles and best practices for product commercialization
- Learn to successfully integrate their scientific background and business knowledge to create and convert new ideas into commercially viable applications
- Learn to leverage their integrated science and business knowledge for complex problem-solving.

Preferred Academic or Professional Experience

Academic

- Applicants should have a bachelor's degree in one of the following areas: food science, chemistry, biochemistry, microbiology, engineering, or related fields.
- Students without organic chemistry experience will be required to complete this chemistry course in their first semester.

Professional

- All professional experience will be considered as part of the application process.

Applicants who are unsure of their eligibility for this concentration should schedule an appointment with an enrollment specialist.

4+1 BS/MBS (Master of Business and Science) Programs (SEBS)

Horticulture and Turfgrass Science

Horticulture and Turfgrass Science

Overview

The goal of the MBS Horticulture & Turfgrass concentration is to educate and equip students to work as private consultants or to be directly hired by institutions to design, manage, and provide direct services related to horticulture, landscaping, agriculture, commercial horticulture, and turf management. In addition to gaining advanced, hands-on scientific knowledge, students will gain fundamental knowledge of key business areas including finance and accounting, marketing, communication and leadership, ethics, intellectual property, regulatory, and entrepreneurship.

Skills Gained

Through expert instruction and experiential education, students will:

- Gain thorough understanding of horticulture and related career areas
- Gain fundamental, working knowledge of production and management processes
- Gain a fundamental overview of key business areas that both impact and are impacted by the international agricultural industry

Preferred Academic or Professional Experience

Academic

- It is strongly recommended that applicants possess a bachelor's degree in biological sciences or human science area (social work, psychology or related fields).
- It is also recommended that students have completed one year of general biology, one year of general chemistry, and one year of plant science and/or botany.

Professional

- All professional experience will be considered as part of the application process.

Applicants who are unsure of their eligibility for this concentration should schedule an appointment with an enrollment specialist.

4+1 BS/MBS (Master of Business and Science) Programs (SEBS)

Sustainability

Sustainability

Overview

The goal of the MBS Sustainability concentration is to educate and equip students with the skills and tools necessary to identify, analyze, and better understand connections among social, environmental, technological, and economic systems environmental, social, and governance (ESG) as well as the forces driving these systems. In addition to learning state-of-the art methods to successfully measure, predict, and influence key processes that influence sustainability, students gain fundamental business knowledge in areas including finance and accounting, marketing, communication and leadership, ethics, intellectual property, regulatory, and entrepreneurship.

Skills Gained

Through expert instruction and experiential education, students will:

- Learn a systems-based problem-solving approach to envision and forecast how individual and local actions can affect the function of larger ecosystems, structures, organizations, and/or processes

- Gain fundamental understanding of the interactions of social, environmental, and economic systems
- Learn to propose and promote strategies that meet short-term organizational needs while promoting long-term, sustainable outcomes
- Gain fundamental knowledge of key business areas related to sustainability, as well as the impact of sustainability efforts on these areas

Preferred Academic or Professional Experience

Academic

- It is strongly recommended that applicants possess at least a bachelor's degree in a scientific or engineering discipline. In some cases, promising students without science or engineering degrees may be accepted to the program.
- It is also recommended that students have completed: one semester of calculus, one year of chemistry, one year of another science (e.g., environmental science, ecology, biology, physics, meteorology, air or water pollution, geology), and one semester of statistics.

Professional

- All professional experience will be considered as part of the application process.
- Previous education in environmental sciences is not required.

Applicants who are unsure of their eligibility for this concentration should schedule an appointment with an enrollment specialist.

Accelerated Programs (SEBS)

Bioenvironmental Engineering

Bioenvironmental Engineering

Combined B.S. - M.S. Degree Program for Bioenvironmental Engineering - Program Description

Overview
The Graduate Program in Bioenvironmental Engineering (BEE) and the Undergraduate Programs in Environmental Engineering (EnvE) offer a Combined B.S. - M.S. (4+1) Program enabling qualified BEE/EnvE undergraduate students to be accepted into the BEE graduate program in an expedited way, thus providing those students the possibility to earn an M.S. degree in a shortened time frame.

Recent alumni surveys of BEE/EnvE graduates have shown that approximately 50% of B.S. graduates have gone on to obtain Professional Engineering (PE) licenses. State PE licensing boards are considering a Graduate Studies requirement for all new PEs (in fact, The American Society of Civil Engineering's (ASCE) Policy Statement 465 directly addresses this). Thus, a seamless process leading directly to an M.S. degree is of major benefit to qualified BEE/EnvE students.

In addition, approximately 25% of BEE/EnvE graduates have found employment in the government sector. Some government agencies, including the United States Environmental Protection Agency, regard the M.S. degree as a professional credential with recipients eligible for salary increases.

Eligibility

BEE/EnvE undergraduates who have attained an overall GPA of 3.2 or higher and have completed (or are completing) the second semester of their junior year are eligible to apply to the 4+1 program. Students usually apply during their sixth semester or right before their seventh semester. Applicants apply through the Graduate School application portal. The application fee is waived. The interested student must have completed 90 credits of coursework by the end of their sixth semester of undergraduate study. They will be granted conditional admission while they are still undergraduates and be formally admitted to the M.S. program once they have successfully completed all the requirements for their undergraduate degree. Students are encouraged to discuss with their undergraduate advisor and the directors of the graduate and undergraduate programs, how to best plan their courses during their senior year.

Consistent with School of Graduate Studies policy and other Rutgers Engineering Programs, the GRE requirement is waived for students applying for the 4+1 program. However, it is still recommended that the GRE exam be taken, as it is required for many applications for national fellowships, as well as by many graduate programs at other universities.

Study Program

The traditional BEE M.S. program offers two plans: (A) 24-25 credits of coursework, 6 credits of research, and a comprehensive oral examination that includes the defense of a written thesis; or (B) 30 credits of coursework, submission of an approved critical essay, and a comprehensive oral examination. It is typically completed over a 1.5-year to 2-year time period. The B.S. - M.S. (4+1) program also offers two plans and provides students with the opportunity to earn a Master's degree within an expedited time frame. This becomes possible by taking one or more graduate-level courses in the senior year in addition to completing the undergraduate degree requirements.

The following description is a recommended study sequence for the 4+1 Plan B program:

- Senior year: During the Spring Semester the student takes at least one graduate course in addition to the remaining B.S. courses.
- Summer after Senior Year: Consult with advisor to define topic and scope of critical essay.
- Fifth year Fall Semester: The student takes four 3-credit graduate courses, a one-credit graduate seminar (16:116:611 or 16:375:613) and Special Problems in Bioenvironmental Engineering (16:116:697) for one credit for preparation of the critical essay.
- Fifth year Spring Semester: The student takes four 3-credit graduate courses. In addition, the student takes Special Problems in Bioenvironmental Engineering (16:116:698) for one credit for completion of the critical essay.
- Summer following fifth year: The student finalizes the critical essay and takes the comprehensive final exam.

Alternatively, the following is a recommended study sequence for a Plan A (research) program. This program is suggested for students who will be starting or have been conducting research as part of the Slade or George H. Cook Scholars Programs:

- Senior year: Enroll in Slade Scholars or George H. Cook Honors Program. Take six credits of Honors Research (e.g., 650:491 and 650:492 for Slade Scholars), which count as course credits towards the B.S. Honors research can become the thesis topic for the M.S. degree. Students take 2 graduate courses, if prepared, but can take up to 3 graduate courses. Please note that courses used to satisfy B.S. requirements may not be used to satisfy M.S. requirements (i.e., no "double counting").
- Fifth year: Three graduate courses and three credit hours of research each semester. A one-credit graduate seminar is taken during the fall semester.
- Summer (and perhaps fall) following fifth year: Write M.S. thesis and defend.

Note: Students can change advisors at the end of their fourth year. The Honors research topic does not necessarily have to be the M.S. thesis topic.

Accelerated Programs (SEBS)

Environmental Science

Environmental Science

Co-terminal (4+1) BS/MS Environmental Science

GPD: Lisa Rodenburg (lisa.rodenburg@rutgers.edu) 848-932-5774

For more information, click here.

Overview
The Graduate Program in Environmental Science is pleased to announce the creation of a 4+1 BS+MS program in Environmental Science (ES). Advantages to students pursuing the BS to MS co-terminal degree include: the possibility of pursuing graduate studies at a top-ranked university, the possibility of continuing undergraduate research projects and transforming them into graduate-level research, the option to complete graduate studies in a reduced timeframe and with cost-effective fee structure, and the possibility to have the GRE application requirement waived.

Resources and logistics
The curriculum for the "+1" MS degree is the same as the general MS curriculum. Currently, we offer both the plan A (thesis) and plan B (non-thesis) MS degree. We expect that most 4+1 students will choose the plan B option, but the plan A will also be available to 4+1 students. We expect that students who have performed undergraduate research, especially those that have done this research as part of a George H. Cook Honors Thesis, will continue this research and expand it into their plan A master's thesis.

Procedures and Policies for Admission
Admission to the program is requested by the student in January of their Junior year through the Graduate School application portal. At the time of application, the student should have completed at least 75 course credits toward their BS. They will be granted conditional admission while they are still undergraduates, and be formally admitted

to the MS program once they have successfully completed all the requirements for their undergraduate degree. Students will have to explain in their application how they plan to complete requirements for the BS and MS during their senior year, and will be encouraged to plan for this in conversation with the Directors of the undergraduate and graduate ES programs, and their undergraduate advisor.

Applications to this track will be reviewed by the admissions committee along with all other applicants to the ES MS and PhD programs. The deadline for admissions to all of these programs for a Fall semester start is January 15th. By allowing 4+1 students to apply during their junior year, a full year before they would apply to outside programs, we can ensure that they receive an admissions decision by May 1, well before they need to think about applying to other graduate programs. The GRE requirement is waived for students with a GPA of 3.0 or above in their ES major.

As with all MS students, 4+1 students accepted into the MS program have the option of switching to the PhD program subject to the approval of the Graduate Director. Students may choose to earn the MS degree on the way to the PhD, or may go directly to the PhD program.

Accelerated Programs (SEBS)

Food and Business Economics

Food and Business Economics

Environmental and Business Economics 5-year B.S./M.S Program

This 5-Year BS/MS program allows students to earn both a bachelor's degree in any of the majors at Rutgers University and a master's degree in Food and Business Economics in five years rather than the usual six years (4+2=6). Students must apply while they are in their junior year (see To Apply below). Students who are not Environmental and Business Economics (EBE) majors but interested in the program would also be able to take advantage of this program provided they have the required preparation in economics.

This program recognizes that both bachelor's and master's degrees offered by DAFRE follow rigorous curricula and reside within one of the most prestigious professional schools at Rutgers University - the School of Environmental and Biological Sciences (SEBS). Many SEBS undergraduates, particularly those who major in EBE, seek careers in the region's financial, pharmaceutical, and food industries as well as careers with marketing and consulting firms. These students have an opportunity to attain a MS degree where they will obtain high levels of quantitative and analytical skills in the economics of biotech/pharmaceutical sectors, production and marketing of agricultural and food products, land/environmental policy and management, and international development.

The proposed 3-1-1 program also provides an excellent alternative to the typically more expensive M.B.A. program. In addition, this program will equally prepare those who seek to pursue doctoral programs in the fields of agricultural and resource economics, economics, agribusiness, and public policy. View our brochure.

BS/MS Admissions Requirements

- Students should discuss the program with the Graduate Program Director, Graduate Program in Food & Business Economics, Department of Agricultural, Food & Resource Economics. Contact information for the GPD: Dr. Isaac Vellangany, Associate Professor, isaacv@sebs.rutgers.edu; Tel: 848-932-9131.
- Minimum 3.0 GPA or better is required at the time of application.

- Students must successfully complete either Intermediate Microeconomics (01:220:203) or Demand and Price (11:373:422) no later than Spring Semester of their junior year.
- Students should apply to the program in the Spring Semester (May 31st deadline) of their junior year (need to make sure that they are applying to the 3-1-1/MS program and not to the traditional MS program).

To Apply to the BS/MS Program

- Fill out the B.S./M.S. degree application form.
- Attach a copy of your transcript (downloadable copy is acceptable)
- Submit a personal statement, i.e., statement of purpose, explaining why you would like to pursue this program
- Three letters of recommendations

Once a student is admitted and he/she maintains the requirements discussed earlier, then during Spring semester of senior year the student will submit a formal application to the Rutgers Office of Graduate and Professional Admissions. The student will use the personal statement submitted (mentioned earlier) in this formal application. The Graduate Program in Food & Business Economics will forward the recommendation letters submitted by the student earlier to the Graduate Admissions office on his/her behalf.

A Typical Program of Study for the B.S./M.S. Program in Food and Business Economics (full-time) will be as follows:

SENIOR YEAR (FOURTH YEAR)

Fall:

1. Econometric applications (11:373:425), or Econometrics (01:220:322) (This course should ideally be taken by interested students in an earlier fall semester, and must not count towards their B.S. degree requirements.)
2. Research methods (16:395:503)
3. Micro theory w/app (16:395:505)

Spring:

1. Applied econometrics (16:395:506)

FIFTH YEAR

Fall:

1. Graduate elective courses 9 Credits for those in the thesis option. 12 Credits for those in the Plan B option.

Spring:

1. Graduate elective courses:3 Credits for those in the thesis option. 12 Credits those in the Plan B option.
2. Research in Food & Bus Econ (16:395:702) 6 Credits for those with thesis option
3. Indep. Study in Food & Bus Econ (16:395:620) 3 Credits for those with Plan B option

For those in the thesis option, write M.S. thesis and defend. For those in Plan B, write the Plan B paper and defend.

To successfully complete the M.S. program in Food & Business Economics, a student must complete either 24 course credits and 6 research credits (thesis option), or 30 course credits and 3 independent study credits (non-thesis option).

Accelerated Programs (SEBS)

Landscape Architecture

Landscape Architecture

BSLA + MLA Dual-Degree 5 Year Program

OVERVIEW
The dual degree program provides academic space and instruction for students to develop the rigor of independent graduate research and design and enhance their preparation for professional or academic careers.

BENEFITS OF A DUAL DEGREE

- Pursue your career goals and passions with original research and design projects that align with your interests.
- Address contemporary challenges engaging in interdisciplinary research with faculty and advisors across departments and schools at Rutgers.
- Enhance your professional practice and community work experience by building relationships with municipalities, ecological groups, and community organizations.
- Focus discussions about equity and inclusion in the practice of landscape architecture by challenging established disciplinary norms.

APPLY TO THE DUAL DEGREE PROGRAM
Undergraduate BSLA candidates apply for admission to the Dual Degree MLA program in February of their junior year. A call for applications is announced at the beginning of the Spring semester and the application requirements include:

- Portfolio
- Personal Statement (Why do you want to pursue a masters in Landscape Architecture? What are your career goals?)
- Unofficial Transcript
- 2 Academic Letters of Recommendation. Recommenders email directly to: Gail McKenzie
- Optional supplementary letters from non-academic connections (employer, non-profit, volunteer position). Email directly to: Gail McKenzie

Email your application documents to: Gail McKenzie.

If you have any questions, contact Richard Alomar, Graduate Program Director.

More information about coursework

Accelerated Programs (SEBS)

Meteorology

Meteorology

4+1 Program in Meteorology/Atmospheric Science (BS/MS)

General Information
The 4+1 Program in Meteorology/Atmospheric Science (BS/MS) allows Rutgers SEBS students to obtain both BS (Meteorology) and MS (Atmospheric Science) degrees in five years by taking some graduate-level courses in their fourth year.

How to Apply
Students wishing to complete the 4+1 program should apply by sending a personal statement to the Undergraduate Program Director by the end of the spring semester of their second year of post-secondary study.

Requirements
Automatic Admission
Students who apply and meet the following requirements will be automatically accepted into the program:

- The following prerequisites completed (with C's or higher) by end of the spring semester:
    - 11:670:101 Introduction to Meteorology
    - 11:670:102 Introduction to Climate Science
    - 11:670:211 Meteorological Analysis
    - 11:670:212 Computational Methods for Meteorology
    - 01:640:151¿152 Calculus for Mathematical and Physical Sciences
    - 01:640:251 Multivariable Calculus
    - 01:750:203¿204 General Physics
    - 01:750:205¿206 General Physics Laboratory
- 11:670:323 Thermodynamics of the Atmosphere on fall schedule
- No more than 30 transfer credits
- Cumulative GPA of 3.30 or higher (including spring and summer courses of second year)

Other Scenarios
Should an applicant not meet the requirements for automatic admission, the Graduate Program in Atmospheric Sciences Admissions Committee will consider the applicant's personal statement and all other pertinent information and make a decision on admission to the 4+1 program.

Decision Timing
All applicants will be notified about acceptance into the program by the end of August.

For more information, click here.

Course Listing (SEBS)

COURSE LISTING

Explanatory Note

Agriculture and Food Systems 020

Agriculture and Natural Resource Management 035

Animal Science 067

Arts and Sciences 090

Biochemistry 115

Bioenvironmental Engineering 117

Biotechnology 126

Community Health Outreach 193

Ecology, Evolution, and Natural Resources 216

Educational Opportunity Fund 364

Entomology 370

Environmental and Biological Sciences 015

Environmental and Business Economics 373

Environmental Planning 573

Environmental Policy, Institutions, and Behavior 374

Environmental Sciences 375

Food Science 400

Interdisciplinary Studies 554

Landscape Architecture 550

Leadership Skills 607

Marine Sciences 628

Meteorology 670

Microbiology 680

Nutritional Sciences 709

Plant Science 776

Student to Professional Internship Network (SPIN) 902

Explanatory Note (SEBS)

EXPLANATORY NOTE

Each course at Rutgers University is given a unique eight-digit number, which precedes the course name in the following listing. The first two digits are the administrative code (standing for the faculty or school offering the course), the next three digits are the subject code for the course, and the final three digits are the actual course number.

Administrative Codes. The administrative code for the School of Environmental and Biological Sciences is 11. For a complete list of administrative codes, see the beginning of the Programs, Faculty, and Courses section in this catalog.

Subject Codes. A subject code comprises the third through fifth digits in all course numbers and indicates the subject matter of the course. Courses with the following subject codes are listed in this chapter. (Subject codes are not necessarily major programs of study and do not always have the same code numbers as the curricula.)

015 Environmental and Biological Sciences

020 Agriculture and Food Systems

035 Agriculture and Natural Resource Management

067 Animal Science

115 Biochemistry

117 Bioenvironmental Engineering

126 Biotechnology

193 Community Health Outreach

216 Ecology, Evolution, and Natural Resources

364 Educational Opportunity Fund

370 Entomology

373 Environmental and Business Economics

374 Environmental Policy, Institutions, and Behavior

375 Environmental Sciences

400 Food Science

550 Landscape Architecture

554 Interdisciplinary Studies

573 Environmental Planning

607 Leadership Skills

628 Marine Sciences

670 Meteorology

680 Microbiology

709 Nutritional Sciences

776 Plant Biology

902 Student to Professional Internship Network (SPIN)

Course Numbers. The sixth, seventh, and eighth digits comprise the course code in all course numbers. Two course codes separated by a comma indicate that each semester may be taken independently of the other (example: 11:015:483,484). Two course codes separated by a hyphen indicate that satisfactory completion of the first semester is a prerequisite to the second semester (example: 01:119:101-102); however, credit may be earned for the first semester without registration for the second. In general, course numbers beginning with "1" or "2" (e.g., 101; 210) are intended for students in their first or second year of study at the university, while course numbers beginning with "3" or "4" (e.g., 325; 432) are more advanced courses intended for students in their third or fourth year of study at the university.

Course Credits. Credits awarded for the successful completion of each course are indicated in parentheses following the course title. The credit-prefix E indicates that the credits are not included in the calculation of credits required for graduation ("degree credits"). The notation BA indicates that the number of credits is determined by arrangement with the department offering the course. The notation P/NC indicates that the course is graded on only a Pass/No Credit basis.

Hours of Attendance. Unless otherwise indicated, a course normally meets for a number of lecture hours per week equal to the number of credits to be earned. Special hours or modes of class other than lecture (e.g., recitation; laboratory), are usually indicated below the course description.

Consult the Schedule of Classes for the name(s) of the faculty member(s) currently offering each course.

Agriculture and Food Systems 020 Courses (SEBS)

AGRICULTURE AND FOOD SYSTEMS 020 COURSES

11:020:205 ***Careers in Agriculture, Food, Natural Resources, and the Environment (1)***
This survey course will introduce students to career opportunities in the areas of agriculture, food systems, and

natural resources through invited guests and analysis of career trends. Students will learn to research a career path and present their research to the class. The final assignment is to create a cover letter and resume for a summer job. Attendance is required in all classes.

11:020:210 ***Introduction to Agriculture and Food Systems (3)***
The online course examines the challenges faced by humanity to produce enough food for a growing world population, which is expected to exceed 9 billion by 2050, including risks from weather events, soil degradation and water shortages, pest and disease pressure, dwindling genetic diversity, and increasing energy demands. The course will also examine the controversies over adoption of technologies as well as social justice and ethical considerations. Potential solutions are examined including sustainable agriculture and the role that consumers can have through the food choices they make.

11:020:215 ***Applied Practical Applications in Agriculture and Food Systems (3)***
Students will learn qualitative and quantitative problem-solving skills focusing on applied practical applications in agricultural and food enterprises. These are skills that must be mastered to be successful, accurate, efficient, and safe when working.
Prerequisite: 11:020:210 or permission of instructor.

11:020:255 ***Special Topics in Agriculture and Food Systems (3)***
In this lecture class students will analyze current topics in agriculture and food systems. A different special topic will be analyzed each time the course is offered and will be made available at the time of registration. The course is designed for nonmajors as well as majors.
Prerequisite: Enrollment by permission of the instructor.

11:020:296 ***Honors Seminar (3)***
The topic for each semester addresses current issues from the perspectives of the humanities, sciences, and social sciences.
Open only to honors students (SEBS Honors Program, SAS Honors Program, and Honors College) or by permission of instructor.

11:020:305 ***Starting and Managing a Small Farm (3)***
This course takes a case study approach drawing from a variety of farm types. Students will examine the basics of traditional and organic farming systems and learn about resources and strategies to get started running their own farm business. Topics include horticultural crop and/or animal selection, business and economic assessment of the markets in the Northeast, farm management tools, and regulatory requirements.
Prerequisite: 11:020:210 or by permission of the instructor.

11:020:315 ***Direct Farm Marketing and Agritourism (3)***
This course prepares students to successfully develop and manage agricultural enterprises in urbanized areas where farming opportunities involve direct retail sales to customers via community farmers markets and agritourism venues. Students will prepare, present, and evaluate enterprise development projects.

11:020:321 ***Principles and Practices of Small-Scale Organic Farming (3)***
Through hands-on learning in the field, students will gain an understanding of organic food production and will improve their agricultural literacy and ability to work collaboratively with peers and community members.

11:020:333 ***Community Food Justice and Advocacy (3)***
This course will focus on building student's knowledge and skills in advocacy in order to help promote healthier, more sustainable, and more equitable food systems. Students will be introduced to the concepts of food justice and food sovereignty, and introduced to the value of individual and community-level advocacy and action as means to achieving them.
Prerequisite: 11:020:210 or by permission of the instructor.

11:020:337 ***Sustainability: Tackling Food Waste (3)***
Students will develop analytical skills and experience to help them be part of the solution to the food waste problem. Students will learn about sustainability and food waste through case studies, and will consider various opportunities, methods, and scales of action that can contribute to food waste reduction. One or more field trips.
Prerequisite: 11:020:210 or 11:374:299 or 11:374:298 or permission of instructor.

11:020:340 ***Indoor Cultivation of High-Value Crops (4)***
Investigates the use of emerging greenhouse technologies for agribusiness production of high-value crops. Students will gain hands-on training with commercial mini-model hydroponic, geoponic, and aeroponic indoor growth systems and the development of a production, business, and marketing plan.
Open to sophomores, juniors, and seniors.

11:020:425 ***Developing Ideas in Agricultural Education (3)***
This course develops the core concepts covered in agricultural K-12 education. Design and development of curricula and curriculum evaluation procedures appropriate to agricultural/extension education. Principles and techniques for developing leadership skills: interpersonal influence, commitment, goals, and power for effective leaders. Issues and problems facing leadership in agriculture.

11:020:426 ***Teaching Agriculture and Food Systems (3)***
Pedagogical content knowledge and skills for teaching in agricultural/extension education. Analysis of the agricultural/extension education curriculum; development of teaching strategies and adjustments for different students; lesson planning; design of formative and summative assessment tools.

11:020:436 ***Sustainable Agriculture (3)***
Through class participation and field trips to a variety of New Jersey farm operations (including farms in the Pine Barrens), this course will explore sustainability challenges facing U.S. farmers in relation to farming and soil practices, struggles for economic profitability, and public policies. Topics include cover crops and rotations, agricultural chemical benefits and risks and integrated pest management, industrial animal farms and food safety, genetically modified organisms (GMOs), cost-price squeeze, etc.

11:020:442 ***Entrepreneurial Agriculture (3)***
Principles of identifying and pursuing business opportunities in production agriculture. The course focuses on development of business and marketing plans and farm management skills.

11:020:455 ***Advanced Topics in Agriculture and Food Systems (3)***
This advanced seminar class challenges students to use their analytical and critical thinking skills to analyze and assess important topics in agriculture and food systems. A field trip is included. Topics change regularly.
Prerequisite: Enrollment by permission of the instructor.

11:020:460 ***Applied Analysis of Successful Agricultural Enterprises (3)***
Students will learn about major agricultural production systems throughout the state and region through discussions and visits to successful farm operations. Program emphasis will include analysis of management practices and total business skills, attitudes and approaches that separate mediocre and highly successful agricultural enterprises.

11:020:465 ***Feeding America's Cities (3)***
This seminar course will focus on a deep analysis of the food systems of cities and build critical thinking, writing, and presentation skills.
Prerequisite: 11:020:210 or permission of instructor

11:020:490 ***Agriculture and Food System Practicum (3)***
This course allows student to gain experience-based education in consultation with a faculty adviser. A learning contract is agreed upon at the start of the project. A report must be submitted by the student at the end of the practicum.
Prerequisite: Enrollment by permission of the instructor.

11:020:492 ***Tropical Agricultural Systems (3)***
Analysis of tropical agriculture systems: climatic parameters, major and important crops, animals, cropping systems, social and technical constraints, and methods of analysis.
Prerequisite: Enrollment by permission of the instructor.

11:020:495,496 ***Special Problems in Agriculture and Food Systems (3)***
Projects in agriculture and food systems with assigned reading, laboratory work, and conferences.
Prerequisite: Enrollment by permission of the instructor.

Agriculture and Natural Resource Management 035 Courses (SEBS)

AGRICULTURE AND NATURAL RESOURCE MANAGEMENT 035

11:035:200 ***Quantitative Methods for Program Evaluation (3)***
This course introduces students to the summary and analysis of evaluation data from community education and outreach programs in environmental, youth development, community healthy, and agriculture disciplines. Students will develop skills in appropriate data analysis, interpretation of statistics, and presenting this information in written and graphical form.

11:035:215 ***Spanish Language and Culture for the Agricultural Professional (1.5)***
Students will engage in beginning, conversational Spanish designed specifically for a supervisor of an agricultural workforce. Students will also explore the cultural diversity of the Spanish-speaking world.

11:035:250 ***Topics in Digital Photography (2)***
Students will learn how to properly use an advanced digital camera equipped with various camera lenses to achieve desired photographic outcomes and to use basic concepts of photographic composition. Students will become proficient in the use of Adobe Photoshop CS6 for digital photo editing. The course is taught online, and is "hands

on" with assignments focused on taking photographs and correcting/enhancing them. Students must have a digital camera available for the course.
Students must have a digital camera available for the course.

11:035:258 ***Field Identification of Birds for Use in Land Management (1)***
Field identification of birds by sight, sound, habitat, and flight pattern; natural history, preferred habitats, and migration timeline along the Eastern Flyway in New Jersey.

11:035:268 ***Environmental Pollution - Issues in Agriculture, Industry, and Communities (2)***
Evidence-based analysis of real-world problems of air, water, and land pollution on the local, state, national, and international arenas. This online course offers extensive opportunities for active discussion threads.

11:035:272 ***River and Stream Ecology (1)***
This online course is a broad introduction to the chemical, physical; and biological processes of rivers and streams. Students will gain an appreciation of these water bodies as dynamic and constantly evolving ecosystems while acquiring skills to conduct and analyze scientific methods and data related to river and stream management issues.

11:035:274 ***Organic Farming and Gardening (2)***
This online course is an introduction to organic farming and gardening from the perspective of both agricultural professionals and home gardeners. After completing the course students will be able to plan and design an organic garden using concepts of soil fertility, composting, plant growth measurements, data collection, pest management, natural landscapes, and rain gardens.

11:035:280 ***American Lawns and Turfgrass (1.5)***
This online course presents a chance for students to explore the environmental, social, and economic aspects of lawns and turfgrass through a variety of readings. Contemporary issues for New Jersey will also be investigated, including pollution in Barnegat Bay and the state law regulating fertilizer applications to turf for homeowners and professional landscapers.

11:035:288 ***Edible Gardening for Enrichment and Education (2)***
Preparation and maintenance of residential/community/educational edible gardens.

11:035:300 ***Critical Analysis of Issues in Agribusiness I (3)***
Students will develop skills needed to critically analyze current issues driving the performance and trajectory of the agribusiness sector. This course prepares students for careers by blending experience-based learning with traditional coursework. Through business meetings with industry and public sector leaders, students gain hands on business experience. Topics and field trips will vary by semester.
Requires admission into the Clearing Corporation Charitable Foundation Agribusiness Scholars Program. Special Permission number required to register.

11:035:400 ***Critical Analysis of Issues in Agribusiness II (3)***

Students will develop skills needed to critically analyze issues driving the performance and trajectory of the agribusiness sector. This course prepares students for careers by blending experience-based learning with traditional coursework. Through business meetings with industry and public sector leaders, students gain hands on business experience. Topics and field trips will vary by semester.

11:035:300 and admission into the Clearing Corporation Charitable Foundation Agribusiness Scholars Program. Special Permission number required to register.

Animal Science 067 Courses (SEBS)

ANIMAL SCIENCE 067

11:067:101 ***Careers in Animal Science (3)***
Career opportunities in the field of animal science. Professional skills development emphasized.

11:067:102 Animals in Society (3)

This introductory course will explore the foundational knowledge about companion animal roles in society and how this impacts the environment and cultures from a global perspective. Students will explore the connection of the human-animal bond as well as the treatment of companion animals in different parts of society. Students will gain knowledge of the animal science discipline to understand the future of the field and its diversity. Students will gain a broad understanding of the history of companion animals and the evolution of the companion animal economy. Students will develop an understanding of the principles of animal welfare and ethical treatment of animals.

11:067:142 ***Animal Science (3)***
Fundamental principles and functions important in animal science and zoology; emphasis on growth, nutrition, reproduction, lactation, and heredity in domestic animals.

11:067:150 ***Introduction to Animal Handling (1)***

The Introduction to Animal Handling course aims to equip students with fundamental skills and knowledge in handling various animal species. Throughout the semester, students will have the opportunity to work with pigs, sheep, goats, cows, horses, and poultry, gaining hands-on experience and practical insights into their handling techniques and behavior.

11:067:175 ***Animal Handling, Fitting, and Exhibition (1)***
Experience in the handling (using a halter, leading, displaying), fitting (clipping, grooming, cleanliness), and exhibiting (showmanship) of large animals.

11:067:176 ***Animal Handling and Fitting Supervisor (1)***
Experiential learning course that focuses on expanding experience handling, fitting, and working with livestock as well as developing teaching skills.
Prerequisite: 11:067:175 or permission of instructor.

11:067:201 ***Cattle Practicum (2)***
Practical experience is provided in the daily care of beef cattle. Formal lectures on animal products/production, nutrition, reproduction, behavior/welfare, and health/diseases. Field trips supplement and enhance the practical experience.

11:067:202 ***Small Ruminant Practicum (2)***
Practical experience is provided in the daily care of sheep and goats. Formal lectures on animal products/ production, nutrition, reproduction, behavior/welfare, and health/diseases. Field trips supplement and enhance the practical experience.

11:067:203 ***Swine Practicum (2)***
Practical experience is provided in the daily care of swine. Formal lectures on animal products/production, nutrition, reproduction, behavior/welfare, and health/diseases. Field trips supplement and enhance the practical experience.

11:067:205 ***Laboratory Animal Practicum (2)***
The student, under the guidance of the animal facility supervisor, performs all tasks necessary to provide animal care in a facility and program accredited by the Association for the Assessment and Accreditation of Laboratory Animal Care.
Pre- or corequisite: 11:067:275 or permission of the instructor.

11:067:207 ***Horse Practicum (2)***
The students assist with the daily care (feeding, stall cleaning, grooming) of the research/teaching horses on campus and routine health management (farrier, vaccinations, deworming, treatment of wounds or injuries) of the herds. The students also are assigned to assist in the care and training of a weanling/yearling horse and may be asked to assist with research projects.

11:067:210 ***Introduction to Veterinary Technology (3)***

The Introduction to Veterinary Technology (IVT) course offers a comprehensive introduction to the field of veterinary technology. Students will learn about the scope of the Veterinary Technician and Technologist profession and gain knowledge in husbandry, common companion animal diseases, behavior, triage, dentistry, and elements of veterinary nursing.

11:067:250 ***Companion Animal Science (3)***
Overview of the human-animal bond, responsibilities of animal care and ownership in current society. Course topics include: domestication, behavior, physiology, nutrition, health, and diseases of companion animals.

11:067:260 ***Animal Evaluation and Selection (3)***
Overview of livestock operations and judging of various livestock species. Field trips to different locations occur throughout the semester.
Prerequisite: 11:067:142.

11:067:275 ***Laboratory Animal Science: Management and Techniques (3)***
Principles and practices of laboratory animal science; emphasis on animal care and various animal research techniques.
Lec. 2 hrs., lab. 3 hrs.

11:067:300 ***Integrative Physiology (4)***
Physiological basis of animal function: membranes; homeostasis; endocrine/neural communication; cardiovascular, respiratory, renal, and reproductive systems; and animal production (meat, milk, eggs, and fiber).
Two 80-min. lec.; one 80-min rec. Prerequisites: 01:119:115-116; 01:160:161-162, 171.

11:067:310 ***Domestic Animal Behavior and Welfare (3)***
Animal welfare is becoming an increasing concern for producers as consumers are requiring a higher level of accountability for animals to be ethically raised. This class will provide a forum for discussion of current topics concerning animal scientists, veterinarians, and livestock producers. Normal and stereotypical behaviors will be discussed, along with behavior modification techniques. Students will learn to evaluate animal welfare in a real-world setting using scientific techniques. Training techniques allowing them to work safely around animals will also be covered.
Prerequisite: 11:067:142.

11:067:322 ***Dairy Cattle Artificial Insemination (P/NC1)***
Anatomy and physiology of the reproductive tract. Training and practical experience in artificial insemination and semen handling.
Prerequisites: 11:067:142 and 11:067:327. Three-day workshop held off campus during spring break. By special permission only.

11:067:327 ***Animal Reproduction (3)***
Anatomy and physiology of reproductive organs; reproductive processes including female cycles, pregnancy, parturition, and lactation; fertility control with particular emphasis on domestic animals.
Prerequisites: 01:119:115-116.

11:067:328 ***Animal Genetics (3)***
Introduction to mechanisms of heredity and evolution, Mendelian inheritance, meiosis, recombination, gene mutation and mapping, epigenetics, quantitative and population genetics, with an emphasis on animal models. Students will learn the logic of genetics problem solving.
Prerequisites: 01:119:115-116 and 11:067:142.

11:067:330 ***Animal Nutrition (3)***
Application of nutritional principles to livestock feeding. Nature of nutrients, their metabolism, and physiological function. Factors influencing nutrient requirements for various aspects of production.
Prerequisites: 01:119:115-116, 01:160:161-162, and 11:067:142.

11:067:331 ***Animal Nutrition Laboratory (1)***
Laboratory to accompany animal nutrition for on-campus students.
Pre- or corequisite: 11:067:330.

11:067:336 ***Production Animal Management (3)***
Management practices in livestock industries: animal evaluation and selection, reproduction techniques (AI, ET), birthing/newborn care, milking, tail docking/castration, shearing, health and disease, animal behavior, feed formulation/production studies, record keeping.
Prerequisite: 11:067:142

11:067:341 Poultry Production and Management (3)

The course provides an in-depth study of the husbandry and management of poultry. It will provide a solid understanding of the basic requirements for poultry management in a variety of settings based on the behavioral, anatomical, physiological, and health considerations of poultry animals. The course is appropriate for both novice and experienced poultry enthusiast. We will also explore the ins and outs of poultry production specifically in NJ.

Prerequisite: 11:067:142

11:067:350 Canine Behavior and Training (3)

This course will explore the science and application of animal behavior and learning. Students will become familiar with Pavlovian and operant conditioning, various schedules of reinforcement and punishment, extinction, stimulus control, and establishing operations and their effects on animal behavior. Additionally, students will learn to apply the most efficient and humane behavior modification plans to teach basic obedience and manners to dogs. Students will work with a dog during the semester to practice the mechanics of training. The student will utilize a personally owned dog or visit a local shelter to train the dog to engage in several functional behaviors. Students will be encouraged to work with dogs at a local shelter as this training may improve the adoptability of the dog. After completing this class, the students will be proficient in identifying animal behavior, animal learning theory, and dog training.

Prerequisites: 11:062:102 or 11:067:250. Sophomore or higher standing.

11:067:384 ***Horse Management (3)***
Breeding, feeding, and management of horses, with emphasis on behavior, physiology, nutrition, anatomy, and routine care.
Prerequisite: 11:067:142 or permission of instructor.

11:067:389 Companion Animal Nutrition (3)

This course provides a comprehensive examination of the principles and application of nutrition in companion animals, with primary focus on dogs and cats. Students will explore dietary strategies for different life stages, including growth, maintenance, reproduction, and aging as well as specialized nutrition for clinical conditions such as obesity, diabetes, renal disease, and food allergies. The course will also address pet food formulation, ingredient selection, processing methods, and regulatory guidelines set by the Association of American Feed Control Officials (AAFCO), and the National Research Council (NRC).

Prerequisite: 11:067:330 or permission of instructor.

11:067:390 ***Equine Nutrition (3)***
Nutritional requirements and feeding by type and age; evaluation of feedstuffs and rations; feed and pasture management; nutritional diseases and the nutritional management of certain diseases.
Prerequisites: 11:067:330 and 11:067:384, or permission of instructor.

11:067:391 ***Comparative Mammalian Anatomy (3)***
This course will cover basic mammalian anatomy and anatomical terminology, the diversity of animal body structure and its relationship to comparative physiology among mammalian species, and the structural differences among the anatomies of selected mammals.
Prerequisites: 01:119:115-116. Open to juniors and seniors only.

11:067:392 Comparative Mammalian Anatomy Lab (1)

This course will cover basic mammalian anatomy and anatomical terminology, the diversity of animal body structure and its relationship to comparative physiology among mammalian species, and the structural differences among the anatomies of selected mammals.

Prerequisite: 11:067:391.

11:067:395 ***Animal-Assisted Therapy (3)***
This course will provide students with an overview of animal-assisted therapy and its relevance as an alternative treatment modality for common psychological disorders. Information regarding the history and evolution of animal-assisted therapy in counseling, common therapeutic animals and techniques, ethical concerns when using animals in therapy, and the use of therapy animals with special populations will be covered.
Prerequisites: 01:119:115-116.

11:067:398 ***Advanced Equine Health Care and Management (3)***
A systems-based approach to common medical conditions and ailments affecting horses. The foundations of anatomy and physiology are reinforced while presenting clinical situations observed in horses. The course is recommended for students with a medical science interest, are equine enthusiasts, and managers/owners of equine facilities.

11:067:401 ***Topics in Equine Science (3)***
Reports and discussions in selected areas relating to equines.
Open to juniors and seniors only.

11:067:402 ***Equine Exercise Physiology (3)***
Survey and critical evaluation of current concepts regarding the physiological and environmental factors associated with exercise in the horse.
Prerequisite: Course in physiology (11:067:300 or 01:146:356) or permission of Instructor.

11:067:404 ***Animal Diseases (3)***
The biology of parasites (viruses, bacteria, protozoa, helminths, and arthropods) and the pathogenesis of their associated diseases. Current concepts of prevention and control of common diseases.
Prerequisites: 01:119:115-116. Open to juniors and seniors.

11:067:406 ***Farm Productivity Analysis (3)***
Productivity analyses of livestock farms. On-farm visits, problem solving, diagnostic analysis, and development of management recommendations.
Open to juniors and seniors only.

11:067:410 ***Neuroendocrinology (3)***
Comprehensive coverage of the interrelationships between the central nervous system and the endocrine system in the mammal.
Open to juniors and seniors only.

11:067:411 ***Studies in Animal Science (BA)***

Provides credits for students engaged in educational activities that differ from research activities. By arrangement credits for faculty-supervised student projects that are not considered research (literature searches, topic reviews, and written reports).

11:067:414 ***Teaching in Animal Science (BA)***
Experiential learning course designed to provide credits for students engaged in educational activities that differ from research activities. The course focuses on expanding knowledge and experience working with livestock as well

as building teaching skills.
Prerequisites: Students are eligible to register for this course if (1) they are under the guidance of a faculty member; and (2) serving as an undergraduate teaching assistant for a course (such as Animal Nutrition Laboratory and Animal Practicums). By arrangement credit given 1.5, 2.0, or 3.0.

11:067:415 ***Leadership in Animal Science (BA)***
Experiential learning course designed to provide credits for students engaged in educational activities that differ from research activities. The course focuses on expanding knowledge and skill handling and fitting livestock, as well as building leadership skills associated with animal handling and fitting coordinator/supervisor positions.
By arrangement credit given 1.5 or 2.0.

11:067:416 ***In Vivo Lab Animal Techniques (3)***
The in vivo lab animal techniques (IVT) is an intensive EL training course for students to gain proficiency in lab animal rodent concepts and techniques used in research labs. Students will develop hands-on expertise in rodent handling, dosing, blood collection, anesthesia, analgesia, use of surgical equipment, survival surgery techniques, and necropsy. Students will gain knowledge in laboratory animal diseases, health surveillance, transgenic animals, and other pertinent topics in laboratory animal medicine
Prerequisite: 11:067:275

11:067:430 ***Animal Microtechniques and Tissue Culture (4)***
Microscopic, cytological, and cell culture techniques as used in modern research laboratories. Emphasis on aseptic techniques for animal cell culture; requirements for growth in vitro; mechanisms for cellular differentiation; immunohistochemistry; in situ hybridization; expression of transfected DNA.
Prerequisites: 01:119:151-117; and two semesters of general chemistry.

11:067:450 ***Endocrinology (4)***
Endocrinology and neuroendocrinology of animals, including humans. Structure and function of the endocrine glands, including the hypothalamus, and the biosynthesis and chemistry of hormones.
Prerequisites: 01:119:115-116. Recommended: Courses in physiology and organic chemistry. Open to juniors and seniors only. Credit not given for both this course and 01:146:450.

11:067:461 ***Topics in Companion Animal Science Issues: Animals and Health (2)***
This course will explore various topics pertaining to the health of companion animals with an emphasis on dogs and cats. The format of the course will consist of in-class lectures and discussions, hands-on demonstrations, oral presentations, quizzes, and exams.
Prerequisites: 01:119:116 and 01:160:162

11:067:490 ***Pathophysiology (3)***
This comprehensive course will review and discuss pathophysiological processes in all body systems in both humans and animals.
Prerequisite: 11:067:300 or 01:146:356.

11:067:491 ***Reproductive and Developmental Toxicology (3)***
Application of toxicological principles in reproductive studies and instruction on the effects of toxicants on male and female reproduction, and on the developing embryo/fetus.
Prerequisite: 11:067:300 or 01:146:356 or 11:704:360 or 11:067:327 or 11:115:422 or 11:115:434.

11:067:492 ***Molecular and Cellular Physiology (3)***
This course will provide a solid understanding of the molecular basis of eukaryotic cell function within the context of whole organisms.
Prerequisites: 01:119:115-117, 01:160:307-308, or permission of instructor.

11:067:493,494 ***Research in Animal Science (BA,BA)***
Individual animal science projects with faculty guidance.
Prerequisite: Permission of instructor.

Arts and Sciences 090 Courses (SEBS)

ARTS AND SCIENCES 090

11:090:101 ***The Byrne Seminars (1)***
Focusing on the research and interests of the faculty and introducing students to the range of intellectual and career possibilities offered to them at Rutgers.
For first-year students. Graded Pass/No Credit.

11:090:120 ***First-Year Interest Group Seminar (FIGS) (1)***
Highly interactive seminars on selected topics focusing on career goals/potential majors of first-year students. Analysis and discussion of presentations by a broad spectrum of faculty and alumni speakers; introduction to and utilization of university resources. Each seminar is led by a peer instructor closely supervised by the FIGS curriculum coordinator.
Open to first-year students only. Graded Pass/No Credit. May not be repeated for credit.

11:090:124 ***First-Year International Transition (RU-FIT) (1)***
Introduction to undergraduate academic study at American research universities. Designed to assist students in the adjustment to Rutgers and to promote academic success; topics may include time management, successful study habits, academic integrity practices, long-term goal planning, presentation skills, group work, and accessing university resources.
Must be an international student. Special permission required. Graded Pass/No Credit.

Biochemistry 115 Courses (SEBS)

BIOCHEMISTRY 115 COURSES

11:115:100 ***The Molecules of Life: Biochemistry for Everyone (3)***
Introductory biochemistry for nonscience majors, this lecture and discussion-format course presents the biochemistry of human health through the lens of current topics including metabolism, the microbiome, genetic engineering, and everyday pharmaceuticals. Through independent learning students will delve into current topics that are of particular interest to them through in-class active learning exercises.

11:115:110 ***Experiments with Green Fluorescent Protein (3)***
An introduction to protein biochemistry and protein purification using green fluorescent protein (GFP) as a teaching tool.

11:115:201 ***Contemporary Issues in Biochemistry (2)***
Topics to be covered in this course include the role of biochemistry in stem cell research; genetically modified microorganisms, plants, and animals; drug development; and disease progression. Students will be introduced to these topics by directed reading from current literature, interactive lectures, and class discussion. In addition, some amount of class time will be devoted to introducing students to laboratory research to prepare them to be productive participants in the laboratory. Students will be expected to be active participants in the class discussions and will also be required to submit short essays on the selected topics throughout the semester.

11:115:301 ***Introductory Biochemistry (3)***
The chemistry and metabolism of proteins, carbohydrates, lipids, nucleic acids, and other biologically important compounds.
Prerequisites: 01:160:209 or 307-308 or 315-316.

11:115:313 ***Introductory Biochemistry Laboratory (1)***
Techniques used in research, clinical, and food laboratories, including tests of biological materials, methods of separations, and determinations of enzyme activities.
Lab. 3 hrs. Prerequisites: 01:160:209 or 307-308 or 315-316

1:115:321 ***Ethics in Biochemical Research (3)***
Exploration of ethical issues in biochemistry, genetics, and molecular biology including recombinant DNA technology, genetically modified organisms, stem cell research, scientific patents, and DNA databases.
Prerequisites: 01:119:115-116,117

1:115:403,404 ***General Biochemistry (4,3)***
A comprehensive survey of the chemistry and metabolism of biological compounds, including proteins, polysaccharides, lipids, and nucleic acids. Enzyme kinetics, bioenergetics, organelles, and cellular organization. Expression and processing of biological information, including DNA replication; transcription into RNA; translation into protein, regulation, and recombinant DNA techniques. A detailed computer laboratory study of structural biology, including protein and nucleic acid three-dimensional structures and the interactions between these and ligands.
Prerequisites: 01:160:307-308 or 315-316 with grades of C or better. Prerequisite for 11:115:404 is 11:115:403.

11:115:406 ***Problem Solving in Biochemistry (2)***
Modern instrumentation and analytical techniques used in biochemistry research.

11:115:409 ***Principles of Biophysical Chemistry (3)***
An extensive treatment of thermodynamics as it applies to matters such as protein stability, allostery, ligand binding to receptors, membrane formation and others. Areas of spectroscopy routinely used in biochemistry include absorption, fluorescence and circular dichroism. Advanced kinetics including transition state theory is covered.
Prerequisites: General Biochemistry 11:115:403 and one year of Calculus. A year of Physics and a year of Biology are strongly recommended.

11:115:413,414 ***Experimental Biochemistry (3,3)***
Isolation, characterization, and quantitative determination of biological compounds. Spectrophotometric and titrimetric analyses; chromatography and gel electrophoresis; high performance liquid chromatography. Isolation

and characterization of enzymes, nucleic acids, and lipids. Graphing and statistical treatment using computers.
Lec. 1 hr. (for 413), 55-min. (for 414), lab. 4.5 hrs (for both 413 and 414). Corequisites: 11:115:403,404. Recommended: 01:447:380.

11:115:421 ***Biochemistry of Cancer (3)***
DNA damage/repair mechanisms; oncogenes/tumor suppressor genes; signaling pathways; apoptosis/cell death; the cell cycle; metastasis-cell, cell contact, and protease activation; tumor growth and angiogenesis; genetic events; genetic polymorphisms; chemical carcinogenesis; chemotherapeutic targeting.
Prerequisites: 11:115:403-404.

11:115:422 ***Biochemical Mechanisms of Toxicology (3)***
General principles and mechanisms of biochemical toxicology, including pharmacokinetics and pharmacodynamics. Examples of metabolism of industrial compounds, organic agrichemicals, and carcinogens.
Prerequisites: 01:119:115-116,117 (formerly 01:119:101-102), 01:160:307-308 or 315-316. Pre- or corequisites: 11:115:403,404 or equivalent. Recommended: 01:146:356 or equivalent.

11:115:423 ***Fundamentals of Genomics (3)***
This course will provide an introduction to genome science to undergraduate and graduate students with a variety of backgrounds such as biochemistry, microbiology, animal, and plant science who are confronted with the growing influence of this field in their work but may not be knowledgeable in its uses and limitations. The lectures will provide an overview of genomics technology and provide real-life examples in the life sciences.
Prerequisite: 01:119:102 or 01:119:116. Formerly 11:216:423.

11:115:436 ***Molecular Toxicology Laboratory (3)***
Techniques currently applied in public and private toxicology laboratories.
One 80-min. pre-lab., one 3-hr. lab.

11:115:485 ***Advanced Methods for 3-D Structure Determination of Biomolecules (3)***
This course is a survey of advanced techniques for the determination of biomolecular structure and will include in-depth discussions of cryo-EM, NMR, and X-ray crystallography as well as other emerging techniques.
Prerequisites: 11:115:403/404 or permission of instructor.

11:115:491 ***Seminar: Biochemistry Communication (3)***
Practice in techniques for oral presentation of scientific reports and reviews, based on search of research literature in biochemistry and, where applicable, the student's own research results.
Pre- or corequisites: 11:115:403,404. Open only to senior biochemistry majors.

11:115:493,494 ***Research Problems in Biochemistry (BA,BA)***
Research projects under the guidance of faculty members.
Prerequisite: Permission of department.

Bioenvironmental Engineering 117 Courses (SEBS)

BIOENVIRONMENTAL ENGINEERING 117

11:117:100 ***Introduction to Bioenvironmental Engineering (1)***
Overview of specializations within bioenvironmental engineering. Expanding role of biological and environmental sciences in engineering. Analysis of selected problems. Review of professional opportunities.

11:117:296 ***Honors Seminar in Bioenvironmental Engineering: Building and Using Sensors (3)***
Students enrolled in this course will use the Raspberry Pi computer platform to develop sensing systems that can operate autonomously based on preprogrammed software instructions. They will receive a set of hardware components and will be tasked to design and construct their own sensing systems. They will be writing their own software programs using the Python programming language. There will be an opportunity to fly the sensing systems on a drone allowing for aerial data collection.

11:117:323 ***Environmental Fate and Transport for Engineers (3)***
Fundamental principles of physical and chemical processes including mass and energy balance approaches, phase partitioning, reaction kinetics, mass transfer, advection and dispersion. Topics include: (1) toxicity and risk assessment; (2) systems and processes characterization; (3) chemical thermodynamics and kinetics; (4) diffusion and mass transfer; (5) continuity equations; (6) transport in surface water and groundwater systems. It emphasizes how to simplify extremely complex systems so that solutions and conceptual design can be obtained.
Prerequisites: 01:640:251; 01:750:227; 11:375:202; or permission by instructor.

11:117:333 ***Environmental Engineering Analysis Tools (3)***
This course applies state-of-the-art environmental engineering tools in analyzing problems and creating solutions and designs. Tools include, as examples, measurement tools and techniques, programming languages and software for graphics, statistical analysis and modeling. Tools may vary with current engineering practice.
Prerequisites: 14:440:127; 14:180:215 or 14:180:216.

11:117:413 ***Unit Processes in Environmental Engineering I (3)***
Physical and chemical processes and operations commonly applied for water and wastewater treatment, including coagulation, flocculation, sedimentation, filtration, adsorption, ion exchange, membrane separation, precipitation, oxidation, and disinfection; principles of chemical reaction kinetics, modeling of ideal and non-ideal batch and flow-through reactors.
Prerequisites: 01:640:244; 11:117:323 (or 11:375:203).

11:117:414 ***Unit Processes in Environmental Engineering II (3)***
Biological principles and operations for wastewater treatment, bioremediation, and energy production including: microbial ecology; energetics, stoichiometry, and kinetics of microbial growth; kinetics of pollution degradation; modeling of ideal bioreactors; design criteria for specific wastewater treatment processes; and new developments in use of microorganisms in bioenvironmental engineering.
Prerequisites: 11:375:201, 11:117:413; or permission of instructor.

11:117:423 ***Unit Processes in Environmental Engineering Laboratory I (1)***
Demonstration of physicochemical operations used in drinking water and wastewater treatment, including reactor design and residence time distribution, coagulation, flocculation, sedimentation, filtration, carbon adsorption, chemical oxidation. and oxygen transfer.
Corequisite: 11:117:413.

11:117:424 ***Unit Processes in Environmental Engineering Laboratory II (1)***
Demonstration and investigation of biological processes used in the treatment of wastewater, including: natural biological processes in biotreatment ponds; biodegradability and biodegradation kinetics; activated sludge reactors; anaerobic digestion for bioenergy production; use of laboratory methods and analytical equipment to assess biological processes; and introduction to activated sludge simulation software.
Prerequisites: 01:160:171, 01:160:211; Corequisites: 11:117:414.

11:117:450 ***Applied Instrumentation and Control (4)***
This class will develop an understanding of how to conduct experiments involving the collection of field data and the various tools and techniques required to do so.
Prerequisite: 11:375:203.

11:117:462 ***Design of Solid Waste Treatment Systems (3)***
Analysis and design of integrated solid waste management systems, including waste minimization, quantity estimates, waste characteristics, life-cycle thinking in waste management, collection, composting, materials recovery, recycling, incineration, and landfilling.
Prerequisites: 01:640:152, 11:375:201, and 14:180:215.

11:117:468 ***Hazardous Waste Treatment Engineering (3)***
Engineering and process design aspects of hazardous waste management and remediation of hazardous waste sites, waste reduction and recovery, regulatory process, case studies and engineering solutions to model hazardous waste problems.
Prerequisite: 11:117:413 or permission of instructor.

11:117:474 ***Air Pollution Engineering (3)***
Engineering design techniques for air quality control. Control of particulate and gas emissions from stationary sources. Control of mobile source emissions. Design for indoor air quality and regional air quality control.
Prerequisite: 14:180:387 or 14:650:312.

11:117:488 ***Environmental Engineering CAPSTONE Design I (2)***
Design morphology. Case studies and special design problems. Solutions developed using creative design processes that include analysis, synthesis, and iterative decision making. Safety and professional ethics.
Open only to seniors in bioenvironmental engineering and environmental engineering.

11:117:489 ***Environmental Engineering Capstone Design II (2)***
Completion of bioenvironmental engineering senior design project. Evaluation. Presentation of final report.
Prerequisite: 11:117:488. Open only to seniors in bioenvironmental engineering and environmental engineering.

11:117:492 ***Energy Conversion for Biological Systems (3)***
Principles of energy conversion techniques and their application to various biomechanical systems including solar energy systems, composting, methane and alcohol production, and the internal combustion engine.
Prerequisite: 14:650:351.

11:117:494 ***Contaminant Hydrogeology Engineering (3)***
Principles of groundwater hydrology and pollution. Development of mathematical formulations for describing pollutant movement in groundwater systems. Examination of control measures. Discussion of case studies. Introduction to and application of MODFLOW.
Prerequisite: 11:375:423 or permission by instructor.

11:117:495 ***Surface Water Quality Modeling (3)***
Formulation and solution of mathematical models as applied to surface water quality systems. Techniques of simulation and validation using case studies.
Prerequisite: 11:375:423 or permission by instructor.

11:117:496 ***Planning and Design of Land Treatment Systems (3)***
Engineering design of land treatment systems for municipal and industrial wastewater, including spray irrigation, overland flow, infiltration/percolation, and subsurface soil adsorption systems. Facilities planning.
Prerequisite: 14:180:387.

11:117:497,498 ***Special Problems in Environmental Engineering (BA,BA)***
Studies of special interest in some selected area of environmental engineering.
Prerequisite: Permission of undergraduate program director.

Biotechnology 126 Courses (SEBS)

BIOTECHNOLOGY 126 COURSES

11:126:111 ***Ethical and Scientific Challenges in Biotechnology (3)***
Applications and implications of biotechnology, including ethical and social controversies. Two 80-minute lecture periods, a large portion of which is discussion and student presentations and includes invited expert speakers.

11:126:296 ***Honors Seminar (3)***

11:126:383 ***Nucleotide Sequence Analysis (3)***
Introduction to DNA, RNA, and amino acid sequence analysis using publically available and web-based tools such as Blast, Clustal, etc. and biological databases such as NCBI, Genbank, and OMIM. Exercises in genetic manipulation, recombinant DNA technology, and restriction mapping using programs like NEBcutter, Net Primer, and Primer 3Plus.
Prerequisites: 01:160:308 and 01:447:380. Offered spring and fall semesters.

11:126:401 ***Seminar in Biotechnology (1.5)***
Development of communication skills needed by professionals in the field of biotechnology through student oral presentations and facilitated discussion. Topics include current scientific advances in biotechnology and the social impact of biotechnology.
One 80-min. lec. Open only to seniors majoring in biotechnology.

11:126:407 ***Comparative Virology (3)***
Biology of viruses and approaches to control through antivirals and genetic engineering. Genome organization, gene expression, replication, movement, and transmission across kingdoms.
Prerequisites: 01:119:115-116,117 (formerly 01:119:101-102), 01:160:308. Offered in odd-numbered years in the fall semester.

11:126:413 ***Plant Molecular Biology (3)***
Fundamental and applied aspects of plant molecular biology: structure, expression, and isolation of plant nuclear genes; molecular biology of plant development, plant organelles, and plant-microbe interactions; and plant biotechnology.
Prerequisites: 01:447:380 and 11:126:481 or 11:115:404 or 01:694:408. Offered in even-numbered years in the spring semester.

11:126:427 ***Methods and Applications in Molecular Biology (4)***
Introduction to techniques and experimental approaches used in eukaryotic molecular biology.
One 80-min. lec., one 80-min. rec., one 280-min. lab. Prerequisites: 01:447:380 and completion of 11:126:481 and 482 with grades of C or better. Offered fall semesters.

11:126:434 ***Molecular Delivery Applications in Biotechnology (3)***
Applications and mechanisms-of-action of formulated and natural biological delivery systems--liposomes, carbon-based nanostructures, polymeric complexes, dendrimers, viruses, extracellular vesicles, etc. A broad range of applications from agricultural to pharmaceutical.
Two 80-min. lec., including class discussion and presentations. Prerequisites: 01:160:308 and 11:680:390; 11:115:403 or 01:694:407 highly recommended. Offered spring semesters.

11:126:444 ***Advanced Technologies in Biosciences (3)***
Lecture and demonstration of advanced instrumentation and other advanced technologies in bioscience. Includes demonstration of each instrument, detailed description of data analysis and interpretation of results. Methods include confocal microscopy, surface plasmon resonance detection, quantitative PCR, mass spectroscopy, flow cytometry/cell sorting, genotyping, TNO intestinal models.
Two 80-min. periods of lectures and demonstrations. Prerequisite: 11:115:403 or 01:694:407 or 11:126:481. Offered spring semesters.

11:126:481 ***Molecular Genetics (3)***
Principles of genetics at the molecular level, including the chemical nature of hereditary material. The genetic code, regulatory mechanisms, the molecular basis of mutation, DNA replication and recombination.
Prerequisites: Organic chemistry and completion of 01:447:380 with a grade of C or better. Offered fall semesters.

11:126:482 ***Molecular Genetics Laboratory (4)***
Biochemical and molecular aspects of gene function and gene recombination.
One 280-min. lab., one 80-min. lab., one 80-min. lec. Prerequisites: Completion of 11:126:481 with grade of C or better and 11:680:390. Offered spring semesters.

11:126:484 ***Bioinformatics (3)***
The course introduces: (a) various biological metadatabases such as NCBI, Ensembl, UCSC-Genome browser, TAIR, etc.; (b) methods of DNA sequencing and sequence analysis; (c) methods of RNA expression analysis; (d) protein families and domains; (e) protein structure prediction and three-dimensional structure of proteins; (f) significance of mutations, single nucleotide polymorphisms, and biomarkers in disease characterization; (g) tools used in structural bioinformatics; and (h) *in silico* drug design and discovery.
Prerequisite: 01:126:481 or 11:126:383.

11:126:486 ***Functional Genomics for Research (3)***
Focuses on execution of tools and protocols used to elucidate the biology, ecology, and life histories of organisms through analysis of their genomes using algal genomes as models.
Prerequisites: One semester biology (01:119:115 or equivalent) and (11:216:251/486 or 01:447:380 or 11:115:301/403 or 01:694:315/407).

11:126:497,498 ***Research in Biotechnology (BA,BA)***
Independent research projects in biotechnology under the guidance of a faculty member.
Prerequisites: Permission of undergraduate program director and faculty adviser.

Community Health Outreach 193 Courses (SEBS)

COMMUNITY HEALTH OUTREACH 193

11:607:200 ***Principles of Leadership (3)***
An introduction to leadership. Topics covered include developing leadership skills, creating a vision, and overcoming obstacles.

11:193:232 ***Community Gardening for Health and Wellness (3)***
This course emphasizes the nutritional and social health benefits of community gardening with an added focus on developing agricultural and community leadership skills. Topics include soil, plant, and pollinator health; garden design, marketing, and financial management; human nutrition and food security; and the social implications of community gardening. Course includes hands-on field experience and field trips to gardens in the New Brunswick area.

11:193:255 ***Integrated Nutrition, Health, Environment and Agricultural Systems (3)***
This course examines the movement of food from seed to table. Students will explore local food systems; sustainability; food-related issues that impact agriculture, health, and community; successful programs; and challenges to improving food system, food, and health.

11:193:259 ***Cooking Healthy, Economical Meals on a College Budget (1)***
Basic principles of food safety, nutrition, meal preparation, and food choices on well-being and pocketbook; nutritional value, balanced meal plans, food handling, and cooking techniques.

11:607:381 ***Presentation Skills: Advocating for Change (3)***
This course will strengthen student presentation and public speaking skills with the leadership focus on advocating for change, participating in civic engagement, and promoting community service.

11:607:401 ***Foundations of Program Planning (3)***
Students develop the skill set to methodically design, develop, implement, and evaluate educational programs that are effectiveness-based and impact-driven. This course is beneficial for students pursuing careers in health care, public health, human services, education, community development, nongovernmental organizations (NGO), faith-based organizations, nonprofits, government (local, state, federal), foundations, and businesses and corporations.

11:607:402 ***Building Community Partnerships (3)***
This course presents key elements for building collaborative partnerships. Students examine various coalition/ community partnership frameworks and models and develop leadership skills necessary to initiate, build, evaluate, and sustain durable coalitions and community partnerships. This course is beneficial for students pursuing careers in health care, public health, human services, education, community development, nongovernmental organizations (NGO), faith-based organizations, nonprofits, government (local, state, federal), foundations, and business and corporations.

11:193:413 ***Community Interventions in Obesity (3)***
The course examines the multifactorial aspects of obesity, maintenance of healthy weight, the relationship of weight status and chronic disease prevention, and provides an overview of obesity and its relationship to public health. Traditional and novel nutrition and exercise theories as well as current popular diet and exercise trends will also be discussed. The course also introduces assessment of obesity, dietary habits, and physical activity and interventions to improve health at both individual and environmental levels.

11:193:421 ***Wellness Behavior (3)***
In today's world, health and wellness are headline news. What can you do to change your behavior to ensure a long and healthy life along with helping to improve the health of those people around you? Getting and staying well is a worthwhile goal no matter where you are right now. You can make positive changes for yourself and you can be an agent for change for your family, friends, and community.

11:193:438 ***Women, Food, and Health (3)***
Women have a complex relationship with food and there are many factors that influence this relationship. In this course students will explore the various aspects of women's relationship with food and the impact on health. Themes that will be addressed include: changing nutrition needs over the life span; emotional, societal, and cultural influences on food choice; the role of nutrition in the causation, prevention, and treatment of diseases and health conditions that are prevalent in women of all cultures; historical trends in nutrition and food; marketing food to women; body image and eating disorders; and the link between women, poverty, food, and health.

11:193:440 ***Community Health Outreach Practicum (1)***
Students will participate in a community health outreach experience-based practicum. Students will gain knowledge, skills, and practical hands-on experience in community health outreach.

Ecology, Evolution, and Natural Resources 216 Courses (SEBS)

ECOLOGY, EVOLUTION, AND NATURAL RESOURCES 216

(All 704 courses are now 216 courses, effective spring 2014.)

11:216:101 ***Introduction to Ecology and Evolution (3)***
This course provides the basic foundations for understanding evolutionary and ecological processes. The course covers natural selection, basic evolutionary theories, human evolution, population ecology, community ecology, biodiversity, biogeochemical cycling, global climate, and conservation biology.
Two 80-min. lecs. This course meets the Core Curriculum requirement for natural sciences.

11:216:104 ***Topics in Ecology, Evolution, and Natural Resources (1)***
Seminar-type presentations by faculty members in the ecology and natural resources curriculum designed to introduce students to the curriculum's faculty and their areas of experience in conducting research and applying their research findings, and the importance of their research to society.
Not open to seniors. Open to ecology, evolution, and natural resources students only.

11:216:110 ***Evolution, Disease, and Medicine (3)***
Together with 01:119:101, this course will fulfill the nonscience majors SEBS life science requirement. Basic concepts in the theory of evolution will be introduced and applied in the context of discussion of human and animal disease and the medical treatment thereof. The course will cover infectious and noninfectious diseases and real-world applications of evolutionary theory to the practice of medicine.
One 80-min. lec. This course meets the Core Curriculum requirement for natural sciences.

11:216:115 ***Evolution of Sex and Gender in Animals (3)***
This course will examine the biological basis of sex determination and resultant gendered behavior in all animals, including humans. We will discuss how and why sex evolved, how different organisms express, and often change, their gender and the selection pressures involved.
Two 80-min. lec. This course meets the Core Curriculum requirement for natural sciences and Contemporary Challenges (CCO-2)

11:216:199 ***Trees and the Environment (3)***
This is an introductory course examining tree structure and function as part of complex forest ecosystems. Concepts from population, community and landscape ecology, succession, soil structure, biological diversity, biogeochemical cycling, and sustainability will be incorporated from the point-of-view of trees. Topics from disturbance ecology (fire, drought) to climate change and the role of forest management will be discussed in relationship to forest ecology.
Two 80-min. lec. This course meets the Core Curriculum requirement for natural sciences.

11:216:210 ***Nature Journaling (3)***
Students will explore, learn about, and understand everyday biodiversity, environment, and organism structures through lectures, discussions, and hands-on nature journaling, developing creative, written, visual, and quantitative ways to communicate facts/observations.
One 160-min. lec.

11:216:217 ***Principles of Natural Resource Management (4)***
The course will introduce students to the applied discipline of natural resource management. The course will require students to complete team projects at the Rutgers University Ecological Preserve.

11:216:240 ***Behavioral Biology (3)***
Basic principles of animal behavior, including social behavior, animal communication, and physiological mechanisms underlying behavior. Topics include ethology, aggression, displays and communication, territoriality, and ethological view of human behavior. Motion pictures observe the behavior of fish, birds, reptiles, and primates.
Two 80-min. lecs. and one 80-min. rec. Prerequisite: 01:119:102 or 116.

11:216:251 ***Fundamentals of Evolution (3)***
The course will introduce students to the breadth of evolutionary biology, from micro to macroevolution, and cover topics from molecular evolution to the fossil record. Through lectures and readings, students will gain a basic and fundamental understanding of the evolutionary forces that have shaped all life on earth.
Two 80-min. lecs. Prerequisite: 01:119:102 or 116.

11:216:252 ***Fundamentals of Evolution Lab (1)***
Provides students with hands-on experiences related to generation, analysis, and evaluation of evolutionary data, from populations to macroevolution. Skills developed in the lab include DNA extraction, PCR, sequence alignment and phylogenetic analysis, DNA barcoding, population genetics calculations, and many other aspects of evolutionary research.
One 3-hr. lab. Prerequisite: 01:119:102 or 116. Corequisite: 11:216:251.

11:216:269 ***Evolution of Animal Behavior (3)***
Broad exposure to evolutionary theory and natural selection using examples from animal behavior. Not intended to be comprehensive in either evolutionary theory or in animal behavior, but rather to engender understanding of the principles of evolution, the basic terms and concepts in animal behavior, and the evolutionary and ecological processes that shape it.
One lec. 3 hrs. Prerequisites: 01:119:101,102 or 103 or 115-116 or 11:216:101.

11:216:272 ***Dendrology (4)***
Nomenclature, identification, ranges, and habitats of important native and naturalized trees of North America. Shrubs and vines important as wildlife food and cover. Forest regions and types, emphasizing the Middle Atlantic area.
One 80-min. lec., one 280-min. lab. Not open to first-year students. Prerequisite: 01:119:102 or 116.

11:216:274 ***Field Techniques in Ecology and Natural Resources (4)***
One lecture per week followed by a two-week field course; the latter runs five days a week, all day for two weeks following the close of the spring semester (starting on a Monday). Students are immersed in two different

ecosystems and learn fundamental aspects of forestry, field ecology, wildlife biology, entomology, remote sensing, and natural resource management.
One 80-min. lec. and two weeks of fieldwork.

11:216:296 ***Honors Seminar (03***
The topic for each semester addresses current issues from the perspectives of the humanities, sciences, and social sciences.
Open only to honors students (SEBS Honors Program, SAS Honors Program, and Honors College) or by permission of instructor.

11:216:302 ***Parasite Ecology (4)***
The ecology and evolution of animal parasites, focusing on the ecology of disease, transmission dynamics, and parasite roles in community regulation and conservation biology.
Two 80-min. lecs. Prerequisite: 01:119:102 or 116.

11:216:314 ***Forest Measurements (4)***
The purpose of this course is to introduce students to the most common methods of and process for quantitative assessment of forest resources. Students will take part in field and computational exercises which will be supported by lectures and readings.
Two 80-min. lecs. One 3 hr lab. Prerequisites: 01:119:116 General Biology II AND (11:216:272 Dendrology OR 11:550:233 Landscape Plants)

11:216:315 ***Conservation Techniques (3)***
Introduction to the application of conservation and management theory. Online lecture material will present the principles and review the methods used for each approach. Case studies will illustrate how conservation actions were developed and applied. Discussions will evaluate the merits and limitations for each approach in theory and practice.
Online course.

11:216:317 ***Conservation Ecology (3)***
Effects of technology and population growth on species, ecosystems, and human communities. Environmental impact of agricultural and industrial systems. Global environmental change. Biological and social underpinnings of conservation. Extensive scientific and nonscientific readings.
Lec. 3 hrs. Prerequisites: 01:119:102 or 116 or equivalent, and permission of instructor. This course meets the Core Curriculum requirement for Contemporary Challenges and Writing and Communication.

11:216:320 ***Controversies in Sustainability (3)***
Sustainable environmental management is the dominant economic, environmental, and social issue of the 21st century. This course will use online materials (articles, papers, podcasts, video, etc.) to examine controversial topics like climate change, natural gas drilling, renewable energy, and others. Discussions will provide a forum for debate and further examination of the issues.
Online course.

11:216:323 ***Ornithology (4)***
The biology, ecology, and field identification of birds of the region. Weekly field trips and two all-day field trips.
Two 80-min. lecs., lab. 3 hrs. Prerequisite: 01:119:102 or 116

11:216:324 ***Invertebrate Zoology (4)***
Comparative study of some representative invertebrates as a basis for understanding the interrelationship between the physiological activity and the structure of organisms.
Lec. 3 hrs., lab. 3 hrs. Prerequisite: 01:119:102 or 116.

11:216:325 ***Vertebrate Zoology (4)***
The classification, evolution, ecology, and life histories of the order and families of the vertebrates, especially of the eastern United States. Seven field trips required, including one two-day weekend trip and one evening trip.
Two 80-min. lecs., lab. 3 hrs. Prerequisites: 01:119:102 or 116 and 117.

11:216:332 ***Plant Ecology (4)***
Study of plant life histories, populations, communities, and plant-animal interactions (pollination, dispersal, herbivory). Evolutionary basis for plant ecological traits. Weekly field trips to representative habitats in the state, including a weekend trip. Lab includes greenhouse, field experiments, and library reports.
Lec. 3 hrs., lab. 3 hrs., field trips. Prerequisites: 01:119:102 or 116 and 117.

11:216:334 ***Aquatic Ecology (3)***
This online course focuses on the study of inland waters including lakes, wetlands, rivers, and streams. Foundational concepts will be covered through online lectures, exercises, discussions, and quizzes embedded in videos. Concepts will include how waterbodies form, organisms that live in aquatic environments, and implications of policy and conservation decisions on water quality and quantity.
Prerequisite: 01:119:102 or 116. Credit not given for both this and 11:216:335.

11:216:335 ***Freshwater Ecology (4)***
Freshwater Ecology is the study of inland waters including lakes, wetlands, rivers and streams. Theoretical and applied concepts will be covered through lectures, exercises, and labs including several field trips.
Lec. 3 hrs., lab. 3 hrs. Prerequisite: 01:119:102 (General Biology) or 01:119:116 (General Biology II) or 28:120:205 (Foundations of Biology: Ecology and Evolution Lecture-Newark) or 50:120:102 (General Biology II-Camden). Credit not given for both this and 11:216:334.

11:216:351 ***Principles of Ecology (3)***
Concepts underlying the organization of living systems. Environmental adaptations of species, population, and community dynamics, energetics, nutrient flux. Practical applications of ecological concepts.
Two 80-min. lecs. Prerequisite: 01:119:102 or 116 or equivalent.

11:216:352 ***Principles of Ecology Lab (1)***
This laboratory course is required for the 216 (Ecology, Evolution, and Natural Resources) and 628 (Marine Sciences) majors and is an option elective for all others. The laboratory course does not simply reinforce the lecture course but instead extends its scope. Principles of Ecology Lab incorporates critical analyses of seminal ecological publications and the collection, analysis, and graphical presentation of ecological data, both descriptive and experimental. Laboratory exercises will introduce students to observational and experimental methods and procedures in ecology.
One 3-hr. lab. Prerequisite: 01:119:102 or 116 (117 can be taken concurrently). Corequisite: 11:216:351.

11:216:353 ***Experimental Evolution (4)***
Evolution in action: students are introduced to the vibrant field of experimental evolution while themselves evolving a bacterial virus (RNA phage phi6), sequencing the evolved populations, and presenting their results.
Combined lecture/lab. Prerequisites: 01:119:102 or 01:119:116/117, and 01:447:380.

11:216:360 ***Animal Physiological Ecology (3)***
The course addresses physiological topics from the perspectives of comparative, ecological, environmental, evolutionary, integrative, and organismal issues. Objectives are to understand: the diversity of life, with a particular focus on physiological functions that allow animals to live and thrive in in a range of environments; the breadth of the discipline of physiology and the importance of integrating physiology with ecology and behavior, and with cellular and molecular biology; and that evolution is the fabric of biology.
Two 80-min. lecs. Prerequisites: 11:119:102 or 116 and 117.

11:216:365 ***Arboriculture (4)***
This course considers the relationship of tree biology and management of trees in the developed landscape. Field exercises will complement lectures for practical applications. We will discuss the theory and practice of managing individual trees in developed landscape and field assignments provide hands-on and realistic perspectives in the practice of professional tree care.
Two 80-min. lecs, one 80-min lab. Taught in even-numbered years. Prerequisite: 01:119:102 or 116.

11:216:369 ***Analytical Methods in Ecology, Evolution, and Natural Resources (3)***
To familiarize students with common (and a few not-so-common) statistical/quantitative techniques and data analysis procedures used by professionals in ecology, natural resource management, and land-use management, and to introduce computer programming using the R language.
This course meets the Core Curriculum requirement for Quantitative & Formal Reasoning [QQ].

11:216:370 ***Freshwater Ecology (3)***
Freshwater Ecology is the study of inland waters including lakes, rivers, and streams. Foundational concepts will be covered through online lectures, exercises, discussion, and quizzes embedded in videos. Concepts will include how water bodies form, organisms that live in aquatic environments, and implications of policy and conservation decisions on water quality and quantity.
Online. Prerequisite: 01:119:102 or 01:119:116.

11:216:371 ***Introductory Remote-Sensing Image Analysis (3)***
Interpretation and analysis of aerial photography and remotely-sensed imagery for environmental and natural resource management. Photogrammetry, mapping, geology, land forms, hydrology, soils, vegetation, and cultural features.
Prerequisite: 11:573:232.

11:216:376 ***Practicum in Fisheries Management (BA)***
Practical experience in fishery management under the direction of faculty mentors, fishery scientists of N.J. Division of Fish, Game, and Wildlife; National Marine Fisheries Service; or other appropriate state or federal agencies. Students will learn hands-on experience in the management of fisheries resources that are essential for careers at the regional, state, and federal level in sustainable management of U.S. fisheries.

11:216:377 ***Practicum in Forest Management (BA)***
Practical experience in forest management under the direction of foresters working for private industry; local, state, and federal government agencies; and in consulting capacities for landowners.
Open only to majors in ecology, evolution, and natural resources.

11:216:401 ***Evolution of Eukaryotes (3)***
This course will discuss the recent advances in our understanding of eukaryote origins and evolution. Phylogenetics, genomics, the role of horizontal gene transfers, and the endosymbiotic origin of mitochondrion and plastid are some of the issues that will be examined in detail as they relate to ecology and evolution of eukaryotic organisms.
Two 80-min. lecs. Prerequisites: 01:119:102 or 116 and 11:216:251 or equivalent.

11:216:403 ***Urban Forestry (3)***
Benefits and costs of trees, planning and design, soils, tree selection and nursery stock, IPM, composting, removal, wildlife, laws, finance, inventories, maintenance scheduling, planting. Field trips.
One 80-min. lec., one 180-min. lab. Prerequisite: 11:216:272 or permission of instructor.

11:216:405 ***Evolution of Infectious Disease (3)***
This course surveys how pathogenic microorganisms have evolved, with an emphasis on understanding how the same evolutionary principles that we infer from large eukaryotic species can be concretely observed in viruses, bacteria, and eukaryotic parasites.
Two 80-min. lecs. Prerequisite: 01:447:380 or equivalent or permission of instructor.

11:216:411 ***Plant Diversity and Evolution (4)***
An overview of the evolution and diversity of vascular plants, from ferns to conifers and flowering plants. Field identification, morphology, principles of classification, and basic concepts in evolutionary research.
Two 80-min. lecs., lab. 3 hrs. Prerequisites: 01:119:102 or 116.

11:216:421 ***Wetland Ecology (4)***
An overview of the ecology, management, and function of wetlands. Current issues of wetland management and biological features of wetlands will be covered through classroom exercises and case studies.
Lec. 3 hrs., lab 3 hrs. Taught in odd-numbered years. Prerequisite: 01:119:102 or 01:119:116 or 01:119:103 or 28:120:205 or 50:120:102.

11:216:422 ***Soil Organismal Diversity (3)***
A hybrid course on soil biotic diversity and function. Students will attend lectures, read scientific articles, interpret data, and understand how soil biota relates to natural- and agro-ecosystem functioning.
Prerequisite: 01:119:116.

11:216:431 ***Fundamentals of Ecological and Environmental Modeling (4)***
This course will review the background mathematical and statistical tools necessary for students interested in pursuing ecological and environmental modeling, and will discuss general model formulation, validation, hypothesis testing, nonlinear phenomena, and forecasting. Topics include linear algebra, differential equations, statistical tools, regression and curve fitting, box models, and population dynamics models. General model formulation, validation, hypothesis testing, nonlinear phenomena, and forecasting. Review of necessary mathematical and statistical tools. Recommended for advanced ecosystem modeling courses.
Two 80-min. lecs. Taught in odd-numbered years. Prerequisites: : 01:640:135 or 01:640:151, statistics, or permission of instructor.

11:216:440 ***Practical Experience in Ecology, Evolution, and Natural Resources (3)***
Practical Experience will be divided into Section 01 for hands-on experience in ecology, evolution, and natural resources under the guidance of faculty members. Section 02 is for student TAs who will assist/teach a lab section of a course under the guidance of faculty members.
Prerequisite: Permission of faculty adviser.

11:216:441 ***Animal Behavior (3)***
Physiological foundations and principles of animal behavior, with particular emphasis on mechanisms underlying sexual behavior, feeding aggression, and behavioral development.
Lec/rec. 3 hrs. Prerequisites: 01:119:102 or 116 or permission of instructor.

11:216:450 ***Landscape Ecology (3)***
Landscape ecology is a sub-discipline of ecology that focuses on spatial relationships and the interactions between patterns and processes. The course is an introduction to the field coupling theoretical concepts with applications through modeling projects and hands-on practical experience with landscape analysis tools and ideas.

11:216:451 ***Climate Change Ecology (3)***
Analysis of the major global changes based on principles of ecosystems ecology; carbon, nutrient, and pollution cycling mechanisms and budgets; the methods used to study these phenomena.
Lec. 3 hrs. Taught in even-numbered years. Prerequisite: 11:216:351 or equivalent.

11:216:454 ***Molecular Ecology (3)***
This course will explore how new tools from genetics and genomics are revolutionizing our understanding of ecology. We will learn how to use DNA to infer behavior, kinship, historical demography, dispersal patterns, natural selection, community composition, and conservation genetics, among other topics. The emphasis of the course will be on giving students the theoretical understanding and practical skills they need to apply these cutting-edge tools themselves.
Two 80-min. lecs. Prerequisite: 01:119:102 or 116.

11:216:461 ***Field Ecology (2)***
Concepts of ecological organization developed through field experience in the principal habitat types of New Jersey. Emphasis on field application of ecological knowledge.
One 320-min. lab. Prerequisite: 11:216:351.

11:216:464 ***Wildlife Ecology and Conservation (3)***
Quantitative analysis and understanding of the ecology, management, and conservation of game and nongame wildlife (terrestrial and aquatic). Population censusing and dynamics, harvesting, habitat requirements and fragmentation, migration, conservation genetics, and managing protected areas.
One 80-min. lec., one 280-min. lab. Prerequisite: 01:119:116.

11:216:469 ***Wildlife Diseases (3)***
In this course, the diseases of wildlife will be examined with emphasis on causes and mechanisms of disease, and epidemiology and population significance of disease. The goal of the class is to provide a comprehensive and up-to-date understanding of the causes and consequences of infectious disease at the levels of whole organisms, populations, communities, and ecosystems.
Two 80-min. lec. Prerequisite: 01:119:102 or 116.

11:216:474 ***Advanced Remote-Sensing Analysis (3)***
Principles of satellite remote-sensing and digital image analysis for environmental and natural resource applications. Instruction in state-of-the-art digital image processing/analysis software.
Prerequisites: 11:573:369 and 11:216:371.

11:216:475 ***Winter Field Ecology (P/NC, 1)***
A one-week, off-campus field experience in January, exploring the adaptations of temperate plants and animals to the harshness of winter.
Prerequisite: Permission of instructor.

11:216:476 ***Ecology: Natural, Shallow, Social, and Deep (3)***
A junior/senior colloquium. The goal of this course is to explore the relationships between scientific knowledge and social perceptions of the environment.

11:216:477 ***Forest Management Applications (4)***
This capstone course brings together the policies, ethics, values, and data used in the creation of forest management plans that help foster sustainable forests and the benefits they provide.
Two 80-min. lecs. One 3 hr lab. Pre-Requisite: 11:216:471 Silviculture.

11:216:484 ***Research Problems in Ecology, Evolution, and Natural Resources (BA,BA)***
Research projects in applied ecology under the guidance of faculty members.
Prerequisite: Permission of faculty adviser.

11:216:486 ***Principles of Evolution (3)***
Theories, principles, and mechanisms of the evolution of cellular and organismic systems, with some attention to human evolutionary studies.
(Formerly 01:119:484). Prerequisites: 01:160:161-162; 01:447:280. Not open to students who have taken 01:119:485.

11:216:487 ***Urban Ecology (3)***
Urban Ecology is a seminar course where we will focus on the processes determining patterns of abundance and distribution of organisms in urban ecosystems, the interactions among organisms in the urban environment, the interactions between humans (and societies) and nature in urban environments, and some aspects of urban planning as it relates to ecology and the environment.
11:216:332 or 11:216:351 or equivalent

11:216:488 ***Restoration Ecology (4)***
Study of the ecological processes that underlie the re-creation of a natural community. Habitat characteristics, life histories, reproductive ecology, biological invasions, mutualism, societal laws, and attitudes toward restoration. Field trips to representative restored habitats.
(Formerly 01:119:488). Lec. 3 hrs., lab. 3 hrs. Pre-or corequisites: 11:704:351 and one course in plant or animal organismic biology (e.g., mammology, principles of botany, insect biology, etc.).

11:216:499 ***Senior Capstone in Ecology, Evolution, and Natural Resources (1)***
This course will help students review, synthesize, and articulate their academic and professional experience. In addition, Senior Capstone will help prepare students for the transition into the real world of finding jobs and dealing with llfe after graduation.
One 80-min. lec. Ecology, evolution, and natural resources students only.

Educational Opportunity Fund 364 Courses (SAS)

EDUCATIONAL OPPORTUNITY FUND 364

11:364:106 ***First-Year Student Success Seminar I: College Exploration (1)***
The course is designed to assist incoming freshman with a successful transition to collegiate life through class assignments, readings, and projects. Sessions will build upon each student's individual skills as determined by discussions, academic performance, and observed social skills. The curriculum will integrate various subject matter, along with the student's personal life, to promote and develop cognitive study skills necessary for coursework in mathematics and science. Collaborations with university departments and community organizations will offer an adaptive instructional pedagogy that will encourage student self-directed learning. Seminars and out-of-class experiences will enhance the student's ability to connect classroom activities with real-life situations to develop communication and leadership skills, adding to their personal and intellectual growth.

11:364:107 ***First-Year Student Success Seminar II: Career Exploration (1)***
A continuation of academic sessions designed to facilitate entering student's successful transition to collegiate life. In addition to readdressing selected topics from SSS I in the fall semester, topics of graduation/career planning, financial literacy, and the history of higher education access will be incorporated using both in-class and online sessions. Each session will build upon each student's individual skills as determined by discussions, academic performance, and observed social skills. The curriculum will promote and develop cognitive study skills necessary for coursework in mathematics and science. Collaborations with university departments, academic/community organizations, and alumni will offer an adaptive instructional pedagogy that will encourage student self-directed learning. Seminars and out-of-class excursions will enhance student's ability to connect classroom activities with real-life situations to develop communication and leadership skills, adding to their personal and intellectual growth.

11:364:108/109 ***Transfer Student Seminar (TSS) (1)***
This course engages students, new to Rutgers University and the School of Environmental and Biological Sciences (SEBS), in learning about the processes by which individuals learn in class and, ultimately, achieve academic success. The course is geared toward transfer students in a semi-individualized, small discussion/seminar format. Transfer students will gain a clear understanding of SEBS and Rutgers University program policies; stay connected to the Office of Academic Programs, Educational Opportunity Fund (EOF) and academic advisers and be more aware of resources offered; find and create peer support networks within the SEBS and EOF community; and experience a smoother transition into Rutgers developing into EOF scholars within SEBS.

11:364:110 ***Emerging Topics in Environmental Science (2)***
This course is designed to foster understanding of societal vulnerabilities and being resilient as essential tools when transforming our lives and practices in the 21st century to be competitive and successful individuals. Concepts have interdisciplinary components, which can make the class attractive to students in other programs. This course is shorter than the courses provided during the spring and fall semesters. It provides an introductory understanding of the importance of new topics, including resiliency, and areas of transformation as needed for tomorrow's world.
Online. Summer Session.

11:364:254 ***Critical Thinking in the Sciences (1)***"
Critical Thinking in the Case of Learning the Water-Energy-Food Nexus Seminar" provides an introductory understanding of the importance of conscious thinking, developing and using potential intellect, and applying

critical thinking to important scientific and social matters. Most people unconsciously absorb and adopt the thinking of the people around them, in the media, and social media. They don't develop their own intellect or use it very effectively to rationalize or justify their infantile or egocentric thoughts including the matters related to the environment, food, energy, health, and ethics. Learning to be a critical thinker is going to help students to ask the right questions at the right time with correct skills and to practice skills that enable a student to learn quickly and speak and decide factually. This class will teach students to learn to engage in good and efficient disagreement which is a skillful critical thinking tool. These skills will help students learn how to build strong arguments and to evaluate the strength of arguments made by others. These skills will also help students in the short term in achieving academic success and in the long term to think consciously, deliberately, and skillfully in ways that transform them into strong and secure persons who not only learn to agree to disagree but also dare to disagree with relevant supporting knowledge.

Entomology 370 Courses (SEBS)

ENTOMOLOGY 370 COURSES

11:370:202 ***The World of Insects (3)***
The diversity, nature, and importance of insects that affect our lives and the environment through competition for food, nuisance, and disease transmission.

11:370:250 ***Insects and the Environment (3)***
An overview of insects and their role in our environment and how biodiversity and disease vectors are impacted due to pollution and global warming.

11:370:308 ***Apiculture (3)***
Management, honey and wax production, bee language, social behavior, and pollination ecology. For students with or without a background in science who are interested in keeping bees or crop pollination

11:370:350 ***Agricultural Entomology and Pest Management (3)***
Recognition and ecology of plant pest species; sampling and survey techniques; pest management methods and the environmental impact of control procedures; integrated control.

11:370:352 ***Toxicology of Insects (3)***
Effects, side effects, history, hazards, and usefulness of synthetic pesticides essential for the long-term production of food and fiber.

11:370:355 ***Applied Acarology (3)***
The goals of this course are to learn the biology, diversity, and phylogeny of mites and ticks as well as the economic impact that mites have in agriculture and human health.

11:370:380 ***Insect Biotechnology (3)***
Insect Biotechnology focuses on the technologies that have allowed us to understand insect genetics and the regulation of genes and how we have utilized this to help solve problems in insect control through gene editing systems. The study of these is new and rapidly evolving. This course requires a background in genetics, biochemistry or entomology.

11:370:381 ***Insect Biology (4)***
A survey of insects; their structure, function, behavior, evolution, diversity, and effect on agricultural production, as well as on people and animals.

11:370:402 ***Aquatic Entomology (3)***
Identification, classification, morphology, and natural history of aquatic insects. Fieldwork emphasizing aquatic insects of New Jersey.

11:370:403 ***Insect Structure and Function (4)***
Insect physical features, including exoskeleton, body regions (head, thorax, abdomen, and appendages), nervous system, digestive system, respiratory system, circulatory system, endocrine system, reproduction system.

11:370:406 ***Medical and Veterinary Entomology (3)***
Insects and other arthropods in relation to human and animal annoyance and disease.

11:370:407 ***Careers and Professional Development in Entomology (1)***
This course will provide professional development opportunities in entomological fields and prepare students for the transition to employment. The course will also cover entomological communication skills and presentation components. Students will be expected to incorporate information learned in other classes within the Department of Entomology.

11:370:409 ***Insect Classification (4)***
For students interested in insect diversity and evolution. Life histories and sight recognition of major families, especially those of economic or medical importance.

11:370:414 ***Forensic Entomology (3)***
Exposes students to forensically important insects by discussing their biology, collection and preservation techniques, and how the information they provide relates to criminal investigations and legal proceedings.

11:370:416 ***Forensic Entomology Lab (1)***
An applied approach to forensic entomology that engages students in hands-on data collection at a decomposition site.

11:370:417 ***Insect-Plant Biochemical Interactions (3)***
The biochemistry of interactions between herbivorous insects and their host plants, coevolutionary adaptations to toxic phytochemicals and pollination. Descriptive chemistry of plant compounds and explanation of biological activity features of the molecules, the metabolic and physiological defense mechanisms of insects, and the mode of action and molecular features of the target physiological insect systems.

11:370:425 ***Insect Behavior (3)***
Insect behavior from a functional standpoint: stimuli and responses; adaptive significance and evolutionary context; underlying physiological mechanisms.

11:370:430 ***Urban Entomology (3)***
Learn about common insects and other arthropods in urban environments. This course will introduce their biology, ecology, health risks, and management strategies.

11:370:493,494 ***Research Problems in Entomology (1-4,1-4)***
Research projects in entomology under the guidance of faculty members.
Prerequisite: Permission of adviser.

11:370:495 ***Seminar in Entomology (1)***
This course is designed to expose students to current topics in entomology via the seminar format. Students will be required to attend and participate in departmental seminars, meet with seminar speakers, and develop/present a mini-seminar on an entomological subject of their choosing.

Environmental and Biological Sciences 015 Courses (SEBS)

ENVIRONMENTAL AND BIOLOGICAL SCIENCES 015

11:015:100 ***Introduction to Making: Access to Tools (1)***
Introduces first-year SEBS students to the process of making objects that solve specific problems, using the tools available in an academic Makerspace. Students will identify specific individual or societal problems, design objects that address these problems, and make these objects through an iterative process. Students will gain experience using the tools available in the Cook campus Makerspace to make novel 2D (primarily planar) and 3D objects with defined functions that solve specific problems.
First semester undergraduate at SEBS, including freshman and transfers.

11:015:112 ***Academic Mentoring (1)***
Development of study skills for matriculating freshman in their first semester.

11:015:113 ***Portals to Academic Success (1)***
Development of study skills for freshman in their second semester.

11:015:120 ***International Independent Study (BA)***
This course offers the opportunity to earn credit for internships carried out internationally. Students should consult with their major adviser or major program director.

11:015:205 ***Internship in the Life Sciences (3)***
This purpose of this course is to provide students with the opportunity to develop experience and knowledge regarding the expectations, qualifications, competencies, and responsibilities of professionals working within the life sciences through an internship experience with academic component. Students will integrate knowledge from their life science coursework to the internship experience, develop new skills, and reflect on their learning experience.
Declared biological sciences majors or by special permission of the instructor. Cumulative GPA of 2.0.

11:015:230 ***Fundamentals of Agroecology (3)***
Introduction to concepts of agroecology, including human interactions with the environment, agricultural plants, and animal-plant interactions.

11:015:273 ***Wine Insights (1)***
This course is about the biology of wine, not about the marketing of wine. It covers grape growing, wine making, wine tasting techniques, wine and health issues, and wine and food matches.
Prerequisites: 21 years of age and senior undergraduate

11:015:395 ***Exploring Graduate School (1)***
This course describes the basics of selecting, applying to, and attending graduate school. It will help students prepare a competitive application for admission to the graduate school of their choosing.
Registration by special permission number only. Contact Dr. Suzanne Sukhdeo at ssukhdeo@sebs.rutgers.edu.

11:015:483,484 ***Research Problems: Agriculture and Environmental Science (BA,BA)***
Original work in the student's major field.
Credits and hours by arrangement with a faculty adviser, the appropriate curriculum coordinator, and the Office of Academic Programs and Research.

Environmental and Business Economics 373 Courses (SEBS)

ENVIRONMENTAL AND BUSINESS ECONOMICS 373 COURSES

11:373:101 ***Economics, People, and Environment (3)***
Applications of economic concepts to problems related to environmental and other social problems. Topics include opportunity cost, marginal analysis, supply and demand, cost-benefit analysis, fiscal and monetary policies, and international trade.
Not open to students who have completed a semester of microeconomics or macroeconomics.

11:373:121 ***Principles and Applications of Microeconomics (3)***
Economic principles, laws, processes, and institutions of a free-enterprise economy with applications to contemporary economic life. Emphasis on individuals and firms within the economic system that bring about resource allocation.

11:373:122 ***Principles and Applications of Macroeconomics (3)***
Applications of economic concepts to the general economy. Topics include inflation, unemployment, economic growth, economic recessions, budget deficits, international trade, and fiscal and monetary policies.
Prerequisites: 01:640:111, 112 or 115.

11:373:200 ***Agricultural Accounting (3)***
The course introduces general accounting concepts and offers instruction into how an accounting system is constructed and operated, with a specific focus on the basic financial infrastructure governing modern agricultural production. The course pays particular attention to using accounting methods to evaluate and manage agricultural business risks, financing alternatives, hedging strategies, cooperatives, government programs and financial statement preparation.

11:373:201 ***Corporate Social Responsibility (3)***
Investigation of ethical issues facing businesses including acceptable risk, workers rights, economic sustainability and inclusivity, outsourcing, whistle-blowing, and ethical issues in marketing and biotechnology.
Prerequisite: 11:373:121 or 01:220:102.

11:373:202 ***Sustainability Decision Tools (3)***
This course is designed to engage students in the practical and theoretical aspects of sustainability, and prepare them for careers such as corporate sustainability officer, green supply chain manager, environmental policy analyst, energy or materials accountant/auditor, utilizing life cycle and carbon footprint analysis.

11:373:205 ***Small Business Essentials (3)***
Focuses on the design and management of all aspects of a business, such as bookkeeping, inventory management, customer experience, pricing, marketing, and benchmarking. Emphasis is placed on providing the knowledge base and skills to succeed in small business administration.
Prerequisite: A basic math class is recommended.

11:373:210 ***Business Decision Computer Tools (4)***
Applied business decision making, using computer technology to set up, analyze, solve, and communicate results, using databases, spreadsheets, graphics, word processing, and communication techniques.
Lec. 80 min., lab. 160 min. Prerequisite: 11:373:121 or 01:220:102.

11:373:211 ***Applications of Mathematical Concepts in Agricultural Economics (4)***
Applications of mathematical concepts to business and economics. Topics include economic applications of equilibrium, slopes and derivatives, differentials, optimization, constrained optimization, discounting, compounding, and solving linear equations using methods of matrix algebra and linear programming.
Prerequisite: 01:640:111, 112, or 115.

11:373:215 ***Applications of Statistics in Business Economics (3)***
Applications of descriptive and inferential statistics necessary for effective interpretation of data used in business decision making.
Prerequisite: 01:640:115.

11:373:218 ***Sustainable Food Policy for Developing Countries (3)***
This course provides an overview of the food problem in the developing world and examines the social, political, and economic reasons for population growth, poverty, malnutrition, food insecurity, underemployment, under development, and gender inequality, and the role of agriculture in economic development.
Open to sophomores and above.

11:373:220 ***Introduction to Environmental Valuation (3)***
This course will provide students the knowledge and skill set to extend and integrate economic systems to biophysical and ecological environments.

11:373:231 ***Introduction to Marketing (3)***
Introduction to marketing in business and the food industry with emphasis on the economics, institutions, and policies of the food marketing system. Consumer behavior, marketing strategies, cooperatives, food markets, and computer applications.
Prerequisite: 11:373:121 or equivalent.

11:373:241 ***Introduction to Management (3)***
General application of basic concepts, functions, and tools of management that contribute to success and improve individual performances in decision making and other situations and problems in the field of management.
Prerequisite: 11:373:121 or equivalent.

11:373:242 ***Customer Relationship Management (3)***
This course examines business relationships with customers from acquisition, retention, and development, and focuses on the strategic, operational, and analytical aspects that are central to successful customer relations.
Prerequisite: 11:373:121 or 01:220:102.

11:373:296 ***Honors Seminar (3)***
The topic for each semester addresses current issues from the perspectives of the humanities, sciences, and social sciences.
Open only to honors students (SEBS Honors Program, SAS Honors Program, and Honors College) or by permission of instructor.

11:373:319 ***Corporate Sustainability Reporting (3)***
How do we know if an organization is sustainable or not? This course helps students understand the reporting needed to communicate an organization's sustainability activities to its key stakeholders.
Open to Sophomores, Juniors, and Seniors. Crosslisted with 11:374:319.

11:373:321 ***Economics of Production (3)***
Production theory (factor-product, factor-factor, product-product relationships) and its application to farms, business firms, and industries. Derivation of cost functions, product supply functions, and resource demand functions and their use in constructing theories of value, resource pricing, and distribution. Provides an overall perspective of operations management within the context of a business organization.
Prerequisites: 11:373:121 or equivalent, 11:373:210 or equivalent computer course, a semester of calculus or equivalent, or permission of instructor.

11:373:323 ***Agricultural and Food Policy (3)***
The nature, importance, and economic consequences of U.S. agricultural and food policies. Commodity price examination of the major public policies influencing the relationships between business and consumers. Appraisal and analysis of antitrust legislation, consumer protection, and state and federal regulations.
Prerequisite: 11:373:121 or equivalent. Open only to juniors and seniors.

11:373:331 ***Food Marketing Management (3)***
The structure and workings of the U.S. food marketing system, including effects on farmers, consumers, processors, wholesalers, retailers, and food services, and the forces shaping this dynamic market.
Prerequisites: 11:373:210, 231.

11:373:341 ***Organizational Dynamics (3)***
Integration and application of behavioral and managerial sciences to promote processes by which individuals, groups, and organizations work together for common goals and mutual success.
Prerequisite: 11:373:101 or a semester of microeconomics.

11:373:351 ***Business Finance I (3)***
Concepts and practices of financial management. Analysis of financial position, working capital management and budgeting, cost of funds and capital structure, and financial instruments and institutions, with applications to emerging issues.
Prerequisites: A semester of microeconomics, a semester of accounting, 11:373:210, 01:960:211 or 285.

11:373:352 ***Economics of Futures Markets (3)***
Development, functions, operation, and importance of futures markets. Mechanics of trading futures contracts for hedging and speculative purposes. Use of futures contracts as instruments of financing business activities.
Prerequisite: 11:373:210. Open only to juniors and seniors.

11:373:353 ***Personal Finance (3)***
Overview of the financial planning process, goal setting, cash flow management, financial statements and ratios, income taxes, credit and debt, identity theft, time value of money and compound interest, investing, retirement planning, and estate planning.
Prerequisites: Micro- and macroeconomics; 11:373:351; 33:010:272.

11:373:355 ***Energy Economics and Policy (3)***
Examination of the history of oil, economics of petroleum and petroleum products, natural gas, coal, and unconventional fossils. Economics of renewables and socioeconomic origins of energy problems. Emphasis placed on energy-related policies in the areas of transportation, power, heat, and electricity.
Prerequisite: 11:373:121 or 01:220:102.

11:373:361 ***Land Economics (3)***
Application of economic principles to utilization of land resources. Physical and institutional factors affecting land use. Emphasis on real property rights, economics of conservation, the valuation process, cash flow analysis, and public policy.
Prerequisite: 11:373:121 or equivalent.

11:373:362 ***Natural Resource Economics (3)***
Market/nonmarket decision-making structure regarding natural resource use and policy implications, with emphasis on public choice. Benefit-cost analysis and market failure as these apply to natural resource use.
Prerequisite: 11:373:121 or equivalent.

11:373:363 ***Environmental Economics (3)***
The economics of pollution. Socioeconomic origins of environmental problems, failures of market economy and property rights systems, public policies to protect environmental quality. Emphasis on economic incentives as a means of control.
Prerequisite: 11:373:121 or equivalent.

11:373:371 ***Food, Nutrition, and Health (3)***
The nature, importance, and economic consequences of U.S. agricultural and food policies. Commodity price supports, supply controls, marketing orders, soil and water conservation, food subsidies, food safety, agricultural research, taxation, and macroeconomic policies.
Prerequisite: 11:373:121 or equivalent.

11:373:402 ***Global Marketing (3)***
The sociocultural, economic, and geopolitical environments in which strategies and programs are formulated, the cumulative impact on marketing opportunities and threats, and the management skills relevant to global planning and expansion.
Prerequisites: Microeconomics and 11:373:231 or equivalent. Nonmajors only by permission of instructor.

11:373:403 ***Innovation and Entrepreneurship (3)***
Methods and procedures for selecting, planning, financing, organizing, and operating a small business. Emphasis on commercializing innovations derived from research and technology development, including academic entrepreneurship.
Prerequisites: Micro- and macroeconomics; 11:373:231; 373:241; 373:351; 33:010:272; or permission of instructor.

11:373:404 ***Bioscience Policy (3)***
Policy needs of the biotechnology industry: public sector research and private technology development; intellectual property and its influence on innovation; regulation of research and technology development; government procurement and federally financed research.
Prerequisites: Open to juniors and seniors in the 373 and 126 majors; others by permission; 11:373:101 or microeconomics.

11:373:422 ***Demand and Price Analysis (3)***
Advanced analysis of consumer behavior, market demand, producer behavior, and price determination under alternative market structures. Introduction to empirical price analysis.
Prerequisites: 01:220:103, 11:373:210, a semester of calculus, a semester of statistics.

11:373:425 ***Econometric Applications (3)***
Applications of econometrics to problems in environmental and business economics. Estimation techniques, model specification, problem diagnostics, and forecasting.
Prerequisites: Micro- and macroeconomics; a semester of calculus; a semester of statistics.

11:373:431 ***International Trade Policy (3)***
This course focuses on the political economy of trade in agricultural products, trade policies and practices of import and export nations, trade negotiations, and current developments in agricultural trade from a multidisciplinary perspective.
Prerequisite: 11:373:121 or 01:220:102.

11:373:451 ***Business Finance II (3)***
Efficient capital markets, asset pricing models, risk, return, portfolio theory, equity valuation; fixed-income and derivative investment instruments, with emphasis on practical application of theoretical concepts.
Prerequisites: 11:373:210 or equivalent computer course; 11:373:351 or equivalent; Calculus I; a semester of statistics.

11:373:465 ***Applied Marketing Research (4)***
Marketing Research is an important tool in the real world of business and marketing management. It is a systematic inquiry of challenges facing businesses in the real world in order to provide information that guides managerial decision making.
Two 80-min. lecs., one 55-min. rec. Prerequisites: (01:960:285 INTRODUCTORY STATISTICS FOR BUSINESS or 11:373:215 APPL STAT BUS ECON) AND (11:373:231 INTRO TO MARKETING).

11:373:491 ***Applied Research in Economics (3)***
Research problems and independent projects under guidance of faculty members.
Prerequisite: Permission of adviser.

11:373:492 ***Business Issues (3)***
Research problems and independent projects under guidance of faculty members.
Prerequisite: Permission of adviser.

11:373:495 ***Issues in Agricultural, Environmental, and Business Economics (3)***
Senior seminar on major current issues in environmental and business economics. Emphasis on the total system in evaluating rational approaches to issues. Problem solving using best allocation of resources. Debate and discussion.
Prerequisite: Permission of instructor. Open only to juniors and seniors.

Environmental Planning 573 Courses (SEBS)

ENVIRONMENTAL PLANNING 573 COURSES

11:573:202 ***Ecological History of North America (3)***
Almost all of North America today is shaped by human activity. Despite this, the continent still has a wealth of natural resources and harbors large biodiversity. This class will explore why North America has special ecologies. By exploring the biological history of the continent from pre-human times to today (and even beyond), this class is investigating how the biota (flora and fauna) of the continent developed over the millennia and arrived at its current status. The class ranges from topics such as paleontology, archaeology, and historical and bio-geography to urban ecology and conservation biology. The topic will be approached using lectures, field trips, student-facilitated discussion, and paper presentations.

11:573:231 ***Fundamentals of Environmental Planning (3)***
Principles of environmental planning related to the planning process. Special emphasis on natural principles, policy issues, and social concerns impacting land-use outcomes.

11:573:232 ***Fundamentals of Environmental Geomatics (3)***
New technologies to make better use of geospatial data for environmental and natural resource analysis and management. Basic concepts, definitions, and examples of different applications used in an environmental planning and management context.

11:573:233 ***Fundamentals of Environmental Geomatics Laboratory (1)***
An optional laboratory to accompany 11:372:323. Experience in the basics of geographic information systems (GIS) using ArcView.

11:573:296 ***Honors Seminar (3)***
The topic for each semester addresses current issues from the perspectives of the humanities, sciences, and social sciences.
Open only to honors students (SEBS Honors Program, SAS Honors Program, and Honors College) or by permission of instructor.

11:573:302 ***Ecological History of North America (3)***
Almost all of North America today is shaped by human activity. Despite this, the continent still has a wealth of natural resources and harbors a large biodiversity. This class will explore why North America has special ecologies. By exploring the biological history of the continent from pre-human times to today (and even beyond), this class is investigating how the biota (flora and fauna) of the continent developed over the millennia and arrived at its current status. The class ranges from topics from such as paleontology, archaeology, historical and bio-geography to urban ecology and conservation biology. The topic will be approached using lectures, field trips, student facilitated discussion and paper presentation.

11:573:362 ***Intermediate Environmental Geomatics (3)***
Concepts and techniques for the manipulation and analysis of geospatial data. Emphasis on environmental and natural resource management applications. Instruction in desktop geographic information system software.
Prerequisite: 11:372:232 or by permission.

11:573:409 ***Challenges and Opportunities in Environmental Planning (3)***
Practice of planning, including land use, environmental, transportation, and other planning fields; structure of planning for all levels of government, covering planning history, legislation (with a focus on the Municipal Land Use Law), intergovernmental relationships, and the various participants in the planning process. Includes a team-based field project.
Prerequisite: 11:372:231 or equivalent.

11:573:411 ***Environmental Planning and the Development Process (3)***
Comprehensive examination of the relationship of environmental planning to land development; fundamental principles of environmental planning and assessment; analysis of environmental considerations critical to the land-development process using case studies. Includes a team-based field project.
Prerequisites: 11:372:231 and 232, or equivalent.

11:573:413 ***Open Space Planning and Management (3)***
Through lecture, case studies, and hands-on projects, this course will examine the social and economic drivers behind the move to protect land, the planning processes most often used, and the best management practices most often employed.

11:573:437 ***Spatial Data Visualization and Map Design (3)***
While we often work with complex overlay analyses, geostatistical modeling, and other rich analytical methods, the creation and interpretation of maps remain as important to understanding spatial information as it has for thousands of years. This course introduces students to the fundamental concepts of cartography, the science and art of making maps. Students will be able to design effective and sophisticated maps and have the ability to interpret and critically evaluate the many maps.
Prerequisites: 11:573:232 and 233 or permission of instructor.

11:573:444 ***Watershed Planning and Management: An Interdisciplinary Approach (3)***
Problems and challenges of watershed management with respect to particular New Jersey watersheds. Review of current comprehensive watershed management and storm water management policy.
Open only to juniors and seniors.

11:573:445 ***Ecological Design and Stewardship (3)***
The application of environmental principles and research is essential to sustainable planning, design, and management of land. The goal of this course is to teach students, who would like to include land planning, design, or management in their future career, how to be an effective end user of environmental science.
Prerequisite: 01:119:103 or 01:119:115 or equivalent.

11:573:462 ***Advanced Environmental Geomatics (3)***
Advanced and applied analysis of geospatial data. Emphasis on environmental and natural resource management applications. Instruction in state-of-the-art geographical information system software.
Prerequisites: 11:372:362 and 369.

11:573:493,494 ***Special Problems in Environmental Planning (BA,BA)***
Special problems in environmental resources involving original work.
Prerequisite: Permission of the environmental planning and design curriculum coordinator.

Environmental Policy, Institutions, and Behavior 374 Courses (SEBS)

ENVIRONMENTAL POLICY, INSTITUTIONS, AND BEHAVIOR 374

11:374:101 ***Introduction to Environmental Policy, Institutions, and Behavior (3)***
The study of complex and varied patterns of interaction between people and the environment, with special attention to concepts, concerns, and methods of environmental policy, institutions, and behavior.

11:374:103 ***Introduction to Science Communication (3)***
This survey course is as an introduction to the field of science communication. Students will learn the ways that science is communicated including through research articles, mass media, films, museums, and social media.

11:374:108 ***Processes in Human Ecology (3)***
Examination of the interplay of natural and social science processes and drivers of human ecology.

11:374:110 ***Theories and Reasoning in Human Ecology (3)***
Theories in human ecology and methods of reasoning in the social sciences.
Students are encouraged to take this course before taking Research Methods in Human Ecology 11:374:201.

11:374:115 ***Water and Society (3)***
Fundamentals of water resources issues in the United States and the world, and how they affect the development, design, evolution, and sustainability of societies and economic viability.

11:374:120 ***Waste and Society (3)***
Course covers waste, its production, and its management in socio-political processes. Students will evaluate modes of waste management and how they connect to policy, industry, and personal behavior.

11:374:141 ***Health and Society (3)***
The sociocultural factors affecting health status and disease frequency in human populations.

11:374:175 ***Energy and Society (3)***
Main sources, transfers, and losses of energy in the biosphere; how they relate to human resources and enter the immediate environments of humans and other organisms.

11:374:201 ***Research Methods in Human Ecology (3)***
The basic research techniques used by social scientists, planners, and others in writing social impact statements, evaluating programs, and carrying out basic research on human problems.
Students are encouraged to take Theories and Reasoning in Human Ecology 11:374:110 before taking this course.

11:374:210 ***Nature Journaling: Discovering Biodiversity and Nature in Everyday Life (3)***
In this course students will use nature journaling (writing, drawing) to observe the world around them, and in the process develop and/or strengthen their understanding of the role and importance of biodiversity in our everyday lives.

11:374:220 ***Environmental Solutions (3)***
The complex causes of environmental problems and the full range of nonregulatory approaches to improving the environment. By focusing on understanding the causes and contexts of environmental problems along with innovative environmental solutions, the class aims to provide students an understanding of under what conditions various environmental solutions are appropriate and should be applied.

11:374:225 ***Environment in Society and Mass Media (3)***
Detailed introduction to the patterns and styles of mass media coverage of environmental issues.

11:374:227 ***Food for Thought: Agriculture and Food Issues in Contemporary Media (3)***
This course examines current issues in U.S. agriculture and food systems in contemporary media from the position that what we communicate and how we communicate makes meaning, which is translated into decision-making and behavior.

11:374:240 ***Visualizing Information: Storytelling with Data (3)***
Students will build skills in developing visual ways to tell a science story with data in effective forms to use outside of higher education. We will expand our abilities to engage more effectively and improve our science communication skills (general and technical). We will practice many types of visualizations, develop a final portfolio of visual written products, and deliver a presentation, relevant to a current research project. We will focus on scientific and nonscientific audiences.
Open to sophomores, juniors, and seniors.

11:374:250 ***Environmental Justice (3)***
Seminar examining unequal exposure to environmental harms and demands for environmental justice, including access to environmental goods.

11:374:269 ***Population, Resources, and Environment (3)***
The interaction between populations, resources, and the environment in the developed and developing worlds.

11:374:269 ***Population, Resources, and Environment (3)***
The interaction between populations, resources, and the environment in the developed and developing worlds.

11:374:280 ***Careers in Environmental Policy, Institutions, and Behavior (3)***
Career-making and job-seeking skills and knowledge related to the environmental policy, institutions, and behavior major in fields such as law, communication, health, government, industry, advocacy, andeducation. Topics include résumé writing, internships, and the job interview process.

11:374:289 ***Sustainable Food: Politics, Policy, and Ethics (3)***
How can food systems be made more sustainable and socially just? We examine four food-related social movements: organic farming, local food, fair trade, and animal welfare. For each, we ask: Where does it come from? What are its goals? What is working and what is not? And what should be the focus of 21st-century food politics and policy?

11:374:296 ***Honors Seminar (3)***
The topic for each semester addresses current issues from the perspectives of the humanities, sciences, and social sciences.
Open only to honors students (SEBS Honors Program, SAS Honors Program, and Honors College) or by permission of instructor.

11:374:299 ***Introduction to Sustainability (3)***
Introduction to sustainable practices across sectors.
Required for the sustainability minor (962).

11:374:302 ***Data Analysis for Human Ecology (3)***
Data analysis for social sciences focusing on the human dimensions of environmental issues including quantitative and qualitative measures.
Prerequisite: 11:374:201.

11:374:305 ***Globalization, Development, and Environment (3)***
The management, use, and protection of the global environment in the face of globalization and development.

11:374:306 ***Appraising Sustainability: Modeling the Value of Ecosystems Services (3)***
This course introduces students to the evolving field of Ecosystems Services Value Modeling. Ecosystems Services Valuation can support decisions at scales as small as backyard plantings or as large as regional land use and environmental planning. Ecosystems Services Valuation Modeling provides mathematically supported methods of evaluating land use choices applicable in engineering, planning, advocacy, and public finance assessments among others.

11:374:307 ***Experiencing Sustainability in Action (1)***
Communicating about sustainability as it relates to the mission of the organization. Students will explore sustainability missions of organizations and, using effective communication techniques, will develop a proposal to advance a culture of sustainability at Rutgers.

11:374:310 ***Storytelling about Scientists (3)***
Students will develop science writing and communication skills for both the academic and public context and hone their critical reading skills. Course topics will include: knowing your audience, reading like a writer, unpacking structure, staging uncertainty, delivering a pitch, research techniques, and working responsibly with sources.
Prerequisite: 01:355:101 Expository Writing.

11:374:311 ***Environmental Writing: Rhetorical Strategies for Complex Ecological Issues (3)***
This course examines the range of rhetorical strategies that writers have used to create a sense of urgency in the face of environmental disaster. Our overarching question will be: What is effective environmental writing? Students will write and revise two short essays over the course of the semester and an extended research essay on an environmental topic of the student's choice. Students will present their final work in a class conference.
Prerequisite: 01:355:101 Expository Writing.

11:374:312 ***Environmental History (3)***
Historical aspects of environmental use and change in relation to present-day problems in sustaining the productivity of physical and biological systems.

11:374:313 ***U.S. Environmental Policy (3)***
Political, scientific, and economic dimensions of resource and environmental policy development. Emphasis on the U.S. experience.

11:374:314 ***Natural Resources Policy (3)***
Application of theory and methods of social science, particularly the study of common property theory, to problems in natural resource management. Focus on water use, forestry, rangelands, and fisheries.

11:374:319 ***Corporate Sustainability Reporting (3)***
How do we know if an organization is sustainable or not? This course helps students understand the reporting needed to communicate an organization's sustainability activities to its key stakeholders.
Open to Sophomores, Juniors, and Seniors. Crosslisted with 11:373:319

11:374:322 ***Behavior and the Environment (3)***
Why people engage in environmentally helpful or destructive behaviors, and how to change their behavior.

11:374:335 ***Communities and Environmental Change (3)***
Analysis of people's responses to environmental stresses or disturbances and the ways in which response patterns change.

11:374:350 ***Informal Science Education: Learning and Teaching Science outside of the Classroom (3)***
This course focuses on the teaching and learning of science in out-of-school contexts. These contexts are widely referred to as "informal learning" contexts and include: zoos, aquariums, science centers, natural history museums, docent-led walks/tours, after-school programs, and eco/enviro-tours. Learning theory in this area draws heavily from sociocultural perspectives on knowing and learning, and the class will discuss its influence, along with cognitive and educational psychology, on the teaching and learning of science in out-of-school contexts.

11:374:399 ***Practicum in Sustainability (3)***
Students will apply didactic training in environmental studies, economics, and sociology to one of three community projects with a sustainability perspective: 1) governmental (improvement of New Brunswick city's sustainability); 2) academic institution (Rutgers campus sustainability initiative); or 3) nonprofit organization (the Lower Raritan Watershed initiative or the Sustainable Raritan initiative). Students will focus on problem identification, problem solving, working with stakeholders, budgeting, and producing deliverables.

11:374:416 ***Environmental Education (3)***
Development and integration of environmental education programs for use in existing K-12 curricula. Use of audiovisuals, applied research, evaluation, and other pertinent resources.

11:374:418 ***Social-Ecological Research: Mongolia (1)***
Understanding the multiple components of and how they interact in social-ecological systems is imperative in our growing complex and globalized world. Learn with undergraduate and graduate students from throughout the United States and Mongolia. Design collaborative research projects for field-based research within a discipline (e.g., ecology, anthropology, sociology), as well as across disciplines. This distributed seminar course will be focused around the exemplar of the social-ecological impacts of hydropower development in the Selenge River Watershed, Mongolia.

11:374:424 ***Segregation and Health (3)***
Patterns of settlement by race and income and health outcomes associated with those patterns, social responses, and policies.

11:374:426 ***Climate Change Policy (3)***
Topics in social, economic, legal and political aspects of policy for climate change mitigation and adaption at international, national and subnational levels.

11:374:428 ***Marine Fisheries Policy (3)***
International and national policies on marine fisheries management.

11:374:429 ***Agrarian Landscapes (3)***
Multidisciplinary approach to understanding modern transformations of agrarian, or agricultural, landscapes, with a focus on small-scale agricultural systems.

11:374:430 ***Risk, Health, and Safety (3)***
Toxicological and epidemiological concepts, psychological aspects of risk perception and coping, and influences on self-protective behavior. Media reporting on risk and health, and how to communicate with the public about risks.

11:374:431 ***New and Reemerging Diseases (3)***
Social and physical conditions contributing to the emergence or reemergence of diseases, disease behaviors, and control.

11:374:437 ***Culture and Health (3)***
Understanding of the role of culture in health and health care; cultural competence in health care settings intended to improve health care.

11:374:438 ***Health in the Latino Community (3)***
Health issues in the Latino community; social and environmental factors that affect the health of Latinos in the United States; and how cultural competence efforts can improve health care for Latinos.

11:374:440 ***Race and the Environment (3)***
The ways in which racial categories, racism, environmental care, and environmental destruction have all shaped and informed each other.

11:374:460 ***Environmental Law and Policy (3)***
Introduction to U.S. law and policy governing air, water, and other natural resources; species and public health; and the human activities that affect them and are influenced by them.
Prerequisite: 11:374:279.

11:374:462 ***International Environmental Law and Policy (3)***
The role of formal and informal law in the management of international environmental problems.

11:374:481 ***Internships in Watershed Management (3)***
Internships in the watershed management or water resources field with internship mentors from sponsoring organizations and agencies. Includes classes with a cohort of interns.

11:374:484 ***Internships in Sustainability (3)***

Sustainability Internships will provide opportunities for real-world engagement with sustainability, involving a range of activities that may include research, writing, visualization or other substantive activities. Internships are professional development experiences (i.e., they are not opportunities for sponsoring organizations to acquire inexpensive office help).

Open to sophomores, juniors, and seniors.

11:374:490 ***Research and Practicum in Human Ecology (3)***
Advanced interdisciplinary reading and independent research in human ecology under the guidance of a faculty member.
Prerequisite: By permission only.

Capstone Experience: Seniors Only

Students will create a capstone project that demonstrates skills in research and analysis and knowledge of human ecology that they have gained through their work on the major. Requirement may be fulfilled through one of three options: a) George H. Cook Honors Paper 11:015:497 [498] (3 or more credits); b) Capstone in Human Ecology, Independent Study 11:374:491; or c) Capstone in Human Ecology 11:374:499.

11:374:491 ***Capstone in Human Ecology, Independent Study (3)***
A solo, independent study capstone project completed under the guidance of a faculty member.
Prerequisite: Seniors only.

11:374:492 ***Environmental Studies Internship (BA)***
Internships involving environmental research and policy at Rutgers, other institutions, public agencies, nongovernmental organizations, or businesses.
Prerequisite: By permission only.

11:374:499 ***Capstone in Human Ecology (3)***
Students in this course will complete individual capstone projects related to a particular research topic defined by the instructor.
Prerequisite: Seniors only.

Environmental Sciences 375 Courses (SEBS)

ENVIRONMENTAL SCIENCES 375 COURSES

11:375:101 ***Introduction to Environmental Sciences (3)***
The impact of physical, chemical, and biological assaults on man and environment in air, water, wastewater, streams, noise, occupational health, and solid wastes.

11:375:201 ***Biological Principles of Environmental Sciences (3)***
Hazardous agents, pollution, population interactions and dynamics; biogeochemical cycles in damaged and remediated ecosystems; environmental risk, management, and remediation; human health impacts.
Prerequisites: 01:119:115-116 or 01:119:103, 01:160:161.

11:375:202 ***Chemical Principles of Environmental Sciences (3)***
Introduction to chemical processes in Earth's atmosphere and natural waters, and their modification by human activity.
Prerequisite: 01:160:160 or 01:160:162 or 01:160:164

11:375:203 ***Physical Principles of Environmental Sciences (3)***
Physical properties of water, air, and soils; energy and water in the earth system; kinetic and potential energy; and soil/plant/atmosphere relations.
Prerequisites: 01:750:193 or 01:750:203 or 01:750:123 and 124. Corequisite: 01:750:194 or 01:750:204 or 01:750:227.

11:375:302 ***Water and Wastewater Treatment (3)***
Introduction to unit operations that constitute the state-of-the-art of water and wastewater treatment.
Prerequisite: Calculus 1 and 01:160:162.

11:375:303 ***Numerical Methods in Environmental Science (3)***
Formulation and solution of environmental science problems by applying analytical and numerical techniques. Principles of data analysis. Generation and solution of mass and energy balances.
(Formerly 11:375:437) Prerequisite: 01:640:135 or 151.

11:375:307 ***Solid Waste Management and Treatment (3)***
The generation, storage, transport, processing, ultimate disposal, and regulation of municipal solid wastes, including discussion of agricultural and hazardous wastes and recovery of resources.
Prerequisites: 11:375:202 and 01:750:193 or 01:750:123. Corequisite: 01:750:194 or 01:750:204.

11:375:310 ***Analytical Environmental Chemistry Laboratory (3)***
Analysis of environmental samples; environmental sampling procedures; experimental ethics; data analysis; HPLC; GC; and atomic adsorption spectroscopic analysis of organic and inorganic substances.
Prerequisite: 11:375:202.

11:375:312 ***Environmental Microbiology Laboratory (2)***
Hands-on introduction to microbiological techniques related to environmental issues. Bacterial growth and nutrition, nutrient cycles, waste treatment, and water quality testing.
Pre- or corequisites: 11:375:201,202.

11:375:322 ***Energy Technology and Environment (3)***
Critical consideration of energy technology acceptable in a world faced with global warming, environmental pollution, and declining supplies of oil. Examines traditional (oil, natural gas, coal, nuclear), renewable (solar, wind, biomass), and reduced carbon emission sources (co-generation, fuel cells).
Prerequisite: 01:640:135 or 137 or 151.

11:375:340 ***Environmental Applications of Organic Chemistry (3)***
Concepts from organic chemistry applied to environmental systems: physico-chemical properties; acid-base, nucleophilic substitution, and redox reactions; prediction of lifetimes of organic chemicals in the environment; whether chiral compounds (PCBs, pesticides) have undergone biotransformation.
Prerequisite: 01:160:209 or 01:160:308.

11:375:346 ***Introduction to Atmospheric Chemistry (3)***
This course covers the principles of atmospheric chemistry and the environmental implications of changing atmospheric composition. Students will learn about the components of the atmosphere, the processes within, and how the atmosphere interacts with the earth's surface and outer space. Topics include the Antarctic ozone hole, ozone smog, acid rain, air toxics, greenhouse gases, and aerosols.
Prerequisites: 01:160:161 (Chemistry 1) AND 01:640:135 (Calculus 1)

11:375:360 ***Soils and Water (4)***
Physical and chemical properties of soils, soil-water interactions, erosion, etc. Soil properties important to environmental planning. Soil survey interpretation and use.
Lec. 3 hrs., lab. 3 hrs. Prerequisite: 01:460:101 or 01:160:161 or equivalent.

11:375:380 ***Tropical Environments and Society (3)***
This course addresses a range of topics focusing on key contemporary challenges facing the environments and people of the tropics including threats to ecosystem function and biodiversity as a result of climate change, deforestation, and land use changes. In addition to the regular lecture, students will participate in a field component during Spring Break during which students will engage in targeted research to gain a deeper appreciation of the challenges and opportunities in tropical systems.

11:375:390 ***Careers in Environmental Science (1)***
This course prepares students for a professional life after Rutgers. Students will learn about different employment options in environmental science by speaking directly with past alumni and professionals working in the field. Students will learn how to present themselves and their accomplishments in a professional matter orally and in writing to build their confidence when applying for graduate school and future employment.
Open to Environmental Science majors in junior or senior year, or by permission of instructor.

11:375:407 ***Environmental Toxicology (3)***
Basic principles and applications of toxicology to environmental problems.
Prerequisite: An organic chemistry course.

11:375:411 ***Environmental Microbiology (3)***
Microorganisms in carbon, nitrogen, sulfur cycling, biogeochemical processes, and water and wastewater treatment systems; biodegradation strategies and pathways; and bioremediation of toxic contaminants in the environment.
Prerequisite: One semester of introductory microbiology or bacteriology.

11:375:421 ***Principles of Air Pollution (3)***
Fundamental factors of atmospheric contamination; effect of pollution on man and environment; principles of measurement and survey; methods of control; air cleaning; legal aspects.
Prerequisite: 01:160:162

11:375:423 ***Environmental Fate and Transport (3)***
The fate and transport of chemicals to determine chemical exposures in aquatic systems and predict future conditions. Emphasis on water quality problems introduced by addition of nutrients, metals, and toxic organic chemicals to water, soil, and air.
Prerequisites: 11:375:203 and one semester of calculus.

11:375:424 ***Air Sampling and Analysis Techniques (3)***
Theory and laboratory experience in ambient and indoor air sampling. Calibration, classical air sampling, direct-reading instrumentation. Measurement and analysis of airborne nanoparticles and biological agents.
Prerequisite: 11:375:421 or equivalent or permission.

11:375:430 ***Hazardous Wastes (3)***
Hazardous waste management: case studies, RCRA and other legislation and regulations, treatment and disposal technology, sampling and analysis, fate in the environment, site cleanup.
Prerequisites: 11:375:302 and 11:375:307.

11:375:431,432 ***Special Problems in Environmental Science/Studies (BA,BA)***
Conferences; library and laboratory work on assigned topics.
Prerequisites: Permission of adviser and program director of environmental sciences.

11:375:434 ***Principles of Industrial Hygiene (3)***
Identification, evaluation, and control of chemical and physical stresses of an industrial environment. Gases, aerosols, nonionizing radiation, noise, lighting, ergonomics, industrial ventilation, heat, and health standards.
Prerequisites:01:119:115 OR 01:119:103.

11:375:444 ***Water Chemistry (3)***
Quantitative examination of the thermodynamics and kinetics controlling the speciation of inorganic solutes in natural, contaminated and engineered waters.
Prerequisites: 01:160:160 or 01:160:162 or 01:160:164 and 01:640:135 or 01:640:151.

11:375:450 ***Terrestrial Carbon Cycle (3)***
This course discusses the major land processes that affect the amount of carbon in the global atmosphere. Topics will include a simplified global carbon cycle, general land use change, wetlands, peatlands, "blue carbon", de-/re-forestation, carbon offset schemes, agricultural practices, and urban landscapes all through the lens of carbon cycle impacts.
Prerequisites: 1 semester each of biology (01:119:115 or 01:119:103) AND chemistry (01:160:161).

11:375:453 ***Soil Ecology (3)***
Soil microbial contribution to ecosystem function, microbial diversity, nutrient cycling, soil enzymes, fate of soil amendments, soil flora and fauna, energy cycling, quantification of soil biological processes.
Prerequisites: 01:119:115-116 or 01:119:103 and 01:160:159, 161, 163, or 165 are acceptable.

11:375:474 ***Coastal Biogeochemical Cycles in a Changing World (3)***
Coastal environments are dynamic zones where terrestrial and marine environments meet. They are high-productivity regions of intense biogeochemical cycling that are increasingly challenged by anthropogenic changes including: sea-level rise, ocean acidification, and eutrophication. We will explore four coastal environments from the poles to the tropics while building skills in analysis software.
Prerequisites: (11:375:201 and 11:375:202) or (11:375:444 and 01:119:115 or 01:119:103) or (11:628:320 and 01:160:161 and 01:119:115 or 01:119:103) or permission of the instructor.

11:375:487,488 ***Internship Experience (BA,BA)***
Supervised internship in environmental science.
Prerequisites: Permission of adviser and program director of environmental sciences.

11:375:497,498 ***Research in Environmental Science (BA,BA)***
Supervised research experience in environmental science.
Prerequisites: Permission of adviser and program director of environmental sciences.

11:375:499 ***Environmental Science Senior Survey (0)***
Registration for this course by environmental science majors in their final semester ensures completion of the departmental Senior Survey.

Food Science 400 Courses (SEBS)

FOOD SCIENCE 400 COURSES

11:400:103 ***Science of Food (3)***
Overview of major food components (carbohydrates, fats, proteins, vitamins, and minerals); process of digestion; major food-related diseases in the United States; the bases for food preservation, including processing, food legislation, and current food issues, such as the use of food additives, irradiation, and genetic engineering.
Intended for all students; no previous science required. This course is certified for Natural Sciences requirement.

11:400:104 ***Food and Health (3)***
Personal nutrition and its relationship to health by way of food and nutraceuticals.
Intended for all students; no previous science required. This course is certified for Natural Sciences requirement.

11:400:105 ***Introduction to Foods: The Major and the Discipline (1)***

Overview of food science in an interactive environment.

Intended for all students; no previous science required.

11:400:106 ***Food as Medicine (3)***
Focuses on the emerging fields of food microbial ecology, food pharmacology, nutrigenomics, and nutraceuticals. Topics covered include probiotic and prebiotic foods and their use in chronic disease prevention (e.g., obesity, hypertension, high cholesterol, and digestive disorders). Intended for nonfood science majors, the course will include lectures from leading experts in the field.
Intended for all students; no previous science required. This course is certified for Natural Sciences requirement.

11:400:107 ***Foods from Field to Table (3)***
Open to all majors, students will discover food science from the conversion of raw agricultural commodities to processed foods and the associated water and energy resource costs.
Intended for all students; no previous science required. This course is certified for Contemporary Challenges (CC-O) requirement.

11:400:201 ***Principles of Food Science (3)***
Introduction to foods as chemical systems; structure-function relationships of water, protein, lipids, carbohydrates, minerals, and natural products in foods; food safety fundamentals; preservation methods and effects on food quality.
Prerequisites: General Chemistry I and II (01:160:161 and 162) and General Biology I and II (01:119:115 and 116). Elementary Organic Chemistry 01:160:209 or Organic Chemistry I 01:160:307 must be taken as a co-requisite or completed as a pre-requisite.

11:400:202 ***Principles of Food Science Laboratory (2)***
Fundamental roles of physical properties and chemical reactions of proteins, lipids, and carbohydrates in food systems; principles underlying food function and stability; analysis of food properties.
Lab./rec. 4 hrs. Corequisite 11:400:201.

11:400:301 ***Food Processing Technologies (4)***
Methods and techniques used to transform raw ingredients into food for consumption by humans. Principles of operation and design of industrial equipment used in processing, storage, and packaging of foods. Food quality and food safety as related to food processing equipment. Classification and description of food processing equipment.
Lecture and integrated lab. Prerequisite: Physics I 01:750:193 or 201 or 203 & 205 Calculus I 01:640:135 or 151.

11:400:302 ***Food Process Engineering (3)***
Engineering principles of food processing and preservation. Laboratory experiments designed for hands-on experience using state-of-the-art equipment to understand the engineering principles associated with food processing and preservation taught in lectures. Material balances, gas and vapors, psychrometry, energy balances, fluid mechanics, heat and mass transfer, and dehydration.
Lecture and integrated lab. Prerequisite: Food Processing Technologies 11:400:301

11:400:304 ***Food Analysis (3)***
Modern methods of analytical chemistry, with emphasis on chromatography. Application of analytical methodology to lipids, amino acids, carbohydrates, and other food components. Importance of precision, accuracy, and significance of results.
Prerequisite: Elementary Organic Chemistry 01:160:209 or Organic Chemistry I 01:160:307 and Principles of Food Science 11:400:201.

11:400:305 ***Food Analysis Laboratory (1)***
Food analysis laboratory complements the lecture course and gives students experiences in performing food analysis experiments, analyzing data, and reporting their findings. Identification and critical assessment of the most appropriate and applicable analytical methods for analyzing the properties of a particular food product will be emphasized.
Co-requisite: Food Analysis 11:400:304

11:400:314 ***Current Issues in Food Science and Food Law (2)***
An interactive discussion-facilitated course covering topics including current food safety controversies, obesity, nutrition, consumer knowledge, food laws of the United States and their impact, and the role of federal regulatory agencies in the administration of law.
Prerequisite: 11:400:201.

11:400:315 ***Study Abroad in Thailand - Food and Sustainability (3)***
This course presents the nexus of food sustainability, food security, and food safety. Students will learn the pathway of foods from: farm to processing, warehousing to transport, and retail to table.

Prerequisites: General Biology and General Chemistry (minimum one semester of each).

11:400:316 ***Embedded Study Abroad course in Ireland - Sustainable Food Production (3)***
This course is designed to understand small batch production of artisan foods using locally sourced ingredients keeping in mind sustainability, food safety, and circular food systems.
Co-requisite: Black pudding to Irish Cream - Sustainable Foods of Ireland 01:959:210

11:400:350 ***Wine Basics from Field to Glass (1.5)***
This course provides a brief overview of grape growing and wine history, culture, and making. Global grape varieties and wine styles will be evaluated in instructor-led tasting workshops. All students must be 21 years to take the course and IDs will be checked on the first day of class.

11:400:405 ***Sensory Evaluation of Foods (3)***
Experience in using the senses as analytical tools. Principles of sensory evaluation of foods, including sample presentation, data recording and analysis, and report writing.
Prerequisite: Statistics 01:960:211 OR 01:960:285 OR 01:960:401 OR 11:373:215 OR 11:216:369.

11:400:410 ***Nutrigenomics and Nutraceuticals (3)***
This course explores the science of nutrigenomics and focuses on plant and animal nutraceuticals and bioactives that provide important health, wellness, and comfort benefits.
Prerequisites: General Chemistry (01:160:162) AND General Biology (01:119:116) AND Food and Health (11:400:104) or Nutrition and Health (11:709:255).

11:400:411 ***Food Chemistry (3)***
Chemical/biochemical reactions of carbohydrates, lipids, proteins, and other constituents in fresh and processed foods are discussed with respect to food quality.
Prerequisite: Principles of Food Science 11:400:201; Must have previously taken Biochemistry (11:115:301 or 403) or be registered the same semester.

11:400:412 ***Food Product Development (3)***
A comprehensive consideration of food product development, including fact finding, prototype and process development, shelf life, technical and financial feasibility, distribution, and consumer acceptance.
Prerequisites: Food Processing Technologies (11:400:301), Current Issues in Food Science and Food Law (11:400:314), Food Chemistry (11:400:411), Sensory Evaluation of Foods (11:400:405) and Food Microbiology (11:400:423).

11:400:413 ***Food Chemistry Laboratory (1)***
Students perform experiments that demonstrate the chemical/biochemical reactions of carbohydrates, lipids, proteins, and other constituents in fresh and processed foods with respect to food quality. Reaction conditions and processes that affect color, flavor, and texture of food are emphasized.
Co-requisite: Food Chemistry 11:400:411

11:400:419 ***Food Physical Systems (3)***
The physical chemistry of foods and food ingredients; microscopic properties of foods in terms of molecular structure and physical principles; properties of aqueous solutions, colloids, biopolymers, and crystalline and amorphous solids; effects of temperature, pressure, water activity, solvent, and matrix properties.
Prerequisite: Biochemistry (11:115:301 or 403)

11:400:422 ***Food Safety: Fads, Facts, and Politics (3)***
Dynamic interactions of science, law, agribusiness interests, and consumer concerns. Case studies and participatory exercises to explore a variety of issues.
Open to all majors, Juniors and Seniors only.

11:400:423 ***Food Microbiology (3)***
The role of microorganisms in food processing and preservation and health promotion. The relation of microorganisms to food spoilage, food-borne illness and intoxication, and general food quality.
Prerequisites: Elementary Organic Chemistry (01:160:209) OR Orgo I (01:160:307) OR Introduction to Microbiology (11:680:201) OR General Microbiology (01:447:390/11:680:390). Open to juniors and seniors only.

11:400:424 ***Food Microbiology Laboratory (1)***
Methods of microbiological analysis of foods. Identification of food-related microorganisms and fermentation processes.
Corequisite: 11:400:423.

11:400:490 ***Applying immersive learning to rural Agro-Food issues: Study Abroad in Southern India (3)***

Students will have an opportunity to interact with the host institution's (Amrita Vishwavidyalaya (Amrita University https://www.amrita.edu).) faculty and students who specialize in the field of plant natural products, food, and agriculture. Cross-listed with 11:776:490.

General Biology or General Chemistry (minimum one semester).

11:400:493 ***Research-Based Learning (1-6; BA)***
Research projects in food science under the guidance of the faculty.
Prerequisite: Permission of adviser.

11:400:494 ***Internship-Based Learning (1-6; BA)***
Internship projects in food science under the guidance of the faculty.
Prerequisite: Permission of adviser.

Interdisciplinary Studies 554 Courses (SEBS)

INTERDISCIPLINARY STUDIES 554

11:554:111 ***Readings in Biology (1)***
For first-year students in the SEBS General Honors Program.
Open only to first-year students in the General Honors Program of the School of Environmental and Biological Sciences.

11:554:196 ***Honors Seminar I (3)***
The topic for each semester addresses current issues from the perspectives of the humanities, sciences, and social sciences.
Open only to first-year students in the General Honors Program of the School of Environmental and Biological Sciences.

11:554:296 ***Honors Seminar II (3)***
The topic for each semester addresses current issues from the perspectives of the humanities, sciences, and social sciences.
Open only to sophomores or juniors in the General Honors Program of the School of Environmental and Biological Sciences.

11:554:297,298 ***Honors Tutorial I,II (1,1)***
An independent study project on a topic agreed upon by the student and the cooperating faculty member. Short written report required at the end of each semester.
Open only to sophomore students in the General Honors Program of the School of Environmental and Biological Sciences.

11:554:301 ***Aresty Research Assist (1.5)***
The Aresty Research Assistant (RA) program matches students who are new to research to professors' current research projects for an academic year. Students develop problem-solving skills in research environments, learn to communicate research to diverse audiences, and build confidence in the social environment of research.

11:554:302 ***Aresty Research Assist (1.5)***
The Aresty Research Assistant (RA) program matches students who are new to research to professors' current research projects for an academic year. Students develop problem-solving skills in research environments, learn to communicate research to diverse audiences, and build confidence in the social environment of research.

11:554:347 ***Environmental Photography (4)***
Lecture/laboratory course that emphasizes the development of skills necessary for the production of photographic documents on environmental themes while exposing students to the history and traditions of photographic documentation in science and art. Students are required to provide their own digital camera, preferably with camera raw capability.
Lec. 3 hrs., lab. 3 hrs.

11:554:391,392 ***Independent Study (BA,BA)***
Individualized research project under the direction of one or more faculty members.

11:554:397,398 ***Honors Tutorial III,IV (BA,BA)***
An independent study project in the student's field of interest, carried out with a cooperating faculty member. Written report required at the end of each semester.
Open only to sophomores or juniors in the General Honors Program of the School of Environmental and Biological Sciences.

11:554:487,488 ***George H. Cook Scholars Program (3-6,3-6)***
A two-semester independent research project, culminating in an oral presentation at a program-wide symposium and a written thesis.
Open only to George H. Cook Scholar candidates.

11:554:491,492 ***Independent Study (BA,BA)***
Individualized research project under the direction of one or more faculty members.

11:554:497, 498 ***Honors Tutorial V,VI (BA)***
Senior-year tutorials (3-6 credits/semester) are taken only by students who, for a variety of reasons, have opted not to undertake The George H. Cook Scholars (senior honors thesis) Program. The Tutorial Advisor should, however, expect the same level of initiative and independence as an honors thesis candidate, but no actual "thesis," "defense" or "committee" is required: Tutorials V and VI are simply independent study projects developed by the student.
Open only to seniors in the General Honors Program of the School of Environmental and Biological Sciences.

Landscape Architecture 550 Courses (SEBS)

LANDSCAPE ARCHITECTURE 550 COURSES

11:550:101 ***Landscape Studies (3)***
This course introduces the idea of landscape as a cultural phenomenon that represents how society views nature and the built world and how this changes over time. We study how people interact with their environment to create meaning that is often unconscious or assumed. It is about the shaping of our everyday landscape, both as a nation and in our daily routine.
Field trips required.

11:550:133 ***Architectural Design (3)***
Concepts of architectural and urban design process, systems, and practice. Built environments in relation to human functions, perception, and needs. Space and form design and sketch studies.
One 80-min. lec., lab. 3 hrs. Additional field trips by arrangement.

11:550:220 ***Case Studies of Public Garden Displays (1)***
Travel to three public gardens with vastly different display styles and learn how the garden designers explain the thought process that went into the development of that garden. Archival access to designs complements conversation with garden staff. Case studies compare/contrast garden elements.

11:550:221 ***Design of Public Garden Displays (3)***
The course will focus on pulling together successful combinations of color, texture, line, height, and sequence to craft a garden of primarily herbaceous plants at Rutgers Gardens that will enhance the visitor experience. The final project is the installation of the garden design.
This course has a construction component.

11:550:230 ***Environmental Design Analysis (3)***
Explores the meanings, values, and processes that shape our everyday environments and what it means to enable more sustainable solutions. Design, by its very nature, is multidisciplinary, incorporating the creative arts, social science, environmental science, political science, and other perspectives. Sustainability--both ecological and social--involves not only understanding environmental conditions but also the necessary social engagement to encourage better practices and stewardship. Environmental and social justice are central to accessing resources, enabling choice, and enabling civic activism.

11:550:231 ***Introduction to Environmental Design I (5)***
Design fundamentals and creativity through design process; application to fundamental landscape architecture at small-site scale. Graphic skills and techniques. Impact of environmental design on people and nature.
Two 80-min. lecs. Studio 6 hrs. Not open to first-year students. Prerequisite: Permission of department.

11:550:232 ***Introduction to Environmental Design II (5)***
Refinement of design process and graphic skills, including perspective and paraline drawing, through projects of increasing complexity and magnitude. Site planning, principles of auto and pedestrian circulation, behavioral aspects of design, basic landform manipulation.
Two 80-min lecs. Studio 6 hrs. Prerequisite: 11:550:231 (Intro to Environmental Design I).

11:550:233-234 ***Landscape Plants I,II (3,3)***
Identification, environmental requirements, and landscape assets and liabilities of ornamental plants. First semester: fall aspects of deciduous trees and shrubs. Second semester: the broadleaf and narrow-leaf evergreens and the spring aspects of deciduous trees and shrubs.
One 80-min. lec., lab. 3 hrs. Additional field trips by arrangement.

11:550:235 ***Herbaceous Plants in the Landscape (3)***
Identification, uses, and care of herbaceous plants in private gardens and public spaces: annuals, herbaceous perennials, ornamental grasses, herbs, and plants for ponds and pools.
Additional field trips by arrangement.

11:550:237 ***Landscape Drawing & Drafting (3)***
An introduction to graphic techniques for representing the landscape, including free-hand sketching, perspective drawing, and drafting plans and sections. This course serves two purposes: it prepares students for landscape design coursework, and it provides an introduction to the art and craft of landscape representation.

11:550:238 ***Landscape Management and Maintenance (3)***
Maintenance and culture of landscape plantings, including sustainable landscape stewardship.
Additional field trips by arrangement.

11:550:240 ***Public Garden Management (3)***
Offered as the accompanying colloquium to the Rutgers Gardens/Central Park summer internship program, this course provides an understanding of the planning and maintenance objectives of public gardens and parks. This will include an analysis of organizational structures and economic issues along with addressing management of plant materials in respect to safety and proper visitor experience.

11:550:241 ***Construction 1: Site Engineering (4)***
Site engineering principles; grading, drainage, earthwork, and road alignment; their integration with landscape architecture design.

11:550:250 ***History of Landscape Architecture (3)***
Historical analysis of landscape design theory and practice; design as a physical expression of environmental and cultural determinants.

11:550:271 ***Agriculture and the Landscape (3)***
Explores the relationships of the farmer to his or her land, and how these relationships alter the physical landscape at a variety of scales, accentuating the human scale. The class often collaborates with local nonprofits in a service-learning context. Experiential learning, field trips, and a humanities-based lens provide the tools for reading the landscape. Additional field trips by arrangement.

11:550:275 ***Architecture, Inequality, and Landscapes of Justice (3)***
Gain an understanding of how the built environment is created and learn to see the stratified composition of the contemporary city. Explore the production of the city's physical terrain (housing, public space, environmental systems, transportation, and other infrastructure). Form a connection between these material manifestations and social justice issues by exploring how the city constructs inequality, disparity, access, wealth, safety, health, and identity.

11:550:296 ***Honors Seminar in Landscape Architecture (3)***
The topic for each semester addresses current issues from the perspectives of the humanities, sciences, and social sciences.
Open only to honors students (SEBS Honors Program, SAS Honors Program, and Honors College) or by permission of instructor.

11:550:301 ***Social and Cultural Aspects of Design (3)***
Addresses the design and use of everyday environments as expressions of individual, community, and civic society. Topics include environment-behavior research, community-based design, and ethical debates related to inclusion, participation, diversity, and sustainability. Students learn methods, such as observation, interviewing, and surveying, and then apply them as part of team and individual projects.

11:550:331 ***Environmental Planning Studio (5)***
Analysis and interpretation of the physical environment with emphasis on methodologies such as geographic information systems (GIS), suitability mapping, and visual resource management as applied to land planning, design, and management problems.
Two 80-min. lecs. Studio 6 hrs. Prerequisites: 11:573:232 AND 11:573:233 (Fundamentals of Geomatics + Lab).

11:550:332 ***Junior Praxis Studio I (5)***
A vertical landscape architecture studio with projects of varied thematic content.
Two 80-min. lecs. Studio 6 hrs. Prerequisites: 11:550:231 (Intro to Environmental Design I) and special permission number.

11:550:333 ***Design Build Studio (3)***
Development of a set of design strategies for a specific site or sites, given consideration to the community, context, and reuse of site materials that culminates in the construction of the proposed design. Likely includes community engagement and outreach.
Prerequisite: 11:550:232 (Intro to Environmental Design II).

11:550:337 ***2D Digital Design and Drafting (3)***

Introduction to AutoCAD, the industry standard for computer drafting, bridging landscape architecture, architecture, and engineering and allowing for a seamless exchange of ideas and output. Essential computer-aided design (CAD) tools for the landscape architect to effectively communicate with fellow professionals and clients. This course incorporates beginning Adobe Photoshop, Illustrator, and In-Design skills for use with CAD drawings.
Prerequisites: 11:550:237 (Landscape Drawing and Drafting) AND 11:550:231 (Intro to Environmental Design I).

11:550:340 ***Planting Design (4)***
Plants as design elements affecting function, comfort, energy efficiency, and aesthetic quality. Selection of plants to serve functional and aesthetic purposes. Specification for planting design.
Two 80-min. lecs., studio 3 hrs. Prerequisites: 11:550:231 (Intro to Environmental Design I) AND 11:550:233 (Landscape Plants).

11:550:341 ***Construction 2: Materials & Assemblies (4)***
Introduction to properties of construction materials, structural principles, and methods of construction.
Prerequisite: 11:550:241 (Construction 1: Site Engineering) AND 11:550:237 (Landscape Drawing & Drafting); Corequisite: 11:550:337 (2D Digital Design and Drafting).

11:550:348 ***Landscape Architecture Portfolio Design (1.5)***

Advanced principles of graphic design and Adobe Design Creative Suites expand upon fundamentals acquired in the Visualization Sequence and the introductory studios towards development of presentation portfolios for design professionals. ***This is a half-semester course. Prerequisite: 11:550:337 (2D Digital Design and Drafting).***

11:550:350 ***3D Digital Design & Communication (3)***
Introduction to the use of computer-aided design (CAD) as a design and graphics tool in landscape architecture.
Prerequisite: 11:550:337 (2D Digital Design & Drafting).

11:550:360 ***International Studies in Landscape Architecture (BA)***
An opportunity to study in a landscape architecture program abroad with which the department has established an articulated exchange agreement. Course equivalences will be determined upon completion of the program.
Prerequisite: Special permission number.

11:550:430 ***Advanced Landscape History Seminar (3)***
History of gardens in Italy, France, England, or the United States from the Renaissance to the present. Emphasis on form and meaning of garden design and widespread influence of this genre.
Prerequisite: Permission of instructor.

11:550:431 ***Advanced Landscape Architecture I (5)***
Advanced landscape architecture theory with application to problems of increasing scope and complexity. Social and cultural contexts, with emphasis on design sites for housing and community design.
Two 80-min. lecs. Studio 6 hrs. Prerequisites: 11:550:332 (Junior Praxis Studio) AND 11:550:341 (Construction 2: Materials & Assemblies).

11:550:432 ***Senior Praxis Studio (5)***
A vertical landscape architecture studio with projects of varied thematic content.
Two 80-min. lecs. Studio 6 hrs. Prerequisite: 11:550:331 (Environmental Planning Studio).

11:550:435 ***Professional Practice (1)***
Survey of general professional practice, office management, client relationships, collaborative practice, contracts, and specifications.
Lec. 1.5 hrs.

11:550:436 ***Landscape Enterprise (3)***
Understanding the business management side of the landscape profession (applicable to design firms, landscape construction, landscape maintenance, design build), especially for those interested in starting or owning their own company. Topics include: general business practices; licenses, regulations, and best management practices and standards specific to the industry and green technology.

11:550:437 ***Special Problems in Landscape Architecture (BA)***
Independent projects. Terminal comprehensive project, research of appropriate scope and complexity, or community involvement in environmental design problems.
Open only to majors in the landscape architecture program; others by permission of instructor.

11:550:438 ***Material Tectonics (3)***
Approaches architecture as a material practice and investigates the evolution of computer aided design (CAD) technologies toward the generation of material effects.
Prerequisite: 11:550:350 (3D Digital Design & Communication).

11:550:439 ***Suburbia Transformed: Residential Design in the Age of Sustainability (3)***
Residential design in the age of sustainability explores how contemporary green strategies, tactics, and technologies can be employed in redesigning an existing small-scale suburban house and garden, thus contributing to the transformation of suburbia, one domestic property at a time.
Prerequisite: 11:550:231 (Intro to Environmental Design I) or permission of the instructor.

11:550:440 ***Case Studies in Landscape Architecture: 1850 to the Present (3)***
Research seminar: engage historical and theoretical underpinnings of landscape architecture, relating the profession to concepts of nature, landscape, science, art, and social justice as conceived by the protagonists in the field.
Two 80-min. lectures.

11:550:441 ***Construction 3: Design Implementation and Practice (4)***
Introduction to the construction implementation process; development of technical competence; integration of sustainable design principles; communication through technical documentation. Additional topics related to professional practice.
Two 80-min. lectures. Studio 1-3 hrs. Prerequisites: 11:550:341 (Construction 2: Materials & Assemblies) AND 11:550:350 (3D Digital Design & Communication), AND 01:640:115 (Precalculus Mathematics) or 01:640:111/112 (Precalculus Part I and II).

11:550:442 ***Sustainable Landscape Technology (3)***
Integration of specific sustainable practices and technologies can prepare a site to function efficiently and sustainably in the design and construction of landscape architectural projects. Consideration includes siting of features, integration with existing site systems, design for energy/climate, and reuse of site materials.
Prerequisite: 11:550:341 (Construction 2: Materials & Assemblies).

00:550:443 ***Summer Studio Abroad (5)***
Landscape architecture relying on an international setting for case studies and field investigations of landscape planning, design, and management issues.
Prerequisite: Special permission number.

11:550:460 ***Field Study in Landscape Architecture (1-5 BA)***
Case study and field investigation of landscape planning, design, and management issues.
Open only to landscape architecture majors; others with departmental permission.

11:550:461 ***Field Study in Landscape Architecture (3)***
Case study and field investigation of landscape planning, design, and management issues.
Open only to landscape architecture majors; others with departmental permission.

11:550:480 ***Topology and Design (3)***
The term "topology" derives from the Greek words for "place," "space," and "study," "word," "sense". It comprises a theory of place (concept of "genius loci") and a method of presenting arguments in a discourse. As a design approach, topology advocates to pay attention to deeper spatial, physical, poetic and philosophical values in a long tradition of designed nature.

11:550:497 ***Senior Thesis Preparation (1)***
Development of independent research and comprehensive design project proposal, including literature review and research methodology, to be submitted to the departmental faculty for approval.
Prerequisite: Departmental approval.

11:550:498 ***Senior Thesis in Landscape Architecture (4-5)***
Execution of the project proposed in 11:550:497. May not be used in conjunction with the George H. Cook Scholars Program or a cooperative education course.
Prerequisites: 11:550:497 and departmental approval.

11:550:499 ***Landscape Architecture Senior Survey (0)***
Every senior majoring in landscape architecture must complete this 0-credit survey class in order to graduate. This senior survey is necessary for program accreditation and for students to be permitted to take the licensure examination.
Registration by special permission. Graded P/NC.

11:550:550 ***Common Lecture (0)***
This course is a corequisite for all landscape architecture studios.
Corequisites:11:550:231, 11:550:232, 11:550:331, 11:550:332, 11:550:431, 11:550:432.

Leadership Skills 607 Courses (SEBS)

LEADERSHIP SKILLS 607

11:607:101 ***Introduction to Leadership Studies (1.5)***
Students learn about leadership theories, styles, and practices; the importance of social, emotional, and cultural intelligence and communication skills; and the ethical dilemmas that leaders face.
Prerequisites: By permission of instructor.

11:607:200 ***Principles of Leadership (3)***
An introduction to leadership. Topics covered include developing leadership skills, creating a vision, and overcoming obstacles.

11:607:201 ***Stewardship and Leadership (3)***
An introduction to the concept of stewardship and leadership styles. Topics covered include problem solving and decision making, influence, and community development. This course fulfills the SEBS ethics requirement.

11:607:202 ***Leadership and Social Change (3)***
Students examine the theory and practice of service learning as it relates to their academic studies. Students engage in service learning activities within the community.

11:607:203 ***Foundations of Volunteer Management (3)***
Students will compare several models for volunteer management and apply one to examine an organization that depends upon volunteers. Course readings and activities will address how organizations recruit, train, utilize, and recognize their volunteers. Each student will develop a small case study examining the volunteer management in one organization and making recommendations based on the theories and practices studied in class.

11:607:204 ***Self-Leadership (2)***
Self-leadership is the sense of who you are, what you can do, and where you are going coupled with the ability to influence your communication, emotions, and behaviors to get there.

11:607:211 ***Building Leadership Character (1.5)***
Developing character requires an understanding of ourselves and others. The course will build student's knowledge and skills and put character in the context of leadership and ethical decision-making.

11:607:250 ***The Cross-Cultural Leader (3)***
The purpose of this course is to provide students with the purpose, understanding, value, and applicability of building cross-cultural competencies in order to become effective cross-cultural leaders.

11:607:255 ***Inclusive Leadership (1.5)***
This course provides the knowledge and skills needed to demonstrate inclusion that not only creates organizational growth and success, but also fosters belonging and engagement.

11:607:280/281 ***Special Topics in Leadership (BA,BA)***
This course will explore special topics in leadership.

11:607:364 ***Grant Development and Management (3)***
Careers in the nonprofit or governmental (local, state, federal) sectors will likely require a skill set in grant development and management. After completion of this course students will be able to identify grant opportunities, develop a viable proposal, prepare a formal application for funding, and manage a funded project including fiscal and legal responsibilities.
Prerequisite: 01:355:101.

11:607:380 ***Communication for Today's Leader (3)***
Students explore leadership and communication from a theoretical, as well as a practical, hands-on perspective. Course includes application of leadership theories and principles to personal leadership experiences.

11:607:381 ***Presentation Skills: Advocating for Change (3)***
This course will strengthen student presentation and public speaking skills with the leadership focus on advocating for change, participating in civic engagement and promoting community service.

11:607:382 ***Conflict Management Practicum (3)***
Students learn conflict management skills including consensus building, negotiation, and mediation. Conflict theory is explored as a precursor to understanding and enhancing individual conflict management skills.

11:607:383 ***Meeting Management/Parliamentary Procedures (1.5)***
Key concepts of parliamentary procedure, the foundation for decision making, and meeting management are covered. Students learn meeting management techniques and facilitation skills.

11:607:384 ***Emotionally Intelligent Leadership (1.5)***
This course enables students to understand and develop the skills needed to foster emotionally intelligent leadership. Students explore their experiences in leadership with a focus on learning one's strengths and limitations. Students apply critical thinking skills through essays, case study, analyses, and reflective discussion questions.

11:607:385 ***The Ethical Leader (3)***
Students explore the inextricable need for ethics within the realm of leadership. Topics addressed include power and self-interest, the influence of values on leadership, leaders and followers, and leadership for the greatest good.

11:607:388 ***Facilitating Effective Meetings (1.5)***
Ineffective meetings translate into lost time and opportunity, which can result in reduced motivation and erode the leader's credibility. Through effective facilitation skills, leaders establish a sense of common purpose, enhance collegiality, and move the agenda forward. This course will cover the key concepts of meeting management and effective facilitation skills for presenting content, and dealing with challenging participants and unpopular topics.

11:607:400 ***Nonprofit Organization Leadership (3)***
Regardless of title or role, there are ample opportunities to serve in a leadership capacity while working at a nonprofit organization. Whether coordinating a project, chairing a committee, or managing a team, the goal is always to lead effectively. This course will focus on effective leadership for the nonprofit sector. Students will learn about their personal leadership style and develop goals to improve it. Strategic planning, fundraising, lobbying, and advocacy along with managing employees in the nonprofit sector will be addressed.
Prerequisites: 11:607:200 and 203.

11:607:401 ***Foundations of Program Planning (3)***
Students develop the skill set to methodically design, develop, implement, and evaluate educational programs that are effectiveness-based and impact-driven. This course is beneficial for students pursuing careers in health care, public health, human services, education, community development, nongovernmental organizations (NGO), faith-based organizations, nonprofits, government (local, state, federal), foundations, and businesses and corporations.

11:607:402 ***Building Community Partnerships (3)***
This course presents key elements for building collaborative partnerships. Students examine various coalition/community partnership frameworks and models and develop leadership skills necessary to initiate, build, evaluate, and sustain durable coalitions and community partnerships. This course is beneficial for students pursuing careers in health care, public health, human services, education, community development, nongovernmental organizations (NGO), faith-based organizations, nonprofits, government (local, state, federal), foundations, and business and corporations.

11:607:405 ***Capstone Experience in Nonprofit Leadership (3)***
Intended as a capstone to the nonprofit leadership minor, in this course students will use their prior knowledge, skills, and key competencies along with entrepreneurial skills as they develop an organizational business and strategic plan needed for a successful and sustainable nonprofit organization.
Prerequisites: 11:607:200, 203, 381, 386, 400, 401, 402.

11:607:484 ***Practical Leadership Applications in Agricultural Science (4)***
Provides students with relevant knowledge and skills related to agricultural work environment. Classroom instruction coupled with an intensive field experience in the Netherlands provides international perspective while preparing students to be productive contributors in the workplace. Students apply and integrate classroom-taught theories, principles, and skills to authentic situations encountered beyond the classroom. Establishing contacts and developing rapport with agricultural leaders further enhances student growth, development, and opportunities.
Prerequisite: At least one animal science course, plant science course, or general biology; or permission of instructor.

11:607:485 ***Group Process/Team Dynamics (3)***
Presents an introduction to the knowledge, attitudes, and skills needed to become effective team members through the examination of group dynamics and team processes. This course is a junior/senior colloquium.

11:607:486 ***Leadership in Practice: Designing Your Success (3)***
This course is an exploration of leadership from a practical perspective. Theoretical underpinnings, leadership models, styles, and skills of leadership are reviewed. Students develop skills in networking, problem solving, public speaking, and influence. This course is a junior/senior colloquium.

11:607:487 ***Transformational Leadership (3)***
This course presents a critical analysis of the concepts, principles, and practices of transformational leadership and the implications for developing leadership capacity, serving as role model, and influencing decisions and organizational change.

11:607:488 ***International Relations: Leadership for Sustainable Development Practicum--Travel Seminar (4)***
This course is an introduction to leadership and sustainable development within a developing country. Students examine the interrelationship of multiple groups working to build stronger communities. This course is a junior/senior colloquium.

Marine Sciences 628 Courses (SEBS)

MARINE SCIENCES 628 COURSES

11:628:100 ***Oceanography House (1.5)***
This first-year seminar introduces students to the application of technologies used in ocean observing systems. Students work in small groups mentored by undergraduates with prior observing system experience and participate in ongoing research and development.
Intended for all students; no previous science required.

11:628:114 ***Science, Pseudo-Science, and Society (3)***
Science has transformed society's understanding of the natural world. This course will introduce students to the process and use of science. It highlights how scientific understanding sometimes goes against current belief, leading to so-called "controversies."

11:628:120 ***Introduction to Oceanography (3)***
An exploration of the world's ocean and all its complex interactions with the planet. This course touches on a variety of disciplines including biology, geology, chemistry, and environmental sciences.
Intended for all students; no previous science required. Credit not given for both this course and 01:460:120.

11:628:130 ***Sea Monsters and Weird Biology in Earth's Oceans (3)***
The ocean is full of giant sharks, mythic squids, gargantuan worms, and microbes that shape the planet. Biology is continually adapting and evolving, driven by the environment in which it lives. This class uses the ocean to explore how biology adapts and evolves. We will also explore how the ocean shapes our views of nature, assess how the ocean is changing, and consider how sustainable it will be in the future. Our goal is to increase the biological and ocean literacy of students.

11:628:201-203, 205-210 ***Topics: Marine Sciences (1.5)***
Led by faculty in the Center for Ocean Observing Leadership. Specific topics depend on ongoing research on expanding and applying ocean observation technologies.

11:628:204 ***The Water Planet (3)***
Survey of the science, environmental impact, and resource allocation of water on the Earth. Characteristics of water: hydrologic cycle, runoff and erosion, river systems, past and present climates, water quality, political and economic aspects of water.
Intended for all students; no previous science required. Credit not given for both this course and 01:460:204.

11:628:221 ***Human Interactions with the Coastal Ocean (3)***
Study of the processes governing change in the oceans, with emphasis on basic scientific principles and the ways that scientific knowledge can be used to resolve environmental problems.
Intended for all students; no previous science required.

11:628:230 ***Basic SCUBA Diving (1.5)***
This course introduces students to the fundamental academic concepts and practical skills of SCUBA diving as described by PADI (Professional Association of Dive Instructors) standards. The course provides students with the entry-level knowledge and skills necessary to safely participate in SCUBA dives to a depth of 60 feet (18 meters), or shallower.

11:628:309 ***Fishery Science (3)***
Marine and freshwater, commercial and recreational fisheries; behavior of fish populations, fishers, and management institutions as well as the emergent properties of the entire system.
Prerequisite: Permission of the instructor.

11:628:317 ***Aquaculture (3)***
Aquaculture production methods, fish and shellfish growth and reproduction, nutrition, genetics, disease control, economics, environmental consequences, and public policy issues.
Prerequisites: 01:119:115-116,117 and 01:160:161-162. Class meets intensively for 10 days in January at the Haskin Shellfish Research Lab at Bivalve, in Port Norris, New Jersey.

11:628:320 ***Dynamics of Marine Ecosystems (3)***
Overview of the fundamental processes in the marine environment with emphasis on interdisciplinary linkages in the functioning of marine ecosystems. Dynamics in the physics, chemistry, and biology of the oceans will be emphasized.
Prerequisites: 01:640:135 and any ONE of the following courses in biology, chemistry, or physics: 01:119:116; 01:160:162; 01:750:194; 01:750:204.

11:628:321 ***Ichthyology (4)***
The biology of fish with emphasis on functional morphology, ecology, and behavior. Laboratory exercises will center on the identification and anatomy of New Jersey marine and estuarine fishes.
Prerequisite: 01:119:116.

11:628:341 ***Hydrothermal Vents (3)***
Composition and dynamics of deep-sea hydrothermal vent communities and the geology of seafloor spreading centers.
Prerequisites: 01:119:116 and 01:640:135.

11:628:345 ***Scientific Diving I (3)***
Introductory course designed to provide the student with the academics, practical skill applications, and SCUBA diving training to become competent and confident divers. Training will be conducted under the minimum standards of both the American Academy of Underwater Sciences (AAUS) and applicable recreational training agencies toward achieving AAUS Scientific Diving certification.
Prerequisites: Medical statement with medical clearance for scuba diving as needed. Students must demonstrate satisfactory swimming ability, physical stamina, and emotional stability to instructor during the course.

11:628:346 ***Scientific Diving II (3)***
This is the second course of the American Academy of Underwater Science (AAUS) Scientific Diver Certification designed to provide the student with the academic, practical, and SCUBA skills training to meet and exceed AAUS minimum standards for Scientific Diving certification.
Prerequisite: 11:628:345.

11:628:363 ***Oceanographic Methods and Data Analysis: Biology and Chemistry (3)***
Basic techniques to collect, analyze, report, and interpret biological and chemical oceanographic data.
Prerequisite: 11:628:320.

11:628:364 ***Oceanographic Methods and Data Analysis: Physical Processes (3)***
A field and laboratory course in the analytical tools of oceanography, focusing on navigation, GPS, instrumentation for in situ and remote collection of physical and chemical properties of the ocean.
Prerequisite: 11:628:320.

11:628:401 ***Science in Shoreline Management (3)***
Examination of coastal environments based on the use of science in the management of shoreline resources, culminating in a student project evaluating the conversion of shoreline by direct and indirect human action.

11:628:402 ***The Role of Polar Regions in the Earth System (3)***
The polar regions are a central to the Earth system, playing an outsized role in regulating the planet's climate, chemistry, and ecosystems. The polar regions are changing rapidly in response to global warming, with far-reaching impacts on sea level rise, carbon cycling, and other global dynamics. Processes in the Arctic and Antarctic are central to understanding past and future climate variations, biodiversity and marine resources. In this course, we will build on fundamental physical and biological principles to understand the links between the cryosphere, ocean, atmosphere and biosphere in the polar regions. We will explore the drivers of polar change, and the ramifications of these changes for the Earth system and climate.
Prerequisite: 11:628:320 Dynamics of Marine Ecosystems

11:628:405 ***Molecular Microbial Oceanography (3)***
This course will highlight emerging efforts to elucidate the activity, diversity, and evolution of microbial genes and link them to key oceanic ecosystem and biogeochemical processes by merging biochemistry, molecular biology, and genome-based approaches with innovative instrumentation.
Prerequisites: 01:119:116 and (11:628:320 or 11:216:351).

11:628:410 ***Biophysical Interactions: From Barnacles to Jellyfish (3)***
Focuses on understanding how organisms interact with and are affected by their physical fluid environment, including life at low Reynolds numbers, biomechanics, benthic boundary layers, diffusion, and dispersal. Many principles that are relevant for algae and benthic invertebrates also apply to microbes, terrestrial plants and animals, and chemical tracers.
Prerequisite: 11:628:320 and 01:640:136

11:628:421 ***Advanced Geographic Information Systems (3)***
Research and applications in Geographic Information Systems; geodesy and georeferencing; uncertainty and error propagation; multicriteria/multiobjective decision-making; introduction to surface analysis and spatial pattern analysis; change/time series analysis; GIS and society.
Prerequisite: 01:450:321 Introduction to Geographic Information Systems.

11:628:451 ***Physical Oceanography (4)***
Principles of ocean physics. Mass, momentum, heat, and freshwater conservation and atmospheric exchange. Influence of Earth's rotation. The ocean's role in climate. Tides, waves, and currents. Effects of ocean circulation on its biology and chemistry.
Prerequisite: 01:640:136

11:628:452 ***Geophysical Data Analysis (3)***
Quantitative analysis and display of spatial and time series data, filters, spectral analysis, covariance, coherence, confidence intervals, goodness-of-fit, optimal interpolation of unequally spaced data, empirical orthogonal functions, harmonic analysis. Practical exercises in Matlab analysis. Individual projects and presentations.
Prerequisite: 01:640:252.

11:628:461 ***The Biology of Living in the Ocean: Water Column Ecosystems and Processes (3)***
Processes that regulate the biology of the plankton and fish, which drives the community ecology for ocean ecosystems. It covers ecological themes such as the acquisition and transformation of energy and materials, population regulation, competition/predation dynamics, population connectivity, and marine food webs. Also highlights approaches and technologies used to make measurements in the ocean.
Prerequisite: 11:628:320.

11:628:462 ***The Biology of Living in the Ocean: Boundary Ecosystems and Processes (3)***
Processes that regulate the biology, productivity, populations, and communities of organisms at ocean boundaries, including intertidal zones, estuaries, salt marshes, coral reefs, hydrothermal vents, and the sea floor. This course covers ecological themes such as the acquisition and transformation of energy and materials, population regulation, competition/predation dynamics, population connectivity, and marine food webs.
Prerequisite: 11:628:320.

11:628:472 ***Chemical Oceanography (3)***
Chemical description of the sea and how the distributions of chemical species in the world ocean are related to physical, chemical, biological, and geological processes.
Prerequisites: 01:160:162 and 11:628:320.

11:628:474 ***Coastal Biogeochemical Cycles in a Changing World (3)***
Coastal environments are dynamic zones where terrestrial and marine environments meet. They are high-productivity regions of intense biogeochemical cycling that are increasingly challenged by anthropogenic changes including: sea-level rise, ocean acidification, and eutrophication. We will explore four coastal environments from the poles to the tropics while building skills in analysis software.
Cross-listed with 11:375:474. Prerequisites: 11:628:320 or permission of instructor.

11:628:476 ***History of the Earth System (3)***
The Earth as an evolving physical/biological system; physical and biogeochemical processes that have shaped the environment over geologic time.
Prerequisites: Any three of the following: 01:119:116, 01:160:162, 01:750:204, 01:460:101; or permission of instructor.

11:628:497 (Fall), 498 (Spring) ***Special Problems in Marine and Coastal Sciences (BA,BA)***
Practical field/laboratory experience with faculty in the Institute of Marine and Coastal Sciences.
Prerequisite: Permission of instructor.

Meteorology 670 Courses (SEBS)

METEOROLOGY 670 COURSES

11:670:101 ***Introduction to Meteorology (3)***
Overview of current weather maps. Structure of the atmosphere and the role of moisture in the development of dew, clouds, and precipitation. Air masses, fronts, cyclones, thunderstorms, tornadoes, and hurricanes. Elements of forecasting, instrumentation, and communication.
This course satisfies the SAS Natural Sciences [NS] and the SEBS [NS - physical science] Learning Goals.

11:670:102 ***Earth's Changing Climate (3)***
Major mechanisms influencing climate, including Earth's energy balance, water cycle, and atmospheric circulation; spatial distribution of climate and climate classification; natural climate variability, including El Niño; post climate variations; and the carbon cycle and human-induced climate change.
This course satisfies the SAS Natural Sciences [NS] and the SEBS [NS-environmental science] learning goals.

11:670:111,112 ***Weather, Climate, and Television (1.5,1.5)***
Provides a theoretical foundation of television broadcasting and meteorology to supplement the hands-on television experience gained from the WeatherWatcher Living-Learning Community. By examining the history and characteristics of television, critical analyses of news and weather-related programming, and special topics pertaining to meteorology, students will gain a rounded understanding of the medium and its impact on the field of meteorology and broadcasting. This WeatherWatcher Living-Learning Community academic course is required of all first-year residents.
Pre- or corequisite for 111: 11:670:101. Prerequisite for 112: 11:670:111.

11:670:211 ***Meteorological Analysis (3)***
Surface observation codes. Preparation of surface, upper air, and sounding charts. Forecast guidance, weather map interpretation, and preparation of weather forecasts. Map discussions.
Pre- or corequisite: 11:670:101.

11:670:212 ***Computational Methods for Meteorology (3)***
Introduction to the basic concepts of programming and computation for meteorology and earth science students. Elements of compiled and interpreted languages. Development of skills necessary for the reading, analyzing, and plotting of meteorological and climatic data.
Prerequisite: 11:670:211 or permission of instructor.

11:670:296 ***Honors Seminar (3)***
The topic for each semester addresses current issues from the perspectives of the humanities, sciences, and social sciences.
Open only to honors students (SEBS Honors Program, SAS Honors Program, and Honors College) or by permission of instructor.

11:670:323 ***Thermodynamics of the Atmosphere (3)***
Thermodynamics of the atmosphere, energy conservation, ideal gas law, water and its transformations, moist air, aerosols, hydrostatic stability and convection, vertical motion, cloud formation, and precipitation.
Prerequisites: A grade of C or better in 01:640:151 and 01:640:152 and [11:750:193 or (11:750:203 and 11:750:205)] and [11:750:194 or (11:750:204 and 11:750:206)]

11:670:324 ***Dynamics of the Oceans and the Atmosphere (3)***
Hydrodynamics of the atmosphere. Equations of motion on rotating earth. Vorticity, potential vorticity, and divergence. Boundary layer dynamics.
Prerequisites: 11:670:323; a grade of C or better in 01:640:251.

11:670:325 ***Special Topics in Meteorology (BA)***
Topics selected to meet specific needs.

11:670:334 ***Severe Weather Forecasting Field Trip (3)***
Techniques for the forecasting and safe observation of severe convection; case study analysis of observed events. Two-week field trip required.
Prerequisites: 11:670:211 and permission of the instructor.

11:670:414 ***Hydrologic Processes (3)***
Physical processes governing the occurrence and movement of water through the atmosphere, lithosphere, and biosphere. Techniques for collecting and analyzing hydrologic data and predicting the hydrologic states of particular systems.
Open only to Junior/Senior students. Prerequisites: 01:640:151 and (01:750:201 or 01:750:203).

11:670:431 ***Physical Meteorology (3)***
Atmospheric optics; atmospheric radiation and applications to climate; atmospheric convection; cloud and precipitation formation; turbulence and boundary layer processes; atmospheric electricity.
Prerequisites:11:670:323; a grade of C or better in 01:640:251.

11:670:433 ***Weather Analysis and Forecasting I: Synoptic Meteorology (4)***
Dynamics and thermodynamics of the atmosphere applied to current weather situations and case studies. Cyclone and frontal theory, jet streams, and quasi-geostrophic diagnostics. Weather discussions, map analysis, and forecast preparation.
Lecture and laboratory. Prerequisites: 11:670:211 and 324.

11:670:434 ***Weather Analysis and Forecasting II: Mesoscale Meteorology (3)***
Real-time analysis and nowcasting of mesoscale atmospheric phenomena, including heavy snow, cold-air damming, severe weather, and flash floods. Case studies and weather discussions.
Laboratory. Prerequisite: 11:670:433.

11:670:444 ***Tropical Meteorology (3)***
The dynamics and thermodynamics of the tropics, including regional and large-scale tropical circulations and their role in the global general circulation, tropical wave dynamics, convection and convective systems, synoptic, intraseasonal, and seasonal variability; monsoons, the El Niño/Southern Oscillation, tropical cyclones, and hurricanes.
Prerequisite: 11:670:324.

11:670:451 ***Remote Sensing of the Oceans and Atmosphere (3)***
Methods and instruments of observation of the ocean (temperature, salinity, currents, sea state, turbidity, and pollutants) and atmosphere (temperature, water vapor, ozone, clouds, and wind).
Prerequisites: 01:640:251; 01:750:194 or equivalent.

11:670:453 ***Air Quality Modeling (3)***
A theoretical foundation to understand the principles and governing equations regarding chemical transformation and transport of atmospheric pollution; introduction to and practice in computer programming and numerical techniques as used in approaches to study the atmosphere.
Prerequisites: 01:640:251 and (01:160:160 or 01:160:162 or [(01:160:159 or 01:160:161) and 11:670:212])

11:670:461 ***Climate Dynamics (3)***
The climate system and how it is changing due to natural and human causes, including past climate variations, El Niño, global warming, climate modeling, nuclear winter, mitigation options, and geoengineering.
Prerequisites: 11:670:324 and 431.

11:670:481 ***Applications in Industrial Meteorology (1)***
The applied research and project management skill sets used in industrial meteorology. Weather and climate effects on financial markets. Small applied research exercises that simulate authentic industry experiences. Critical appraisals of the methods used to apply weather and climate information in industry. Guest speakers from relevant weather-impacted industries and the Rutgers Business School-Newark and New Brunswick are typically included. Course may be repeated for additional credit.
Prerequisite: 11:670:212.

11:670:493,494 ***Research Problems in Meteorology (BA,BA)***
Independent study on atmospheric projects. Topic and requirements to be determined individually with the supervising instructor.

Microbiology 680 Courses (SEBS)

MICROBIOLOGY 680 COURSES

11:680:101 ***Living in the Microbial World (3)***
This course examines the impact of the microbial world on humankind. Students will be introduced to microorganisms from the beginning of life on a young and very different earth than we see today and follow the evolutionary journey that has shaped the modern world.
This is a lecture course for undergraduates with little or no science background. There are no prerequisites for the course.

11:680:103 ***Microbiology of Agricultural Products in New Jersey (3)***
Explores the science and culture of agricultural products, food and beverage fermentations, such as cheese production, wine and beer fermentation, fermented sausages, and mushroom cultivation. Students will study the complex chemical and biological processes that create different fermented foods, with techniques that blend modern scientific knowledge with traditional values and practices.

11:680:104 ***Introduction to Microbiomes (3)***
This introductory course describes principles of host-associated microbiomes (microbial ecosystems living on humans and animals), including their development, functions, and roles on health. Students will be required to present recently published works on microbiomes.

11:680:201 ***Introduction to Microbiology (3)***
Presents the basic principles of microbiology and examines the microbes that inhabit our planet and their effect on the biosphere. Students will assess the influence of microbiology and 21st-century challenges and opportunities that arise from our changing relationship with and understanding of microbes.
Prerequisites: Two semesters of biology and two semesters of chemistry.

11:680:202 ***Introduction to Microbiology Laboratory (1)***
Introduction to Microbiology Laboratory is a 1-credit course with one three-hour lab per week. The course will be taught by faculty of the Department of Biochemistry and Microbiology, SEBS. This laboratory course will serve as a companion course to Introduction to Microbiology Lecture (11:680:201). It is designed to reinforce the concepts taught in the lecture course and will allow students to apply the knowledge in practice to various microbiology lab topics.
Corequisite: 11:680:201.

11:680:390 ***General Microbiology (4)***
Basic principles of microbiology. An introduction to the physiology, morphology, pathogenicity, and genetics of groups of microorganisms.
Lec. 3 hrs., lab. 3 hrs. Prerequisites: 01:119:115,116, and 117 (formerly 01:119:101-102); 01:160:161-162, 171, and 307.

11:680:395 ***Peer Mentoring in Microbiology (BA)***
The objective of the class is to provide mentorship and guidance in teaching, leadership, and research pertaining to microbiology. Microbiology faculty will serve as mentors to undergraduate students. Students will receive instruction on implementing effective mentoring and teaching strategies that will directly translate to career-oriented skills and skills that can be applied to post-secondary programs. Students will be able to participate in the microbiology course of their choice (from an approved list) and support the faculty with active learning activities, class discussions, or lab demonstrations. Students will also be able to implement their own active learning activity during the last part of the semester. This will fulfill the experiential learning requirement for SEBS and may be used as elective course for the microbiology major.
Prerequisite: 11:680:390 (General Microbiology) with a grade B or higher or equivalent; by permission of instructor.

11:680:401 ***Ethics and Issues in Microbiology (1)***
Discussion of ethical conduct and scientific integrity in relation to the practice of microbiology.
Prerequisite: 11:680:390. Open to microbiology majors. Others by special permission.

11:680:475 ***Microbiomes and Health (3)***
This course provides an overview on the role of microbiome in human health and disease. It focuses on conceptual framework and technologies for understanding how particularly the gut microbiome impacts human health.
Prerequisites: 11:680:390 or 01:447:390 General Microbiology with a C or better; 11:680:201 with a grade of B or better; or permission of the instructor.

11:680:480 ***Microbial Genetics and Genomics (3)***
Applications of genetics and genomics to fundamental biological functions at the molecular and cellular levels in archaeal and bacterial prokaryotes. Recent developments in horizontal gene transfer, quorum sensing, stationary-phase induced mutagenesis, and prokaryotic genome evolution.
Prerequisites: 01:447:380; 11:680:390 or equivalent.

11:680:481 ***Microbial Physiology (3)***
An intensive course with the goal of integrating biochemistry and genetics to enhance the understanding of the microbial cell and the robust and diverse nature of life. This course is intended to be a capstone class for the microbiology major. It will provide the instructors with the opportunity to re-address the learning goals of the microbiology major and address general scientific misconceptions before student graduation.
This course is targeted to advanced juniors or seniors majoring in microbiology, biochemistry, biotechnology, and related fields, as well as graduate students. Prerequisites: Biochemistry: (11:115:403, 11:115:301, 01:694:301, or 01:694:407) and General Microbiology 11:680:390.

11:680:486 ***Analytical Methods in Microbiology (3)***
Hands-on training in the use of analytical instrumentation in microbiological research and applications, including biotransformations and fermentations, biodegredation, and identification of bacteria and fungi.
One 80-min. lec. and one 180-min. lab. Prerequisite: 11:680:394 or 11:115:403 or lab experience by permission.

11:680:491 ***Microbial Ecology and Diversity (3)***
Ecological determinants; characteristics of aquatic and terrestrial ecosystems; nature and activity of microbial populations; biogeochemical cycles and energy flow; microbial interactions and community structures.
Two 80-min. lecs., one 180-min. lab. Prerequisite: 01:447:390 or 11:680:390.

11:680:492 ***Experiments in Microbial Ecology and Diversity (3)***
Combines lectures and laboratory experiments with hands-on training in microbial community structure and function analyses including experimental design in microbiological research and applications. Analytical methods that are introduced include sampling design, extraction of DNA/RNA from environmental samples and their preparation for high throughput sequencing, bioinformatics (QIIME) analyses, design and set up of enrichment cultures, and respiration rate measurements.
Prerequisite: 11:680:491 or equivalent laboratory experience by permission of the instructor.

11:680:494 ***Applied Microbiology (4)***
Microorganisms in foods; their application in industry, agriculture, environment, and medicine. Physical and chemical factors of growth and control in relation to industrial and natural processes.
Lec. 3 hrs., lab. 3 hrs. Prerequisite: 11:680:390 or equivalent.

11:680:495 ***Seminar in Microbiology (1)***
Practice in techniques for oral presentation of scientific reports and reviews, based on search of research literature in microbiology and, where applicable, the student's own research results.
Open only to senior microbiology majors.

11:680:497,498 ***Research in Microbiology (BA,BA)***
Research projects in microbiology under the guidance of faculty members.
Prerequisite: Permission of instructor.

11:680:499 ***Microbiology Senior Exit Survey (0)***
This is a 0-credit Pass/Fail course for graduating microbiology seniors. The exit survey will allow for seniors to evaluate their experience in the major, including coursework and research opportunities, and share their future career plans.

Nutritional Sciences 709 Courses (SEBS)

NUTRITIONAL SCIENCES 709

11:709:101 ***Nutrition for Today (1)***

The aim of this course is to increase the breadth and depth of student knowledge regarding a wide variety of nutrition topics and how to apply them to their daily lives

11:709:102 ***Careers in Nutrition (1)***
Exploration of current and emerging career paths in food and nutrition. Development of professional skill portfolio for successful career preparation and entry.

11:709:201 ***Culinary Nutrition (3)***
Exploration of the science of food principles and application of culinary food preparation principles.

11:709:202 ***Laboratory for Culinary Nutrition (1)***
Culinary nutrition skill development through laboratory experiences focused on food nutritional and sensory quality and ingredient functions & interactions.
Pre- or corequisite: 11:709:201. White lab coat required.

11:709:235 ***Introduction to Sports Nutrition (3)***
An introduction to nutrition for health and athletic performance. This course addresses the process for developing a nutritionally appropriate meal plan for exercise and training.

11:709:245 ***Food Customs and Nutrition Equity (3)***
Exploration of the diverse cultural, migration and acculturation, religious, gender, economic, political, geographic, and climate influences that shape food availability, patterns, customs, and nutrition justice and nutritional health equity.

11:709:255 ***Nutrition and Health (3)***
Introduction to fundamental human nutrition concepts (nutrients, digestion, absorption, metabolism) and the scientific process for creating evidence-based nutrition recommendations.

11:709:296 ***Honors Seminar (3)***
The topic for each semester addresses current issues from the perspectives of the humanities, sciences, and social sciences.
Prerequisite: Open only to honors students (SEBS Honors Program, SAS Honors Program, and Honors College) or by permission of instructor.

11:709:301 ***Food Safety and Sanitation in Food Service (2)***
Fundamentals of food safety and sanitation, microbiological and environmental food pathogens, foodborne disease prevention in commercial and non-commercial food operations, and food safety guidelines, regulations, and

management systems. Hazard analysis of food preparation and processing activities, determination of critical control points, and monitoring procedures and corrective actions to ensure food safety.
Prerequisites: 11:709:201, 11:709:202

11:709:345 ***Nutrition through the Life Span (3)***
Exploration of how nutritional needs change and vary from before and after conception, through gestation, early childhood, adolescence, adulthood, and older age.
Prerequisite: 11:709:255 (Nutrition and Health).

11:709:400 ***Advanced Nutrition: Macronutrients (3)***
Analysis of biochemical and metabolic pathways essential for nutritional homeostasis with a focus on macronutrient metabolism. Integration of genomic science with nutrition and application of biochemical and metabolic pathways in patients with nutrition-related disease states.
Prerequisites: Biochemistry (11:115:403, 11:115:404, 01:694:395, 01:694:407, 01:694:408, or 11:115:301)All prerequisite courses must be completed with a grade of C or better.

11:709:401 ***Advanced Nutrition: Energy and Micronutrients (3)***
Analysis of biochemical and metabolic pathways essential for nutritional homeostasis with a focus on micronutrients and energy metabolism. Integration of genomic science with nutrition and application of biochemical and metabolic pathways in patients with nutrition-related disease states.
Prerequisites: Biochemistry (11:115:403, 11:115:404, 01:694:395, 01:694:407, 01:694:408, or 11:115:301). All prerequisite courses must be completed with a grade of C or better.

11:709:402 ***Advanced Nutrition: Readings in Macronutrients (1)***
Discussion of problems set by instructors of Advanced Nutrition I to develop understanding of the topics covered.
Corequisite: 11:709:400 (Advanced Nutrition: Macronutrients).

11:709:403 ***Advanced Nutrition: Readings in Energy and Micronutrients (1)***
Discussion of problems set by instructors of Advanced Nutrition II to develop understanding of the topics covered.
Corequisite: 11:709:401 (Advanced Nutrition: Energy and Micronutrients).

11:709:404 ***Advanced Nutrition: Clinical Research Practicum (1)***
Critical review of evidence-based literature that informs nutrition and dietetic practice guidelines. Interpretation of nutrition guidelines to lay audiences.
Corequisite: 11:709:400

11:709:410 ***Dietetics in Professional Practice (3)***
Preparation for post-baccalaureate programming required for the Registered Dietitian Nutritionist credential, including exploration of the RDN pathways, clarification of career goals, and professional practice in dietetics.
Prerequisite: 11:709:102

11:709:427 ***Obesity: Biology, Behavior, and Management (3)***
The causes of human obesity, trends in its prevalence, and how it is influenced by biology, society, and public policy.
Prerequisite: 11:709:255. Only open to juniors and seniors.

11:709:440 ***Contemporary Issues in Nutritional Sciences (1-3)***
Investigations of recent trends and issues in nutrition and development.
Prerequisite: Open only to junior and senior majors; others by permission of instructor.

11:709:441 ***Community Nutrition (3)***
The study of teaching, science, evaluation, and politics of community nutrition. Exploration of programs and agencies designed to improve the nutritional status of various populations. Field experience involving community nutrition program needs assessment for diverse cultures.
Prerequisites: 11:709:345

11:709:442 ***Nutrition Education and Communication (3)***
Exploration and application of behavior change theories and models, health communication, education, and evaluation strategies for evidence-based nutrition education and communication in diverse settings. Critical review and interpretation of evidence-based nutrition literature for lay audiences.
Prerequisites:11:709:441 (Community Nutrition).

11:709:443 ***Methods in Sensory Analysis (3)***
Provides a basic background in human orosensory physiology and sensory testing methods.
Prerequisites: 11:709:201 and 255.

11:709:445 ***Problem Solving with Food, Nutrition, and Business Information (3)***
Teamwork is used to solve actual problems encountered by industry partners using information resources.
Prerequisite: Either 11:709:255, 11:400:201, or 11:373:121. Cross-listed as junior/senior colloquium.

11:709:448 ***Food Production and Management (3)***
Application of quantity food production principles in commercial and non-commercial food service operations. Emphasis is on integration of menu creation and analysis; recipe development, HACCP, and costing; budgeting; food procurement; food production; customer service; and management theories.
Prerequisites: 11:709:201, 202, 301 Corequisite: 11:709:449

11:709:449 ***Food Service Lab (1)***
Laboratory experience in a commercial food service operation, with an emphasis on quantity food production and evaluation skill development.
Corequisite: 11:709:448

11:709:475 ***Nutrition and Fitness (3)***
Interactions between nutrition and exercise are examined by integrating metabolism and physiology concepts in the context of recreational physical fitness training. Topics include fluid, macronutrient, and micronutrient requirements for sport and the specific roles that carbohydrates, fats, proteins, vitamins, and minerals play in fueling the body for exercise. Additional topics include nutritional concerns of athletes and dietary supplements.
Prerequisites: 01:119:115-116 and 11:709:255. Open only to juniors and seniors. Credit not given for this course and 01:377:475.

11:709:481 ***Seminar in Nutrition (1.5)***
Review of nutrition journals, critical reading in topics in the history of nutrition, and specific nutrition problems of current interest.

11:709:483 ***Medical Nutrition Therapy I: Nutrition Assessment & Diagnosis (3)***
Introduction to evidence-based methods for assessing nutritional status and diagnosing nutrition-related conditions via application of the Nutrition Care Process. Critical analysis of anthropometric, biochemical, clinical diet, and environmental measurements during nutrition-focused exams.
Prerequisites: 11:115:301 or equivalent Corequisite: 11:709:484

11:709:484 ***Nutrition Therapy Lab (1)***
Application of nutrition assessments and counseling skills through simulations and/or standardized patients.
Corequisite: 11:709:483

11:709:485 ***Medical Nutrition Therapy II: Intervention, Monitoring, & Evaluation (3)***
Integration of disease pathophysiology and functional nutrition for major nutrition-related disease states that will inform nutritional and pharmacological interventions, monitoring, and evaluation of diverse patients using the Nutrition Care Process.
Prerequisites: 11:709:483 and 11:709:484

11:709:489 ***Experimental Foods (4)***
Physical, chemical, sensory, and enzymatic properties of foods; laboratory investigation of effects of alteration in preparation on quality and acceptability.
Prerequisites: 11:709:202 and 01:160:209 or 308 and 01:960:211 or 401. White lab coat required.

11:709:493,494 ***Research in Nutrition (BA,BA)***
Special problems in the field of nutrition.
Prerequisite: Permission of instructor.

Plant Science 776 Courses (SEBS)

PLANT SCIENCE 776 COURSES

11:776:102 ***Soil and Society (3)***
An introduction to soil processes, their role in the ecosystem, basic management concerns, soil quality, human health, and global processes.

11:776:112 ***Introduction to Bioenergy Technologies (3)***
Introductory understanding of biomass and biomass to low-carbon energy systems including biopower, bioheat, and biofuels, with a scientific examination of feedstocks, conversion technologies, and scale up for industrial production, end products, and their applications. The course will also provide understanding of the concepts of sustainability, systems thinking, and Life Cycle Analysis (LCA).

11:776:170 ***Plants and People (3)***
The influence of plants on the economic, social, and cultural history of man, especially as sources of food, shelter, clothing, drugs, and industrial raw materials. Current problems of agriculture, plant industry, medicine, and conservation.

11:176:201 ***People-Plant Relationships (3)***
Examines the roles and meanings of plants and vegetated settings in human well-being and social development. The framework is provided by the four broad areas of: plants and the individual; plants and communities; plants and human culture; and horticultural therapy. This is a hybrid (mostly online) course.
Formerly 11:776:432

11:776:202 ***Applied Physiology of Horticultural Crops (3)***
The physiology of plants and regulation of their growth. Emphasis on the environmental and developmental aspects of plant physiology that allow plants to survive, grow, and reproduce despite transient and seasonal periods of environmental stress.
Prerequisite: One semester biology (01:119:115 or equivalent) or 11:776:242.

11:776:205 ***Introduction to Ethnobotany (3)***
Broad overview of the science of ethnobotany (how people use plants), with emphasis on current research and issues. This is a hybrid (mostly online) course.
Prerequisite: One semester biology (01:119:115 or equivalent) or 11:776:242.

11:776:210 ***Principles of Botany (3)***
Genetics, stresses and stress responses, classification and taxonomy, diversity, reproduction, ecology and evolution in the plant kingdom.
Prerequisite: One semester biology (01:119:115 or equivalent) or 11:776:242.

11:776:211 ***Introduction to Horticulture (3)***
The art and science of horticulture: its historical impact, biology, technology, and industry. Laboratory exercises applying horticultural techniques to growing plants.
Lecture/Lab.

11:776:221 ***Principles of Organic Crop Production (3)***
Cultural management practices that form the basis for organic crop production: soil stewardship, plant health, and avoiding competition without synthetic chemicals. Implementation of cropping techniques and emerging technologies.

11:776:225 ***Horticultural Therapy: Concepts and Skills (3)***
This foundational course discusses concepts and skills in horticultural therapy (HT), including history and theory. Students will learn about services, settings, and populations pertaining to HT, and learn various horticultural therapy techniques to achieve specific goals within treatment, rehabilitation, or vocational plans.

11:776:242 ***Plant Science (3)***
Fundamentals of structure, function, growth and development, metabolism, reproduction, ynamics, manipulation, biotechnology, and the development of new characteristics in plants.

11:776:257 ***Edible and Poisonous Fungi (1)***
Classification of mushrooms with a focus on edible and poisonous types and the use of fungi by human cultures.

11:776:296 ***Honors Seminar in Plant Science (3)***
The topic for each semester addresses current issues from the perspectives of the humanities, sciences, and social sciences.
Prerequisite: Open only to honors students (SEBS Honors Program, SAS Honors Program, and Honors College) or by permission of instructor.

11:776:302 ***General Plant Pathology (3)***
The occurrence, economic importance, symptoms, causes, diagnosis, and control of plant diseases.
Prerequisites: One semester biology (01:119:115 or equivalent).

11:776:304 ***Turfgrass Management (4)***
Growth, development, adaptation, and selection of the major turfgrass species. Principles of establishment, mowing, nutrition, irrigation, and pest control of home lawn, athletic field, golf, and utility turfs.
Lecture/Lab. Recommended: Classes in soils and plant science.

11:776:305 ***Plant Genetics (4)***
Heritable variation, strategies, and consequences of sexual/asexual reproduction, inbreeding and outbreeding. Chromosome structure, behavior, and mapping. Uses of tissue culture and recombinant DNA techniques in plant genetic manipulation.
Prerequisites: General Biology 01:119:115, 116, 117 or equivalent.

11:776:306 ***Weed Science and Management (3)***
Basic principles of weed ecology, management, and economic impact in agriculture, turfgrass, and ornamental landscapes.
Prerequisites: 11:776:242 Plant Science or one semester of Biology (01:119:115 or equivalent)

11:776:310 ***Plant Propagation (3)***
Theory and practice of multiplying plants by seeds and vegetative means such as cuttings, grafts, buds, and layers.
Lecture/Lab. Prerequisite: 11:776:211 or 242.

11:776:311 ***General Plant Pathology Laboratory (1)***
An optional laboratory course utilizing specific techniques and plant diseases to illustrate the basic principles of plant pathology.
Pre- or corequisite: 11:776:302.

11:776:312 ***Medicinal Plants (3)***
Use of plants for medicinal and other purposes; poisonous plants; cross-cultural aspects; chemistry and biological significance of natural products; natural products from higher plants in modern medicine.
Prerequisite: One semester biology (01:119:115 or equivalent) or 11:776:242.

11:776:313 ***Medicinal and Aromatic Plants Laboratory (1)***
Use of plants for medicinal and other purposes; poisonous plants, cross-cultural aspects, chemistry and biological significance of natural products, and natural products from higher plants in modern medicine are discussed.
Pre- or corequisite: 11:776:312.

11:776:321 ***Greenhouse Systems Management (3)***
The greenhouse environment, its manipulation and control in the production of plants. Principles of various technologies, including greenhouse computer control systems and management skills needed to operate greenhouses.
Prerequisite: One semester biology (01:119:115 or equivalent) or 11:776:211 or 242.

11:776:325 ***Horticulture Therapy: Techniques and Programming (3)***
Use of adaptive devices and enabling tools. Methodologies for program evaluation and for documentation of program effectiveness.
Prerequisite: 11:776:225 or permission of instructor.

11:776:341 ***Fruit Production (3)***
The growing of small fruits and grapes. Varieties, fruit-growing systems, and harvesting methods involved in grapes, strawberries, blueberries, brambles, and cranberries.
Prerequisite: One semester biology (01:119:115 or equivalent) or 11:776:242 or permission of instructor. Recommended: 11:776:210 or 211.

11:776:382 ***Plant Physiology (4)***
Water relations, photosynthesis, inorganic nutrition, metabolism of organic materials, and plant growth regulation. Emphasis on environmental factors in the physiology of plants.
Lecture/Lab. Prerequisites: General Biology 01:119:115,116, 117 or equivalent; and General Chemistry 01:160:161,162,171 or equivalent; and 11:776:242. Recommended: Organic Chemistry.

11:776:390 ***Hemp and Medical Cannabis (3)***
The historical, horticultural, economic, legal, and regulatory aspects of plants, and their products, in the genus *Cannabis*.
Prerequisite: One semester biology (01:119:115 or equivalent) and 11:776:211 or 242.

11:776:391 ***Weeds, Diseases, and Insects of Plants (3)***
Study of the common weed, insect, and disease problems that occur during the production and maintenance of plants in production fields, greenhouses and nurseries, residential properties, parks, recreational areas, and forested sites in a plant health care or integrated pest management context.
Prerequisites: 11:776:302 or 11:370:381 or equivalents. Additional coursework in entomology, plant pathology, and the plant sciences is recommended.

11:776:400 ***Fungi in the Environment (3)***
Identification, ecology, and biodiversity of fungi. Laboratory includes sampling techniques, identification and descriptive procedures, culture collections, mycological herbaria, and field trips.
Prerequisites: One semester biology (01:119:115 or equivalent).

11:776:404 ***Soil Management for Sports Fields and Landscapes (3)***
Principles of turf soil science and management. Managing soils for plant nutrition, manipulation for water supply and drainage, efficient irrigation, and use of poor quality water.
Prerequisite: Soils (11:776:102 or 11:375:360 or equivalent).

11:776:405 ***Plant Biosecurity Issues and Technologies (3)***
Introduces the plant health policies and regulations safeguarding agriculture and environmental resources, the interrelationship between risk assessment, risk management and risk communication for plant pests, and plant pest management and eradication measures. Biosecurity technologies for plant pest monitoring and detection including surveillance, bioinformatics, microscopy, Lucid keys for visual identification of pests, ELISA, PCR, and real-time PCR will be introduced accompanied by laboratory exercises.
Prerequisites: One semester biology (01:119:115 or equivalent) and 11:776:242. Recommended: 11:776:302, 11:776:391, and/or 11:370:381.

11:776:406 ***Plant Breeding (4)***
History, theory, and practice of plant breeding.
Prerequisite: One semester biology (01:119:115 or equivalent) and 11:776:242.

11:776:408 ***Turfgrass Pest Science (4)***
Biology, etiology, and management of major turfgrass pests, including fungal, bacterial, and viral pathogens; insects, nematodes, vertebrates, and weeds. Includes a laboratory in diagnostics.
Prerequisites: General Biology 01:119:115,116, 117 or equivalent and 11:776:304; or by permission.

11:776:410 ***Plants and Innovative Technologies for Bioenergy (3)***
Bioenergy and various renewable energy sources from biomass. Associated agronomic and bioenergy traits from biomass sources, and conversion technologies from different biomass sources.
Prerequisites: One semester biology (01:119:115 or equivalent). Recommended: 11:776:242.

11:776:415 ***Fungi and Human Health (3)***
The impact of fungi on human health, nutrition, and drug discovery.
Prerequisites: General Biology 01:119:115, 116, 117 or equivalent.

11:776:425 ***Special Topics in Horticulture Therapy (1-3)***
Independent research in the area horticultural therapy.
Prerequisite: Permission of instructor.

11:776:427 ***Vocational Skills Training in Horticultural Therapy (1-3)***
An internship course will provide students with foundational knowledge of the vocational rehabilitation service system and the skills necessary to provide green-industry job training to individuals with disabilities.
Prerequisites: 11:776:225 Introduction to Horticultural Therapy and/or 11:776:325 Horticultural Therapy Techniques and Programming; or permission of instructor.

11:776:438 ***Plants and Human Health (3)***
The role of plants in human health and nutrition. Plant-based medicinal and dietary supplements and the underlying bioactive compounds are examined as well as associated toxicity and assessment for efficacy and safety.
Recommended: Prior coursework in nutrition, physiology, chemistry, medicinal plants, or related courses.

11:776:439 ***Nursery Crop Production (3)***
Principles, practices, and production of temperate-zone woody ornamental plants. Both field and container growing considered.
Prerequisite: 11:776:211 or 242.

11:776:440 ***Soil Fertility (3)***
Soil-plant relationships in the field and methods of diagnosing deficiencies in soils and plants.
Prerequisite: 11:375:360 or permission of instructor.

11:776:442 ***Agroecology (3)***
Introduces various topics of agroecology including traditional and organic farming, plant and animal production, energy, pest management, specialized and controlled environment agriculture, and sustainable practices.

11:776:452 ***Plant Tissue Culture and Engineering (3)***
Principles and culture techniques of cells, callus, organs, pollen, anthers, embryos, and protoplasts. The applications in clonal propagation and research in breeding, physiology, and pathology.
Prerequisites: One semester biology (01:119:115 or equivalent) or 11:776:210, 211, or 242.

11:776:495,496 ***Special Problems in Plant Science (BA,BA)***
Out-of-classroom or extracurricular activities that combine technical knowledge of the plant science disciplines with practical skill development in the laboratory, greenhouse, or field. Students enroll in Special Problems to receive credit for the experienced-based education requirement for the plant science major.
Prerequisites: Permission of instructor and special problems adviser.

Student to Professional Internship Network (SPIN) 902 Courses (SEBS)

STUDENT TO PROFESSIONAL INTERNSHIP NETWORK (SPIN) 902

11:902:300 ***SEBS Internship I (3)***
First internship registration.
Prerequisite: Permission of director.

11:902:301 ***SEBS Internship II (3)***
Second internship registration.
Prerequisites: 11:902:300 and permission of director.

11:902:400 ***SEBS Coop (6)***
Full-time cooperative education registration.
Prerequisite: Permission of director.

Administration, Centers, and Faculty (SEBS)

ADMINISTRATION, CENTERS, AND FACULTY

Administration

Campus Centers

Faculty

Administration (SEBS)

ADMINISTRATION

Laura J. Lawson, Ph.D. - Executive Dean of Agriculture and Natural Resources

Office of the Executive Dean

Joyce Carlson - Senior Executive Assistant

Executive Leadership Team

Ann Brooks Gould - Dean of Academic Programs

Margaret (Peggy) Brennan-Tonetta - Senior Associate Director, NJAES; Director, Office of Resource and Economic Development

Wendie Cohick - Dean of Research and Graduate Programs, School of Environmental and Biological Sciences; Director of Research, NJAES

Lauren Errickson - Director of Rutgers Gardens and Stewardship, Rutgers Gardens

Megan Francis - Director, Office of Global Engagement

Carl Lelkhram - Senior Director, Office of Public Outreach and Communication

Gabrielle Peterson - Senior Director of Development

Troy Roepke - Associate Dean, Office of Diversity, Equity, and Inclusion

Brian Schilling - Senior Associate Director, NJAES; Director, Cooperative Extension

Mazen Shehat - Senior Associate Dean of Finance and Administration

Graduate Program Directors

Atmospheric Science - Anthony Broccoli

Bioenvironmental Engineering - Uta Krogmann

Ecology and Evolution - Rachael Winfree

Endocrinology and Animal Biosciences - Carey Williams

Entomology - Anne Nielsen

Environmental Sciences - Lisa Rodenburg

Food and Business Economics - Sanjib Bhuyan

Food Science - Beverly Tepper

Landscape Architecture- Richard Alomar

Microbial Biology - Gerben Zylstra

Nutritional Sciences - Carol Byrd-Bredbenner

Oceanography - Yair Rosenthal

Plant Biology - Bingru Huang

Undergraduate Program Directors

Agriculture and Food Systems - Xenia Morin

Animal Science - Aparna Zama

Biochemistry - Lori White

Biotechnology - Paul Meers

Ecology, Evolution, and Natural Resources - Kim Russel

Entomology - Chloe Hawkings

Environmental and Business Economics, Isaac Vellangany

Environmental Engineering - A.J. Both

Environmental Planning - Frank J. Gallagher

Environmental Policy, Institutions, and Behavior - Cara Cuite

Environmental Sciences - Jeffra Schaefer

Food Science - Chitra Ponnusamy

Landscape Architecture - Arianna Lindberg

Marine Sciences - Silke Severmann

Meteorology - Steven G. Decker

Microbiology - Ines Rauschenbach

Nutritional Science - John Worobey

Plant Science - Nrupali Patel

Campus Centers (SEBS)

CAMPUS CENTERS

On-Campus Centers

Center for Deep-Sea Ecology and Biotechnology
Richard Lutz, Director

Center for Urban Environmental Sustainability
Wolfram Hoefer, Director

Center for Vector Biology
Dina Fonseca, Director

Chrysler Herbarium
Lena Struwe, Director

Cook Animal Farm/Animal Care Program
Clint Burgher, Farm Supervisor

Equine Science Center (NJAES)
Karyn Malinowski, Director

Floriculture Greenhouse
Nicoletta Graff, Supervisor

Food Innovation Center - New Brunswick
Nolan Lewin, Director

Grant F. Walton Center for Remote Sensing and Spatial Analysis
Richard Lathrop, Director

Hort Farm 3 and Research Greenhouses
Joe Florentine, Director

New Jersey Institute for Food, Nutrition, and Health
Wendie Cohick, Acting Director

Rutgers Against Hunger

Rutgers Center for Lipid Research
George M. Carman, Director

Rutgers Center for Ocean Observing and Leadership (RUCOOL)
Scott Glenn and Josh Kohut, Codirectors

Rutgers Ecological Preserve
Richard Lathrop, Director

Rutgers Gardens
Lauren Errickson, Director

Turfgrass Center
Jim Murphy, Director

Water Resources Research Institute (NJAES)
Chrisopher Obropta

Off-Campus Centers

Clifford E. and Melda C. Snyder Research and Extension Farm (NJAES)
Peter Nitzsche, Director

Food innovation Center, South
Nolan Lewin, Director

Haskin Shellfish Research Laboratory (NJAES)
David Bushek, Director

Hutcheson Memorial Forest Center (SEBS)
Myla Aronson, Director

Jacques Cousteau National Estuarine Research Reserve (NJAES)
Michael De Luca, Manager

Philip E. Marucci Center for Blueberry and Cranberry Research & Extension (NJAES)
Peter Oudemans, Director

Rutgers Agricultural Research & Extension Center, Upper Deerfield, NJ (NJAES)
Daniel Ward, Director

Rutgers EcoComplex (NJAES)
Serpil Guran, Director

Rutgers Specialty Crop Research and Extension Center (NJAES)
Mark Robson, Director

Youth Center for Outdoor Education, Lindley G. Cook 4-H Camp (NJAES)
Ben Clawson, Director

Faculty (SEBS)

FACULTY

Faculty (SEBS)

Department of Agricultural, Food, and Resource Economics

Department of Agricultural, Food, and Resource Economics

Chair: Ramu Govindasamy, Cook Office Building

Professors:

Sanjib Bhuyan, B.Sc., Assam Agricultural (India); M.Sc., Asian Institute; M.S., Nebraska; Ph.D., Connecticut

Michael Camasso, B.A., King College; M.A., Virginia; M.S.W., Marywood; Ph.D., Pennsylvania State

Carl E. Pray, B.A., Carlton, Ph.D., Pennsylvania

Ramu Govindasamy, B.S., Tamil Nadu Agricultural (India); M.S., Ph.D., Iowa State; M.B.A., Newport

Gal Hochman, B.A., Ben Gurion, M.A., Tel Aviv (Israel); M.Phil., Ph.D., Columbia

Yanhong Jin, B.A., M.S., Renmin (China); M.A., M.S., Ph.D., California (Berkeley)

Edmund M. Tavernier, B.S., Tuskegee; M.S., Ph.D., Minnesota

Associate Professors:

Paul D. Gottlieb, A.B., Harvard; M.P.A., Ph.D., Princeton

Brian Schilling, Director of Rutgers Cooperative Extension, B.S., M.S., Ph.D., Rutgers

Isaac Vellangany, B.A, Sacred Heart college, B.Ed., St. Xavier's College; B. Phil., Gnanadeepa Vidyapeeth; M.A., Ph.D., Baroda (India); M.B.A., Rutgers

Faculty (SEBS)

Department of Animal Sciences

Department of Animal Sciences

Chair: Nicholas Bello, Bartlett Hall, Room 106

Distinguished Professors:

Dipak K. Sarkar, B.Sc., M.Sc., Ph.D., Calcutta; D.Phil., Oxford

Professors:

Carol A. Bagnell, B.A., Glassboro State; M.S., West Virginia; Ph.D., Georgia

Nicholas T. Bello, B.S., Pennsylvania State; M.S., Drexel College of Medicine; Ph.D., Pennsylvania State

Wendie S. Cohick, B.S., Cornell; M.S., Illinois (Champaign-Urbana); Ph.D., Cornell

Kenneth H. McKeever, B.S., California State Polytechnic (Pomona); M.S., Fresno State; Ph.D., Arizona

Troy A. Roepke, B.S., Long Island (Southampton College); M.A., San Francisco State; Ph.D., California (Davis)

Carey A. Williams, B.S., Colorado State; M.S., Ph.D., Virginia Tech

Aparna M. Zama, B.Sc., Osmania (India); M.Sc., Hyderabad (India); Ph.D., University of Georgia

Associate Professors:

Elizabeth M. Snyder, B.S., Western Washington;Ph.D., Washington State

Mehmet Uzumcu, D.V.M., Ankara (Turkey); M.S., Ph.D., Ohio State

Assistant Professors:

Meli'sa S. Crawford, B.S., University of Arizona; Ph.D., Arizona State

Igor O. Shmarakov, B.S., M.S., Ph.D., Yuriy Fedkovich Chernivtsi National (Ukraine); Sc.D., Taras Shevchenko Kyiv National (Ukraine)

Tess C. Stahl, B.S., Delaware Valley; M.S., Ph.D., New Hampshire

Teaching Instructors:

Henry Bignell, B.S., North Carolina State; M.S., Rutgers

Tobi Ogunribido, B.S., M.S., Federal University of Technology (Nigeria); Ph.D., Purdue

Taylor Ross, B.S., M.S., Nebraska (Lincoln); Ph.D., Texas A&M

Faculty (SEBS)

Department of Biochemistry and Microbiology

Department of Biochemistry and Microbiology

Chair: Max Häggblom, Lipman Hall Room 121

Distinguished Professors:
Debashish Bhattacharya, B.S., M.E.S., Dalhousie (Canada); Ph.D., Simon Fraser (Canada)
G. Charles Dismukes, B.S., Lowell Technical Institute; Ph.D., Wisconsin (Madison)
Max M. Häggblom, B.S., M.S., Lic. Ph., Ph.D., Helsinki (Finland)
Gerben J. Zylstra, B.S., Calvin College (Grand Rapids, MI); Ph.D., Michigan (Ann Arbor)

Professors:
Yana Bromberg, B.A., SUNY (Stony Brook); M.Phil., Ph. D., Columbia
Keith R. Cooper, B.S., William & Mary; M.S., Texas A&M (Galveston); Ph.D., Rhode Island; M.S., Thomas Jefferson
Maria Gloria Dominguez Bello, B.S., Simón Bolívar (Venezuela); M.S., Ph.D., Aberdeen (Scotland)

Costantino Vetriani, M.S., Rome La Sapienza (Italy); Ph.D., Rome Tor Vergata (Italy)
Ning Zhang, B.S., Shandong (China); M.S., Chinese Academy of Sciences; Ph.D., Louisiana State
Liping Zhao, B.S., Shanxi Agricultural, (China); Ph.D., Nanjing Agricultural (China)

Associate Professors:
Jeffrey Boyd, B.S., Iowa State; Ph.D., Utah State
George Pieczenik, B.A., Harvard; M.S., Miami; Ph.D., New York
Lori A. White, B.A., M.S., Maine; Ph.D., Dartmouth

Assistant Professor:
Arkadiusz (Arek) Kulczyk, M.S., Jagiellonian (Poland); Ph.D., Cambridge

Assistant Teaching Instructor:
Kyle Murphy, B.S., Ph.D., Rutgers
Ines Rauschenbach, PhD. Rugers
Natalya Voloshchuk, B.S., CUNY (Brooklyn); M.Ph., Ph.D., CUNY (New York)

Teaching Instructors:
Sharron Crane, B.A., Rider; Ph.D., Rutgers
Karla Esquilín-Lebron, B.S., Puerto Rico; Ph.D., Wisconsin-Madison
Ramaydalis Keddis, B.S., Puerto Rico; Ph.D., Rutgers
Kessler McCoy-Simandle, B.S., Pittsburg; Ph.D., Northwestern

Faculty (SEBS)

Department of Ecology, Evolution, and Natural Resources

Department of Ecology, Evolution, and Natural Resources

Chair: Siobain Duffy, Foran Hall, Room 316

Professors:

Joanna Burger, B.S., SUNY (Albany); M.S., Cornell; Ph.D., Minnesota

Siobain Duffy, B.A., Rutgers; M.S., Ph.D., Yale

Robert M. Goodman, B.S., Ph.D., Cornell

Jason Grabosky, Ph.D., Cornell

Henry John-Alder, B.A., Franklin and Marshall College; M.S., Pennsylvania State; Ph.D., California (Irvine)

Richard G. Lathrop Jr., B.A., Dartmouth; M.S., Ph.D., Wisconsin (Madison)

Julie Lockwood, B.S., M.S., Georgia Southern; Ph.D., Tennessee

Peter J. Morin, B.S., Trinity College; Ph.D., Duke

Lena Struwe, B.Sc., Stockholm; Ph.D., Minnesota

Rachael Winfree, B.A. Dartmouth, Ph.D., Princeton

Associate Professors:

Juan Bonachela B.S., M.S., Ph.D., Granada

Brooke Maslo, B.S., Maryland; Ph.D., Rutgers

John Wiedenmann, B.S., New Hampshire; M.S., Washington; Ph.D., California (Santa Cruz)

Assistant Professors:

Myla Aronson, B.S., Cornell; M.S., Ph.D., Rutgers

Chi Chen, B.E., Wuhan; MA, Ph.D., Boston

Associate Teaching Professors:

Marci S. Meixler, B.S., B.A. Rutgers; Ph.D., Cornell

Kimberly N. Russell, B.A., Colgate; Ph.D., Tennessee (Knoxville)

Suzanne Sukhdeo, B.Sc., British Columbia (Canada); M.Sc., McGill (Canada); Ph.D., Toronto (Canada)

Assistant Teaching Professors:

Allyson Salisbury, B.S., Susquehanna; M.S., Rutgers; Ph.D., Rutgers (New Brunswick)

Research Associates:

Michael Allen, B.S., Rutgers, Ph.D., Rutgers (New Brunswick)

Faculty (SEBS)

Department of Entomology

Department of Entomology

Chair: Dina Fonseca

Professors:
Lena B. Brattsten, M.S., Lund's (Sweden); Ph.D., Illinois

Dina Fonseca, B.A., Coimbra (Portugal); M.S., Central Michigan; Ph.D., Pennsylvania

George Hamilton, B.A., Eastern Connecticut State; M.S., Missouri; Ph.D., Rutgers

Albecht Koppenhöffer, B.S., M.S., Friedrich-Wilhelms(Germany); Ph.D., Geissen (Germany)

Cesar Rodriguez-Saona, B.A., Universidad Nacional Agraria (Peru); M.S., Oregon State; Ph.D., California (Davis)

Associate Professors:
Anne Nielson, B.S. Virginia Tech; M.S., Ph.D., Rutgers

Dana Price, BS. Rutgers; Ph.D. Rutgers

Changlu Wang, B.S., Beijing Forestry (China); M.S., Chinese Academy of Forestry (China); Ph.D., West Virginia

Assistant Professors:
Chloe Hawkings, B.S. Swansea (UK); M.S. Florida; Ph.D. Texas

Alvaro Toledo, Universidad Complutense de Madrid (Spain)

Faculty (SEBS)

Department of Environmental Sciences

Department of Environmental Sciences

Chair: Anthony Broccoli, Environmental and Natural Resource Sciences Building, Room 252A

Professors:

A.J. Both, B.S., M.S., Wageningen (Netherlands); Ph.D., Cornell

Anthony J. Broccoli, B.S., M.S., Ph.D., Rutgers

Enrique Curchitser, B.S., M.S., Ph.D., Rutgers

Donna F. Fennell, B.S., Arkansas; M.S., Ph.D., California (Davis)

Daniel Gimenez, B.S., National University of Tucuman (Argentina); M.S., Agricultural Wageningen (Netherlands); Ph.D., Minnesota

Weilin Huang, B.S., Zhongshan (China); Ph.D., Institute of Geochemistry (China); Ph.D., Michigan

Uta Krogmann, B.S., M.S., Rhenish Westphalian Technical (Germany); Ph.D., Technical (Hamburg-Harburg) (Germany)

Benjamin Lintner, B.S., Texas A&M; Ph.D., California (Berkeley)

Gediminis Mainelis, M.S., Vilnius (Lithuania); Ph.D., Cincinnati

Mark Miller, B.S. Ohio; M.S., Ph.D., Pennsylvania State

Christopher Obropta, B.S., M.S., New Jersey Institute of Technology; Ph.D., P.E., Stevens Institute of Technology

John Reinfelder, B.A., Johns Hopkins; Ph.D., Stony Brook University

Ying Fan Reinfelder, B.S., Beijing Institute of Civil Engineering (China); M.S., Utah; Ph.D., Utah State

Alan Robock, B.A., Wisconsin; S.M., Ph.D., Massachusetts Institute of Technology

Lisa Rodenburg, B.A., Wittenberg; Ph.D., Johns Hopkins

Peter F. Strom, B.S., Massachusetts Institute of Technology; M.S., Ph.D., Rutgers

Christopher Uchrin, B.E., M.E., Manhattan College; Ph.D., Michigan

Nathan Yee, B.Sc., McGill (Canada); Ph.D., Notre Dame

Lily Young, B.A., M.S., Cornell; Ph.D., Harvard

Assistant Professors:

Katherine Dawson, B.A., Goucher; Ph.D., Pennsylvania State

Mary Whelan, B.A., New College of Florida; Ph.D. California (Berkeley)

Associate Research Professor:

Robert Miskewitz, B.S., Pennsylvania State; M.S., Ph.D., Stevens Institute of Technology

Jeffra Schaefer, B.A., California (Berkeley); Ph.D., Rutgers

Assistant Research Professors:

Taewon Han, B.E., M.A., Keimyoung (South Korea); M.S., Ph.D., Texas A&M

Dujuan Kang, Ph.D., Stanford

Beth Ravit, Ph.D., Rutgers

Teaching Professor

Craig Phelps, B.S., Cornell; M.S., Ph.D., Rutgers

Associate Teaching Professors:

Steven G. Decker, B.S., Iowa State; M.S., Ph.D., Wisconsin

Assistant Teaching Professors:

Abigail Porter, B.S., Rutgers; Ph.D., Cornell

Faculty (SEBS)

Department of Food Science

Department of Food Science

Chair: Donald W. Schaffner, Food Science

Professors:

George Carman, B.A., William Paterson; M.S., Seton Hall; Ph.D., Massachusetts

Michael Chikindas, B.S., M.S., Yerevan (Armenia); Ph.D., All Union Research Institute of Genetics (Moscow)

Chi-Tang Ho, B.S., National Taiwan; M.S., Ph.D., Washington (St. Louis)

Qingrong Huang, B.S., Shanghai University of Science and Technology; M.S., Ph.D., Nebraska (Lincoln)

Mukund Karwe, B.S., IIT (India); M.S., Ph.D., Rutgers

Karl Matthews, B.S., Iowa State; M.S., Ph.D., Kentucky

Loredana Quadro, M.S., Ph.D., University of Naples (Italy)

Donald W. Schaffner, B.S., Cornell; M.S., Ph.D., Georgia

Beverly J. Tepper, B.S., Northeastern; M.S., Ph.D., Tufts

Kit L. Yam, B.S., M.S., Ph.D., Michigan State

Associate Professors:

Diana Roopchand, B.Sc, Ph.D., McGill (Canada)

Karen M. Schaich, B.S., Purdue; Sc.D., Massachusetts Institute of Technology

Paul Takhistov, B.S., National Technical University of the Ukraine; M.S., Notre Dame; Ph.D., Academy of Science of the USSR

Adjunct Member:

Thomas Hartman, Ph.D., Rutgers

Teaching Assistant Professor:

Chitra Ponnusamy, M.Sc., Ph.D., SNDT Women's University (India)

Faculty (SEBS)

Department of Human Ecology

Department of Human Ecology

Chair: Rachael Shwom, Cook Office Building, Room 202

Professors:

William K. Hallman, B.S., Juniata; M.A., Ph.D., South Carolina

Pamela McElwee, B.A., Kansas; M.Sc., Oxford; Ph.D., Yale

Rachael Shwom, B.A., Syracuse; M.A., Duke; Ph.D., Michigan State

Associate Professors:

Karen O'Neill, B.A., San Francisco; M.A., Ph.D., California (Los Angeles)

Cymie R. Payne, M.A., Fletcher School of Law and Diplomacy; J.D., Berkeley School of Law

Ethan Schoolman, B.A., University of Chicago; M.A. Princeton; Ph.D., University of Michigan

Associate Extension Specialist::
Cara L. Cuite, B.A., Union; M.A., Ph.D., Rutgers

Associate Teaching Professor:

Mary L. Nucci, A.B., Mount Holyoke; M.A., Ph.D., Rutgers

Assistant Professors:

Victoria Ramenzoni, B.A. Universidad de Buenos Aires; M.A., Ph.D. University of Georgia

Assistant Teaching Professors:

Jack L. Harris, B.A. Rutgers; MCIS Rutgers; Ph.D Rutgers.

Professors Emeritus:

Caron Chess, B.A., New York; M.S., Michigan; Ph.D., SUNY

George F. Clark, B.A., Rutgers; M.A., Maine; Ph.D., Rutgers

Peter J. Guarnaccia, B.A., Harvard; M.A., Ph.D., Connecticut

Bonnie J. McCay, B.A., Portland State; M.Phil., Ph.D., Columbia

Thomas K. Rudel, B.A., Princeton; M.Phil., Ph.D., Yale

Neil Weinstein, B.S., Wisconsin; Ph.D., Harvard

Faculty (SEBS)

Department of Landscape Architecture

Department of Landscape Architecture

Chair: Richard Alomar, RLA

Distinguished Professor, Executive Dean:

Laura J. Lawson, B.S., California (Santa Cruz); M.L.A., Ph.D., California (Berkeley)

Professors:

Anette Freytag, B.A. , M.A., Austria (University of Vienna), Ph.D., ETH Switzerland

David Tulloch, B.S.L.A., Kentucky; M.L.A., Louisiana State; Ph.D., Wisconsin

Associate Professors:

Jean Marie Hartman, B.S., M.S., Wisconsin; Ph.D., Connecticut.

Richard Alomar, B.S., University of Puerto Rico at Mayaguez ; M.L.A., Louisiana State

Wolfram Hoefer, Dr.-Ing., Technische Universität München (Germany)

Kathleen John-Alder, B.A., Oberlin; B.S., Rutgers; M.S., Pennsylvania State; M.E.D., Yale

Assistant Professors of Practice:

Frank Gallagher, B.A, Rutgers; M.A., Montclair State; Ph.D., Rutgers

Holly Grace Nelson, B.A., Yale; M.L.A., Virginia

Assistant Teaching Professors:

Anita Bakshi, B.A., Illinois (Chicago); M. Arch., California (Berkeley); Ph.D., Cambridge

Arianna Lindberg, B.A., Hope; M.L.A., Rutgers

Vincent Javet, B.U.R.P.I,, Toronto Metropolitan; M.L.A., Toronto

David Smith, B.A., Antioch; M.S., Rutgers

Faculty (SEBS)

Department of Marine and Coastal Sciences

Department of Marine and Coastal Sciences

Chair: Oscar Schofield, Marine and Coastal Sciences, Room 104 F

Professors:

Kay D. Bidle, B.S., Maryland; Ph.D., California (San Diego/Scripps)

David Bushek, B.S., Ohio State; M.S., Houston; Ph.D., Rutgers

Robert J. Chant, B.S., SUNY (Buffalo); Ph.D., SUNY (Stony Brook)

Paul G. Falkowski, B.S., M.A., CUNY (City College); Ph.D., British Columbia (Canada)

Scott M. Glenn, B.S., Rochester; Sc.D., Massachusetts Institute of Technology/Woods Hole Oceanographic Institution

Ximing Guo, B.S., Qingdao Ocean (China); M.S., Ph.D., Washington

Lee J. Kerkhof, B.S., California (Berkeley); Ph.D., California (San Diego/Scripps)

Josh Kohut, B.S., College of Charleston; Ph.D., Rutgers

Richard A. Lutz, B.A., Virginia; Ph.D., Maine

James R. Miller, B.S., Massachusetts Institute of Technology; M.A., Ph.D., Maryland

Yair Rosenthal, B.Sc., M.S., Hebrew (Jerusalem); Ph.D., Massachusetts Institute of Technology/Woods Hole Oceanographic Institution

Oscar M. Schofield, B.A., Ph.D., California (Santa Barbara)

Robert M. Sherrell, B.A., Oberlin; Ph.D., Massachusetts Institute of Technology/Woods Hole Oceanographic Institution

Elizabeth Sikes, B.A., Wesleyan; Ph.D., Massachusetts Institute of Technology/Woods Hole Oceanographic Institution

John L. Wilkin, B.E., Auckland (New Zealand); Ph.D., Massachusetts Institute of Technology/Woods Hole Oceanographic Institution

Associate Professors:

Heidi Fuchs, B.S., Wyoming; Ph.D., Massachusetts Institute of Technology/Woods Hole Oceanographic Institution

Daphne Munroe, B.S., Simon Fraser; Ph.D., British Columbia

Grace Saba, B.S., UC California (Santa Barbara); Ph.D., William and Mary

Silke Severmann, B.S., Albrechts Universitat Kiel (Germany); M.S., Ph.D., Southampton

Assistant Professors:

Juan Bonachela, B.S., M.S., Ph.D., Granada (Spain)

Benedict Borer, B.S., ETH Switzerland, M.S., Imperial (London), Ph.D., ETH Switzerland

Travis Miles, B.S., M.S., North Carolina State; Ph.D., Rutgers

Fiorella Prada, B.S., M.S., Parma (Italy), Ph.D., Bologna (Italy)

Danielle Santiago Ramos, B.A. Amherst; Ph.D. Princeton

Associate Teaching Professors:

Daniel Barone, B.S., M.A., Stockton, Ph.D., Rutgers

Assistant Teaching Professor:

Alex Lopez, B.S, M.A.T., New Jersey, Ph.D., Rutgers

Research Professors:

Maxim Y. Gorbunov, M.S., Ph.D., Moscow State

Associate Research Professors:

Thomas Grothues, B.A., California (Santa Barbara); Ph.D., SUNY (Stony Brook)

Julia Levin, B.S., Moscow Oil and Gas Academy; M.S., Ph.D., Columbia

Kim Thamatrakoln, B.S., Ph.D., California (San Diego)

Assistant Research Professors:

Javier Zavala-Garay, B.S., Autonoma (Baja California) (Mexico); Ph.D., Colorado

Research Associate:

Karen Bemis, B.A., Rice; M.S., Massachusetts Institute of Technology/Woods Hole Oceanographic Institution; Ph.D., Rutgers

L. Fernado Pareja, B.S., Andes (Colombia), M.S., Nacional (Colombia), Ph.D., Rutgers

Presidential Postdoctoral Researchers:

Corday Selden, B.S., Eckerd College, Ph.D., Old Dominion

Assistant Research Professors:

Kaixuan Bu, B.E., M.S., Donghua, Ph.D., Mississippi

Lisa Auermuller, M.S., UNC Chapel Hill

Scuba Instructors:

Deborah Miller, B.A., Pittsburgh, M.S.W., Rutgers PADI Course Director, DAN, ASDI & HSA Instructor, Program Coordinator, Dive Safety Officer

Faculty (SEBS)

Department of Nutritional Sciences

Department of Nutritional Sciences

Chair: Joshua Miller, Food Science and Nutritional Sciences Building, Room 107

Undergraduate Curriculum Coordinator: John Worobey, Davison Hall, Room 208

Professors:

Tracy Anthony, B.S., Virginia Tech; M.S., Ph.D., Illinois (Urbana-Champaign)

Dawn Brasaemle (Emeritas), B.S., Maine; Ph.D., Wisconsin

Paul Breslin, B.A., M.A., Ph.D., Pennsylvania

Carol Byrd-Bredbenner, B.S., M.S., Florida State; Ph.D., Pennsylvania State

Mackenzie Ferrante, B.S., Washington; M.S., Idaho; Ph.D., Colorado State

Hans Fisher (Emeritus), B.S., Rutgers; M.S., Connecticut; Ph.D., Illinois

Peter Gillies (Emeritus), B.Sc., Ph.D., McMaster

Daniel J. Hoffman, B.S., St. John's; M.S., Catholic; M.P.A, Boston; Ph.D., Tufts

Debra Palmer Keenan (Emeritas), B.S., M.Ed., Cincinnati; Ph.D., Pennsylvania State

Joshua Miller, B.A., Swarthmore College; M.S., Ph.D., Tufts

Sue A. Shapses, B.S., Syracuse; M.S., Ph.D., Columbia

Judith Storch, B.A., Brooklyn College; M.S., Ph.D., Columbia

Malcolm Watford, B.S., Trent Polytechnic (UK); D.Phil., Oxford (UK)

John Worobey (Emeritus), B.A., Rutgers; M.S., Ph.D., Pennsylvania State

Associate Professors:

Joseph Dixon, B.S., SUNY (Binghamton); M.S., Ph.D., Wisconsin

Nurgül Fitzgerald, M.D., Hacettepe (Turkey); M.A., Simmons College; Ph.D., Connecticut

Harini Sampath, B.S., New Hampshire; Ph.D., Wisconsin

Assistant Teaching Professors:

Pinkin Panchal, B.S., Rutgers; M.S., UMDNJ

Salome Papaspyrou Rao, B.Sc., California (Berkeley); M.Sc., Cornell; Ph.D., Rutgers

Virginia Quick (Dietetics Director), B.S., M.S., Ph.D., Rutgers

Instructor of Supervised Practice

Sarah Cullen, MHS, RD

Faculty (SEBS)

Department of Plant Biology

Department of Plant Biology

Chair: Donald Kobayashi, Foran Hall, Room 338

Distinguished Professors:

Bingru Huang, B.S., Hebei (China); M.S., Shandong (China); Ph.D., Texas Tech

Eric Lam, B.S., SUNY (Stony Brook); Ph.D., California (Berkeley)

Pal Maliga, M.S., Eötvös Loránd (Hungary); Ph.D., József Attila (Hungary)

Ilya Raskin, B.S., Brandeis; Ph.D., Michigan State

Mark G. Robson, B.S., M.S., MPH, PhD, Rutgers

James Simon, B.S., Empire State; M.S., Oregon State; Ph.D., Massachusetts

Nilgun Tumer, B.A., Agnes Scott; Ph.D., Purdue

Professors:

Stacy Bonos, B.S., Gettysburg; M.S., Ph.D., Rutgers

Andrea Gallavotti, B.S., Ph.D., Milan (Italy)

Thomas Gianfagna, B.S., Cornell; M.S., Virginia Polytechnic; Ph.D., Cornell

Joseph R. Heckman, B.S., Ohio State; M.S., Maryland; Ph.D., North Carolina State

Donald Y. Kobayashi, B.S., Washington; Ph.D., California (Riverside)

Thomas Leustek, B.A., M.S., Ph.D., Rutgers

James Murphy, B.S., Western Illinois State; M.S., Ph.D., Michigan State

Peter Oudemans, B.S., New Brunswick (Canada); M.S., Guelph (Canada); Ph.D., California (Riverside)

Lena Struwe, B.S., Ph.D., Stockholm (Sweden)

James F. White, B.S., M.S., Auburn; Ph.D., Texas

Ning Zhang, B.S., Shandong (China); M.S., Systematic and Lichenology Laboratory, Institute of Microbiology, Chinese Academy of Sciences; Ph.D., Louisiana State

C. Andrew Wyenandt, B.S., Cornell; M.S., The Ohio State; Ph.D., The Ohio State

Associate Professors:

Faith Belanger, B.A., Rochester; Ph.D., Illinois

Thierry E. Besancon, B.S., Lorraine (Nancy, France); M.S., Rhone-Alpes Higher Institute of Agriculture (Lyon, France); Ph.D., North Carolina State

Raul I. Cabrera, B.S., Ingeniero Agrónomo en Horticultura (México); M.S., Ph.D., California (Davis)

Edward F. Durner; B.S., Maryland; M.S., Virginia Tech; Ph.D., North Carolina State

Matthew Elmore, B.S., Penn State; M.S., Ph.D., Tennessee

Joseph Goffreda, B.S., Rutgers; Ph.D., Cornell

Ann Brooks Gould, B.S., M.S., Illinois State; Ph.D., Kentucky

Michael Lawton, B.S., Bristol (UK); Ph.D., Oxford (UK)

Thomas Molnar, B.S., Ph.D., Rutgers

Xenia Morin, B.S., Toronto (Canada); M.S., Ph.D., Cornell

Daniel L. Ward, B.S., Ohio State; M.S., Southern Illinois; Ph.D., Virginia Tech

Qing-Li Wu, B.S., Anhui College of Traditional Chinese Medicine (China); M.S., Ph.D., Beijing Union Medical College and Chinese Academy of Medical Sciences (China)

Assistant Professors:

Sonia Arora, B.S., M.S., Delhi (India); Ph.D., Rutgers

Ming-Yi Chou, B.S., National Taiwan; M.S. Ecole Superieure De Commerce De Dijon (France); Ph.D., Cornell

Rong Di, B.S., South China College of Tropical Crops; M.S., Ph.D., Iowa State

Joshua A. Honig, B.S., M.S., Ph.D., Rutgers

John McLaughlin, B.S., Moravian College; M.S., Ph.D., Minnesota

Paul Meers, B.A., Illinois Wesleyan; Ph.D., Cornell

Nrupali Patel, B.S., Rhodes (South Africa); M.S., Tennessee; Ph.D., North Carolina State

Gina M. Sideli, B.S., Stony Brook; M.S., California State (Chico); Ph.D., California (Davis)

Mark Zander, B.S., Ph.D., Georg-August (Germany)

Instructors:

Gary L. Altman, B.A., Rowan; M.S., Rutgers

Academic Policies and Procedures (SEBS)

ACADEMIC POLICIES AND PROCEDURES

Note: See the **University Policies and Procedures** section in the Rutgers Main catalog for university-wide academic policies and procedures.

Scholastic Standing

Academic Credit

Academic Advising and Support Services

Registration and Course Information

Disciplinary Hearing Procedures

General Information (MGSA)

GENERAL INFORMATION

History and Aims of the School

Admission

Scholarships

Facilities

History and Aims of the School (MGSA)

HISTORY AND AIMS OF THE SCHOOL

Established in 1976, Mason Gross School of the Arts at Rutgers, The State University of New Jersey, comprises a vibrant community of nearly 1,200 creators--dancers, filmmakers, musicians, theater artists, visual artists, and designers unafraid to take risks as they collaborate with our renowned faculty of professional working artists. Mason Gross graduates emerge, not merely with a degree, but with a commitment to making innovative and purposeful contributions to the wider community--onstage, backstage, in the gallery, the classroom, the studio, and beyond. Mason Gross School of the Arts nurtures **curiosity**, **skill**, **critical thought**, and **innovation** in creating art and scholarship that touches hearts, challenges minds, imparts joy, and awakens a sense of shared humanity. We uphold the highest standards of inclusive excellence in artistry, pedagogy, and scholarship while affirming the role of the arts in shaping the world around us.

Mason Gross offers undergraduate and graduate degrees in art & design, dance, filmmaking, music, and theater, as well as courses and programs in the arts for the wider university and public programming for the community at large. Our faculty are leading the way in creating challenging, rewarding curricula that celebrate the diversity of the arts and prepare students for a wide range of career paths.

Situated just 45 minutes from New York City and a little over an hour from Philadelphia, Mason Gross serves as the flagship public arts conservatory at Rutgers, a Big Ten research university serving more than 66,000 students. Rutgers is the nation's eighth-oldest institution of higher learning and a member of the prestigious Association of American Universities. Students at Mason Gross benefit from our distinctive identity as an arts conservatory within a leading public research university in a richly diverse region with a robust arts scene. Our students have access to major research collections in the Rutgers University Libraries and a vast array of extra- and co-curricular activities.

Courses in the arts are taught on the New Brunswick and Piscataway campuses and online.

Admission (MGSA)

ADMISSION

All applicants to Mason Gross School of the Arts must complete two applications: the Rutgers University application AND the Mason Gross talent assessment. The talent assessment collects applicant talent through audition, interview, or portfolio. An additional submission fee, separate from the Rutgers University application fee, is required on the Mason Gross talent assessment. Mason Gross applicants are reviewed by faculty members for both admission and merit scholarship based on the Mason Gross talent assessment. Applicants receive information on how to access the Mason Gross talent assessment **after** the Rutgers University application is submitted. For deadlines, submission fees, and audition/portfolio requirements, visit here.

Regardless of U.S. residency status, an English proficiency examination is required of all applicants whose secondary schooling has been outside of the U.S. in a country where English is not the principal language. Score reports must be from tests taken within the past two years and submitted directly to us from the testing service. To review acceptable exams and minimum scores, visit here.

For any questions about the application and admissions process, contact admissions@mgsa.rutgers.edu.

Scholarships (MGSA)

SCHOLARSHIPS

Students are selected for these awards by the Mason Gross School of the Arts Scholarship Committee. Inquiries should be addressed to the Office of the Dean.

Jozefa Kwapinska Anshutz Endowed Music Scholarship. Awarded to a full-time undergraduate student majoring in music; based on academic merit and financial need.

William G. Becker Scholarship. Awarded to a full-time undergraduate student majoring in any string instrument demonstrating high musical and academic promise with financial need.

Joe and Nancy Benincasa Scholarship. Awarded to a full-time undergraduate student majoring in any string instrument demonstrating high musical and academic promise with financial need.

John I. Bettenbender Theater Arts MFA Award. Awarded to full-time M.F.A. students enrolled in design, stage management, costume technology, directing, or playwriting; established in line with the university's mission for diversity. Based on academic merit and financial need.

The Barbara and James Betts Scholarship in the Visual Arts. Awarded to undergraduate or graduate visual arts student(s) based on financial need and artistic excellence.

Linda and Jim Bodycomb Endowed Scholarship. Up to two (2) scholarship awards may be made each year among full-time or part-time undergraduate or graduate students based on financial need. Preference will be given to students studying theater at the Mason Gross School of the Arts with technical concentrations which include but are not limited to costume design, set design, sound and lighting.

Ralph Bown Jass Studies Scholarship. Awarded to part-time or full-time undergraduate or graduate students studying Jazz based on academic merit and financial need.

Carla Allen Caesar Endowed Memorial Scholarship. Awarded to full-time undergraduate or graduate students majoring in Theater at the Mason Gross School of the Arts. Preference will be given to female students with artistic merit as determined by the program administrator.

Colonel Robert B. and Charlotte M. Craig Glass Armonica Fellowship. Awarded to full-time students pursuing a terminal degree in music with an interest in learning to play the glass armonica; based on academic and artistic merit.

Lyda J. Craig Endowed Fund. Awarded to a student studying visual arts at Mason Gross School of the Arts, with a preference given to a student with a concentration in painting, sculpture, or ceramics.

Anna J. Cramer Music Scholarship. Awarded to a full-time undergraduate student based on academic merit. Preference will be given to those who are music majors with a concentration in performance.

Mary Elizabeth Davison Music Scholarship. Awarded to a worthy music student with financial need for the study of voice or an instrument.

Malcolm Dodds Music Scholarship. Awarded to full-time undergraduate or graduate students. Preference to an African-American student enrolled in music. Based on academic merit.

Florence Schnepf Domeshek Memorial Merit Scholarship. Awarded to full-time undergraduate or graduate dance majors based on artistic and academic merit.

David Drinkwater Endowed Scholarship. Awarded to students majoring in keyboard with a preference for students studying organ. Recipients may be encouraged to give a recital at the end of the year.

Electronic Theatre Controls Scholarship in Lighting Design. Awarded to part-time or full-time undergraduate students studying lighting design based on academic merit and financial need.

William Esper Endowed Scholarship. Awarded to full-time students enrolled in the acting program at Mason Gross School of the Arts.

William B. Fielder Endowed Jazz Scholarship. Awarded to music students studying primarily jazz, trumpet, and classical trumpet. Based on academic merit and artistic talent, with a preference given to those exhibiting financial need.

Charlotte Durham Frazier Scholarship. Awarded to an undergraduate or graduate student studying organ (preferably), otherwise any keyboard instrument or choral conducting with financial need.

Lolita Cabrera Gainsborg Memorial Scholarship. Awarded to encourage undergraduate or graduate students to reward and encourage students to study piano. Based on academic merit.

Leila Durham Gladwell Memorial Scholarship. Awarded to an undergraduate or graduate student studying organ (preferably), otherwise any keyboard instrument or choral conducting.

Penelope Dara Genesin Memorial Scholarship. Awarded to full-time or part-time undergraduate or graduate students based on academic merit and financial need. Preference will be given to students majoring in Music focusing on applied music, composition, or conducting; and/or students majoring in Theater Arts who play a principal role in a performance.

Leon Golub Scholarship. Awarded to first- or second-year graduate students enrolled in the visual arts program at Mason Gross School of the Arts.

Elliot and Janet Greene Scholarship. Awarded to full-time undergraduate students majoring in theater. Based on academic merit and financial need. Recipient should be a New Jersey resident.

Hamangia Foundation Annual Fellowship. Awarded to full-time graduate students of art and design studying ceramic sculpture. Based on academic merit and financial need.

Regina B. Heldrich Endowed Scholarship. Scholarships are to be awarded to undergraduate or graduate music majors studying voice or classical instrumental performance.

Gregory Hines Dance Power Endowed Scholarship. 1) Awarded to students in dance or theater arts; based on artistic merit. 2) Full-time undergraduate minority student enrolled in dance or theater based on merit.

Hanya Holm Scholarship Fund. Recognizes outstanding work by a B.F.A. junior or senior in dance. This award will be given to help defray tuition expenses.

Jane C. Inge Scholarship. Awarded to students majoring or active in the field of drama; based on financial need.

Sylvia S. Kapp Memorial Scholarship. Awarded to music majors from Middlesex County, NJ, with preference to residents of East Brunswick; based on academic excellence.

Henry W. and Helen S. Kaufmann Music Scholarship. Awarded to graduate students for the study of music at Mason Gross School of the Arts.

John Kazanijan Fellowship Fund for Mason Gross School of the Arts. Awarded to students who are matriculated in degree programs in music at Mason Gross School of the Arts, maintain a 3.0 or higher GPA, and may be engaged in research or performance.

Dan Kluchinski Memorial Endowed Scholarship. Awarded to full-time undergraduate students based on financial need who have the equivalent number of credits to be considered in their third or junior year, who are members of the Glee Club, studying one of the 21 majors offered at the School of Environmental and Biological Sciences as of the Fall Semester 2017, and exhibiting evidence of commitment and leadership in the musical life and/or management of the Glee Club.

Professor Eric Krebs and Suzanne Krebs Endowed Scholarship. Awarded to full-time or part-time undergraduate students to support and encourage students of theater.

Kelly Kriedeman Endowed Scholarship. Awarded to graduate students, preferably female, in the fall of their final year of the acting program.

Irene Messner Laureyns Opera Scholarship. Awarded to full-time undergraduate or graduate students enrolled in the Department of Music at Mason Gross School of the Arts, based on academic merit. Recipients must have a particular interest in opera performance and/or opera production, majoring in voice performance and participating in an opera production, or be participants in the Opera Institute at the Mason Gross School of the Arts.

Philip and Janice Levin Mason Gross Scholarship. Awarded to students majoring in drama and the theater arts program associated with the the Levin Theater.

Eugene H. and Lois A. Lockfield Scholarship. Awarded to undergraduate or graduate students studying jazz based on academics and financial need.

Dr. Debra Lynch and Paul Sypchala Scholarship. Awarded to undergraduate or graduate students studying theater based on academic merit and financial need.

Marching Band Scholarship. Awarded to students participating in the marching band.

Stephanie Morris Marryott Scholarship. Awarded to undergraduate or graduate students based upon faculty evaluation or relevant application materials such as an audition in the case of performance, jazz, or music education students; based upon financial need.

Edna S. Mason Scholarship. Awarded to talented and worthy students pursuing a professional degree in music, with preference given to those pursuing a career in piano.

Victoria J. Mastrobuono Memorial Opera Scholarship. Awarded to full-time undergraduate or graduate students interested in opera performance and/or opera production at Mason Gross School of the Arts.

Victoria J. Mastrobuono Memorial Scholarship. Awarded to full-time undergraduate or graduate students enrolled at Mason Gross School of the Arts.

Victoria J. Mastrobuono Memorial Theater Scholarship. Awarded to full-time undergraduate or graduate students majoring in theater at Mason Gross School of the Arts.

Patricia Mayer Scholarship. Awarded to incoming first-year students who demonstrate outstanding talent as dancers to help defray tuition expenses.

Steven J. Mento Ph.D Marching Band Endowed Scholarship. Awarded to full-time undergraduate students in the Mason Gross School of the Arts based on academic merit and financial need. Student recipients must be a current member of the marching band.

Monmouth Arts Foundation Endowed Scholarship. Awarded to students from Monmouth County, New Jersey, on a rotating basis in classical piano, visual or performing arts, or jazz or jazz composition.

Robert E. Mortensen Endowed Fellowship Fund. Financial aid for a graduate student in choral conducting or undergraduate students in the Mason Gross School of the Arts registered in both the Glee Club and Kirkpatrick Choir (or other mixed ensemble at the direction of choral activities).

NOE Memorial Scholarship. Provides financial assistance to students majoring in music.

Frank P. and Lilly A. Novak Endowed Scholarship. Awarded to full-time students in visual arts, with a preference given to students studying painting, sculpture, or ceramics.

Presser Foundation Scholarship. Awarded to an outstanding music major at the end of his or her junior year.

Edward W. Price Scholarship. Awarded to a Rutgers University Marching Band member.

Louis T. Rege and Lou Costello Endowed Scholarship. Awarded to students enrolled in the Department of Theater Arts at Mason Gross School of the Arts; preference given to students who reside in the state of New Jersey.

Pee Wee Russell Scholarship. Awarded to students with financial need and demonstrated musical proficiency in jazz.

Rutgers Class of 1953 Endowed Scholarship. Awarded to full-time undergraduate students in any of the four departments of Mason Gross School of the Arts based on academic merit and artistic talent.

Rutgers Class of '79 Merit Scholarship. Awarded to an undergraduate who was in the top 10 percent of his or her secondary school and maintains at least a B (3.0) cumulative average during matriculation at the university.

Catherine Mortola Saldarini Memorial Scholarship. Awarded to undergraduate or graduate students studying classical piano; based upon academic merit and artistic ability.

Ron Sauers Endowed Scholarship. Awarded to full-time or part-time undergraduate or graduate students studying the arts at Mason Gross School of the Arts, based on academic merit and financial need.

W. Robert and Leona Schare Music Scholarship. Awarded to a full-time student with a preference to those who demonstrate excellence in performances and are enrolled in a program which results in a degree in music; financial need is considered.

Edie Schlosser Memorial Art Scholarship. Awarded to undergraduate students majoring in Visual Arts based on financial need.

Jean V. Shaw Estate Organist Scholarship. Awarded to a student studying organ.

Jean V. Shaw Estate Pianist Scholarship. Awarded to a student studying piano.

Liu Shiming Art Foundation Endowed Visual Arts Scholarship. Awarded to part-time or full-time undergraduate or graduate students studying sculpture or drawing based on academic merit and financial need.

Fran and Ray Stark Film Prize. Awarded to an undergraduate or graduate students pursuing filmmaking (film concept, teleplay, screenplay, or computer generated material).

Peter Stroud Scholarship. Awarded to first- or second-year graduate students enrolled in the visual arts program at Mason Gross School of the Arts.

Percy Such Cello Scholarship. Awarded to a string player.

Anne Moreau Thomas Endowed Scholarship. This award supports the Rutgers University Glee Club with a scholarship fund for students needing financial aid; preference is given to those studying music at Mason Gross.

Paul Trilling Scholarship. Awarded to minority music majors at Mason Gross School of the Arts. Preference will be given to students majoring in violin, viola, or cello; other instruments may be considered.

Margery Turner Endowed Scholarship Fund in Dance. Awarded to a full-time undergraduate student based on talent and potential in the field as determined by the program and financial need as demonstrated by the Office of Financial Aid.

University DanceWorks Scholarship. Awarded to incoming first-year students who demonstrate outstanding talent as dancers to help defray tuition expenses.

Deborah B. Waksman Scholarship. Awarded to a music student.

Allan E. Warner Scholarship. Awarded to a music student.

Robert Watts Memorial Graduate Scholarship. Awarded to students entering the M.F.A. program in visual arts who have an impact on the development of contemporary art and demonstrate financial need.

Stanley West MGSA '70 Annual Music Scholarship. Scholarship recipients will be selected among full-time undergraduate or graduate students based on academic merit, as determined by the program administrator, and financial need, as determined by the Office of Financial Aid.

Facilities (MGSA)

FACILITIES

The administrative offices of the Mason Gross School of the Arts and those of the art & design department and the Rutgers Filmmaking Center are located in the Civic Square Building in New Brunswick. Art & Design studios and classrooms also are located in the Livingston Art Building on the Livingston campus.

Facilities (MGSA)

Art and Design

Art and Design

The Department of Art & Design's facilities are in downtown New Brunswick and on the Livingston campus in Piscataway. These two campuses house studio classrooms, fabrication workshops, computer labs, seminar rooms, lecture halls, and the Mason Gross Galleries at Civic Square.

Most art and design classes meet in the Civic Square Building (CSB), in which there are project spaces, critique rooms, a woodshop, and a lighting studio for students to photograph artwork. CSB's five Mac computer labs are equipped with workstations, scanners, and printers tailored to the specific requirements of our specialized areas. Additionally, the photography area has black and white darkrooms and large-scale digital printers, and the media area maintains audio and video recording and editing facilities with the latest software programs. There is also a dedicated room with a wall-sized green-screen for chromakeying photo and video. CSB also houses FORUM, a multi-purpose lecture, performance and critique space, and CHANNEL, a time-based media exhibition gallery.

The Livingston Arts Building (LAB) houses the department's sculpture facilities, including workshops for wood, metal, and ceramics. Individual studios, a gallery, and space for students to work outdoors are also found at LAB. Across the street from LAB, Art & Design students also have access to the Rutgers Makerspace workshop that includes 3D printers, digital plotters, laser-cutters, and other digital fabrication equipment. Studio spaces for M.F.A. students and some advanced B.F.A. undergraduates are available at both CSB and LAB.

The spacious Mason Gross Galleries in the Civic Square Building (4200 square-feet) present nine annual exhibitions by students, alumni, faculty, and staff. All exhibits are free and open to the public.

Facilities (MGSA)

Dance

Dance

The dance department is housed on the Douglass campus in New Brunswick. The Nicholas Music Center contains dance studios, faculty and staff offices, student locker rooms, a student lounge, and the Soma Center, which operates as a fully equipped Pilates, conditioning, and rehabilitation center.

The Victoria J. Mastrobuono Theater is a 335-seat proscenium theater used for the presentation of productions featuring the work of guests, faculty, and student artists.

The Loree Dance Theater is a 220-seat black box theater used for daily dance technique classes, as well as for performances by students, faculty, and visiting guest artists.

Mortensen Hall houses the dance department executive offices, a large public atrium, and the Kevin Goetz Studio for Theater and Dance. Corwin Lodge is also used for dance classes and student rehearsals.

Facilities (MGSA)

Filmmaking

Filmmaking

The Rutgers Filmmaking Center offers students access to large-sensor, high-end digital cameras, such as the Black Magic URSA Mini Pro 4.6k, with the use of interchangeable lenses, as well as professional audio and lighting equipment. The center also has a 4K color Correction Suite with DaVinci Resolve and a Surround Sound Mixing Suite. Classrooms are equipped with Adobe Creative Suite, ProTools, and 2-D and 3-D animation software. Facilities feature a suite of classrooms that include a production studio with lighting grid, a green screen cyclorama, and a 24-hour access editing lab.

For our full list of equipment and facilities, please click here.

Facilities (MGSA)

Music

Music

The Department of Music facilities is a part of the Mason Gross Performing Arts Center on the Douglass campus.

The Marryott Music Building is the department's main administrative building and features the Schare Recital Hall, a 100-seat intimate recital venue.

Robert E. Mortensen Hall opened in fall 2013 and includes the Richard H. Shindell Choral Hall, a state-of-the-art recording studio, the Presser Foundation Practice Suite, the Bauer Music Room, the Kevin Goetz Studio for Theater and Dance, and an atrium with a café where students can congregate and enjoy refreshments.

The Department of Music's primary performance venue is Nicholas Music Center, a beautiful 740-seat concert hall. Performances also take place at Voorhees Chapel on the Douglass campus and in Kirkpatrick Chapel on the College Avenue campus.

The New Brunswick Performing Arts Center, which opened in fall 2019, is the newest Mason Gross School of the Arts facility. This venue houses two theaters of 465 and 253 seats, and an 86-foot stage, equipped with an orchestra pit. The Performing Arts Center partners with the George Street Playhouse, Crossroads Theater, American Repertory Ballet, New Brunswick Cultural Center, and Mason Gross School of the Arts to accommodate musicals, drama, dance, opera, lectures, and other musical events.

The Blanche and Irving Laurie Music Collection, housed adjacent to the department in the Mabel Smith Douglass Library, includes a major collection of books, scores, recordings, and other resources for the scholar and the performing musician. The Mabel Smith Douglass Library is also home to the Performing Arts Seminar Room, a state-of-the-art space for graduate and undergraduate classes, and the Sharon A. Fordham Computer Lab, which serves as the department's computer lab.

The Department of Music facilities include classrooms, performance and rehearsal spaces, studios, faculty offices, and practice rooms.

Facilities (MGSA)

Theater

Theater

Each season our students, often joined by professional theater artists and sometimes on their own, study, facilitate, design, build and perform seven to ten productions. These productions are presented in unique theater spaces that afford the students a wide variety of experiences.

Performance facilities include the Philip J. Levin Theater, a flexible black box theater with 200 seats; the Victoria J. Mastrobuono Theater, a state-of-the-art, 335-seat proscenium theater; and the intimate, 60-seat Jameson Studio Theater.

The department has well-equipped production facilities, including a scene shop, a property shop, a costume production shop, and a sound studio.

Teaching facilities include a costume teaching shop, a lighting laboratory, a computer-assisted design laboratory, two design studios, a movement studio, and three acting/rehearsal studios.

Degree Requirements (MGSA)

DEGREE REQUIREMENTS

Requirements

Graduation

Requirements (MGSA)

REQUIREMENTS

Please consult the Mason Gross School of the Arts website for updated program information, including departmental handbooks and curricular checklists.

Requirements (MGSA)

Credits and Residency

Credits and Residency

The total number of credits required for graduation is a minimum of 120 credits and can exceed that depending on the student's major program. In no instance may a student graduate with fewer than 120 credits and a cumulative grade-point average of less than 2.0.

Incoming first-year students starting a bachelor's degree in art and design, dance, filmmaking, music, and theater should expect to spend a minimum of four years in resident study. These residency requirements are applicable even if college credit was completed during high school.

Transfer students entering Mason Gross programs are subject to review by the departments, which will determine the length of time required to graduate. Transfer students should expect a minimum of two years, but in most instances, will require three or more years to complete their degree.

Each candidate for the bachelor's degree must earn a minimum of 30 of the last 42 credits at Rutgers. Individual programs may have minimum grade requirements for core courses in the degree.

For students transferring to the Department of Music at Mason Gross, although course credits for applied music (performance) courses may transfer, the applied music performance level at Mason Gross is determined by placement from the department.

Requirements (MGSA)

Liberal Arts Requirements

Liberal Arts Requirements

In addition to completing the prescribed program of study in their major as outlined in the Programs of Study chapter later in this section, students must take courses in the following liberal arts categories:

Natural Sciences: life sciences, chemistry, geological sciences, marine and coastal sciences, meteorology, physics and astronomy, anthropology*, cognitive sciences*, exercise science*, sport management*, geography*, School of Environmental and Biological Sciences*
*Not all courses in these departments fulfill this requirement.

Social Science and History: communication, criminal justice, economics, education, environmental policy, exercise and sports science, information technology and informatics, labor studies and employment relations, Latin American studies, political science, Africana studies, African area studies, American studies, Asian studies, history, Latino and Caribbean studies, medieval studies, Middle Eastern studies, South Asian studies, women's and gender studies, planning and public policy, psychology, public health, sociology, anthropology*, European studies*, geography*, Jewish studies*, journalism and media studies*
*Not all courses in these departments fulfill this requirement.

Humanities: archaeology, African, Middle Eastern, and South Asian languages and literatures, American Sign Language, Armenian, Catalan, Chinese, classics, comparative literature, French, German, Greek, Hindi, Hungarian, Italian, Japanese, Korean, Latin, philosophy, Polish, Portuguese, religion, Russian, Spanish, Ukrainian, American studies*, art history*, cinema studies*, English*, European studies*, Jewish studies*, journalism and media studies*, linguistics*, Middle Eastern studies*, South Asian studies*
*Not all courses in this department fulfill this requirement.

Second Writing Intensive or Literature: English, comparative literature, foreign language literature (original or translation, check with your adviser before you enroll)

Quantitative/Technical Skills: mathematics, computer science, statistics, research methods in a department, 01:355:415 Information Design, 01:355:425 Web Authoring, 04:547:320 Web Design, 01:730:201 Introduction to Logic, 01:615:201 Introduction to Linguistic Theory, 01:070:335 Analysis of Archaeological Data, 01:070:395 Quantification of Archaeological Data, 04:192:300 Communication Research, 01:202:307 Criminal Justice Research Methods, 01:377:275 Basic Statistics for Exercise Science, 14:440:127 Introduction to Computers for Engineers, 14:440:221 Engineering Mechanics: Statistics, 01:450:319 Quantitative Methods, 01:450:320 Spatial Data Analysis, 01:450:330 Geographical Methods, 01:711:295 Introductory Topics in Operations Research, 10:762:205 Basic Statistical Methods for Policy, Planning, and Health, 01:790:300 Introduction to Political Science Methods, 01:830:200 Quantitative Methods in Psychology, 01:920:311 Introduction to Social Research, 01:920:312 Computer Analysis of Social Science Data, 04:189:103 Information Technology and Information, 07:577:201 Practical Finance for Entrepreneurial Creatives

Mason Gross Liberal Arts Core Requirements

Part One: Areas of Inquiry (24 credits)
This area allows students to encounter multiple modes of scholarship, research, analysis and synthesis.

A. Natural Science (Minimum 3 credits)

Learning Goals

- Understand and apply basic principles and concepts in the physical or biological sciences
- Explain and be able to assess the relationship among assumptions, method, evidence, arguments, and theory in scientific analysis

B. Social Science and History (Minimum 3 credits)

Learning Goals

- Understand the bases and development of human and societal endeavors across time and place
- Explain and be able to assess the relationship among assumptions, method, evidence, arguments, and theory in social and historical analysis
- Understand different theories about human culture, social identity, economic entities, political systems, and other forms of social organization
- Identify and critically assess ethical issues in social science and history

C. Arts and Humanities (Minimum 3 credits)

Learning Goals

- Examine critically philosophical and other theoretical issues concerning the nature of reality, human experience, knowledge, value, and/or cultural production
- Analyze arts and/or literatures in themselves and in relation to specific histories
- Understand the nature of human languages and their speakers
- Engage critically in the process of creative expression

D. Liberal Arts Elective (to reach a total of 24 credits)

Part Two: Cognitive Skills and Processes (9 credits)
This area provides undergraduates with a solid foundation in areas that are critical for success in academic study and research.

A. Writing (3 credits): College Writing 101

Learning Goals

- Communicate complex ideas effectively in standard written English to a general audience and respond effectively to editorial feedback from peers, instructors, and/or supervisors through successive drafts and revision.

B. Literature or Second Writing-Intensive Course (3 credits)

Learning Goals

- Communicate effectively in modes appropriate to a discipline or area of inquiry
- Evaluate and critically assess sources and use the conventions of attribution and citation correctly
- Analyze and synthesize information and ideas from multiple sources to generate new insights

C. Quantitative/Technical Skills (3 credits)

Learning Goals

- Employ current technologies to access information, to conduct research, and to communicate findings
- Analyze and critically assess information from traditional and emergent technologies
- Understand the principles that underlie information systems

Total Credits: 33

Where permitted by the department, students may count up to 12 credits already required by the major.

Changes in Basic Skills Requirements

* All students are required to take both the English and the math placement tests.

The **Liberal Arts Core Requirements** listed above form a framework that has been approved by the Mason Gross Curriculum Committee. Students must consult the Assistant Dean for Advising and Student Success and/or their departmental Advisor and Student Success Counselor to learn how these requirements are to be fulfilled. The guidelines for fulfillment vary by department.

Dance
Part I (24 credits)
A. Natural Science (3): 07:206:325 Kinesiology
B. Social Science and History (6)
*General Psychology (01:830:101) is required for students tracking into the Ed.M. program in Dance Education)
C. Arts and Humanities (6)
D. Liberal Arts Electives (9)

Part II (9 credits)
A. Writing and Communication (3): 01:355:101 College Writing
B. Literature or Second Writing Intensive Course (3): 01:355:201 Research in Disciplines
C. Quantitative/Technical Skills (3): 07:206:237 Dance Production

Total Credits: 33

Design
Part I: Areas of Inquiry (24 credits)
A. Social Science and History (6)
B. Arts and Humanities (12)
01:082:105 Art History 105
01:082:106 Art History 106

01:XXX:XXX Art History or Cinema Studies elective
One Contextual Studies course; choose **one** from below:
04:189:152 The Structure of Information
04:567:275 Social Media and the Participatory Culture
11:550:133 Architectural Design
04:567:333 Media and Popular Culture
C. Liberal Arts Electives (6)

Part II: Cognitive Skills and Processes (9 credits)
A. Writing and Communication (3): 01:355:101 Expository Writing
B. Literature/Writing Contemporary Art (3)
07:081:200 Seminar in Contemporary Art A
or
01:355:201 Research in the Disciplines
C. Quantitative/Technical Skills (3)

Total Credits: 33

Filmmaking
Part I (24 credits)
A. Natural Science (6)
B. Arts and Humanities (12)
01:082:106 Introduction to Art History
01:175:201 Introduction to Film I
01:175:202 Introduction to Film II
01:175:XXX Cinema Studies Elective
C. Social Science and History (6)

Part II (9 credits)
A. Writing and Communication (3): 01:355:101 College Writing
B. Literature or second Writing Intensive (3)
C. Quantitative/Technical Skills (3)

Total Credits: 33

Music (Composition)
Part I: Areas of Inquiry (21 credits)
A. Natural Science (3)
B. Social Science and History (3)
C. Arts and Humanities (3)
D. Liberal Arts Electives (12)

Part II: Cognitive Skills and Processes (9 credits)
A. Writing and Communication (3): 01:355:101 College Writing
B. Literature or second Writing Intensive (3)
C. Quantitative/Technical Skills (3)

Total Credits: 30

Music (Music Education)

Part I: Areas of Inquiry (21 credits)

A. Natural Science (3)

B. Social Science and History (12)

01:830:101 General Psychology

01:830:331/333 Infant and Child Development or Adolescent Psychology

05:300:306 Educational Psychology

05:300:383 Introduction to Special Education

C. Arts and Humanities (6)

XX:XXX:XXX Music in Historical and Cultural Context Elective

05:300:401 Individual/Cultural Diversity in the Classroom

Part II: Cognitive Skills and Processes (9)

A. Writing and Communication: 01:355:101 College Writing

B. Literature or second Writing Intensive (3)

C. Quantitative/Technical Skills (Math, 01:640:100-level or above) (3)

Total Credits: 30

Music (Jazz, Performance)

Part I: Areas of Inquiry (24 credits)

A. Natural Science (3)

B. Social Science and History (3)

C. Arts and Humanities (3)

D. Liberal Arts Electives (15)

Part II: Cognitive Skills and Processes (9 credits)

A. Writing and Communication (3): 01:355:101 College Writing

B. Literature or second Writing Intensive (3)

C. Quantitative/Technical Skills (3)

Total Credits: 33

Theater (Acting)

Part I: Areas of Inquiry (27 credits)

A. Social Science and History (3): 07:966:417 British Art and Culture

B. Arts and Humanities (3): 07:966:281 Theater History

C. Liberal Arts Electives (21)

07:965:282 Theater History II

07:965:370 Global Theater I

07:965:473 Clothing and Culture I

Liberal arts electives (12)

Part II: Cognitive Skills and Processes (6 credits)

A. Writing and Communication (3): 01:355:101 College Writing

B. Literature (3): 07:966:427 Shakespeare's Plays

Total Credits: 33

Theater (Design)

Part I: Areas of Inquiry (24 credits)

A. Social Science and History (3): 07:966:417 British Art and Culture

B. Arts and Humanities (3)

07:965:281 Theater History

C. Liberal Arts Electives (18)

07:965:282 Theater History II

07:965:370 Global Theater

01:082:106 Art History

01:082:EC Art History elective

Liberal arts electives (6)

Part II: Cognitive Skills and Processes (9 credits)

A.Writing and Communication (3): 01:355:101 College Writing

B. Literature (3)

07:966:427 Shakespeare's Plays

C. Quantitative/Technical Skills (3)

07:966:243 Elements of Design

Total Credits: 33

Theater (Stage Management)

Part I: Areas of Inquiry (24 credits)

A. Social Science and History (3)

B. Arts and Humanities (3)

07:965:281 Theater History I

C. Liberal Arts Electives (18)

07:965:282 Theater History II

07:965:370 Global Theater I

07:965:473 Clothing and Culture

07:557:201 Practical Finance for Entrepreneurship Creatives Online

Liberal arts elective (6)

Part II: Cognitive Skills and Processes (9 credits)

A.Writing and Communication (3): 01:355:101 College Writing

B. Literature or second Writing Intensive (3)

C. Quantitative/Technical Skills (3)

07:966:251 Fundamentals of Drafting

Total Credits: 33

Theater (Technical Direction)

Part I: Areas of Inquiry (24 credits)

A. Social Science and History (3)

B. Arts and Humanities (3)

07:965:281 Theater History

C. Liberal Arts Electives (18)

07:965:282 Theater History II

07:965:370 Global Theater

Liberal arts electives (12)

Part II: Cognitive Skills and Processes (9 credits)

A.Writing and Communication (3): 01:355:101 College Writing

B. Literature or second Writing Intensive (3)

C. Quantitative/Technical Skills (3)

07:966:251 Fundamentals of Drafting

Total Credits: 33

Visual Arts

Part I: Areas of Inquiry (21 credits)

A. Social Science and History (6)

B. Arts and Humanities (12)

01:082:105 Art History 105

01:082:106 Art History 106

01:XXX:XXX Art History or Cinema Studies elective

01:XXX:XXX Art History or Cinema Studies elective

C. Liberal Arts Electives (3)

Part II: Cognitive Skills and Processes (12 credits)

A. Writing and Communication (3): 01:355:101 College Writing

B. Second Writing Intensive Course (6)

07:081:200 Seminar in Contemporary Art A

07:081:201 Seminar in Contemporary Art B

C. Quantitative/Technical Skills (3)

Total Credits: 33

Requirements (MGSA)

Interdisciplinary Requirement

Interdisciplinary Requirement

Incoming first-year students are required to complete 07:557:151, Mason Gross Interplay. Interplay is a 1-credit interdisciplinary course (graded P/NC) designed to introduce students to the artistic disciplines represented at Mason Gross, foster relationships between and within departments, and help students develop the skills needed to collaborate.

Learning Goals:

- Students will be able to relate to their own field and to other departments within Mason Gross. They will have access to a network of potential peer collaborators.
- Students will be able to conceptualize a variety of possible multimedia collaborations. They will gain the skills necessary to collaborate effectively with others.
- Students will be able to reflect critically upon artwork in disciplines other than their own.

Graduation (MGSA)

GRADUATION

Degrees are conferred at the Mason Gross School of the Arts Convocation and the annual university commencement ceremony every May. Degrees are issued to students via postal mail by the university upon recommendation of the faculty and Office for Advising and Student Success once all degree requirements are completed and final grades are posted on the transcript.

The bachelor's degree is conferred with the distinction *summa cum laude* for graduates with a Rutgers cumulative grade-point average of 3.850 or higher; *magna cum laude* for those with an average of 3.700 or higher; and *cum laude* for those with an average of 3.500 or higher. Averages are not rounded to the next higher number in the calculation of honors.

Students graduating in August may request to participate in the commencement ceremonies the preceding spring if they have 6 or less credits to complete their degree and present the dean's office with an academic plan for completion by the August graduation deadline.

Students graduating in January are invited and encouraged to participate in the commencement ceremonies at the completion of the subsequent spring semester.

Degrees are conferred in absentia when the candidate has advised the registrar in advance of their inability to attend commencement. Diplomas are withheld from all students with outstanding financial or library account balances.

Students who complete courses at other institutions or return to Rutgers to complete degree deficiencies must notify the Mason Gross Dean's Office of their completion by submitting official transcripts and completing a diploma application.

Post-Obitum Award of Degree. In the unfortunate event of the death of a student who has enrolled in the Mason Gross School of the Arts as a senior in good standing, requests will be considered for the awarding of the degree that was being earned. The request may be submitted in writing to the Assistant Dean for Advising & Student Success.

Programs of Study (MGSA)

PROGRAMS OF STUDY

Mason Gross School of the Arts offers professional programs in dance, design, filmmaking, theater, and visual arts, leading to the bachelor of fine arts degree, and a professional program in music, leading to a bachelor of music degree. The curriculum codes for these programs are as follows:

206 Dance

208 Design

211 Filmmaking

702 Music

966 Theater

081 Visual Arts

The specific program requirements are outlined in this chapter.

Dance 206 (MGSA)

DANCE 206

See Dance in the Programs of Study and Courses for Liberal Arts and Sciences Students section for bachelor of arts (B.A.) program information.

The objective of the bachelor of fine arts (B.F.A.) program in dance is to provide professional-level training in multiple movement practices for students seeking careers in dance. The program supports student artists' creative and scholarly research on multiple levels, encouraging them to develop critical thinking skills as a base for career pathways in the arts, business, education, sciences, and technology. Students will attain a clear and fundamental knowledge of how their embodied experiences, including improvising, performing, choreographing, writing, and teaching is investigated, integrated, and ultimately synthesized through artistic and scholarly methodologies.

Major Requirements

Major Requirements

Students must complete a minimum of 120 credits to earn the B.F.A. Degree in Dance. This includes 99 Dance credits (including 8 credits of dance electives), 33 credits of liberal arts, and a one-credit interdisciplinary seminar that is mandatory for first-year students and optional for incoming transfer students. Students must earn a C grade or better in the core curriculum (see table below) or repeat the course. Students must be registered for a minimum of 12 credits each semester to achieve full-time status.

Semester: Year 1 - Fall

Course Number	Course Name	Credits
07:206:130	African Diasporic Movement Practices 1	1.5
07:206:131	Classical/Traditional Movement Practices 1	1.5
07:206:132	Contemporary Fusion Movement Practices 1	1.5
07:206:133	Somatic Movement Practices 1	1.5
07:203:115	Introduction to Dance Studies	3
07:206:142	Improvisation 1	2
07:206:101	*Concussion Awareness	0
07:206:100	**Dance Assembly	N.5
07:556:151	Mason Gross Interplay	1.0
07:206:161	Production Study	0.5

Semester: Year 1 - Spring

Course Number	Course Name	Credits
07:206:146	African Diasporic Movement Practices 2	1.5
07:206:147	Classical/Traditional Movement Practices 2	1.5
07:206:148	Contemporary Fusion Movement Practices 2	1.5
07:206:149	Somatic Movement Practices 2	1.5
07:203:145	Performance Skills 1	2
07:206:126	Rhythm for Dancers	2
07:206:101	*Concussion Awareness	0
07:206:100	****DANCE ASSEMBLY**	**N.5**
07:206:161	Production Study	0.5

Semester: Year 2 - Fall

Course Number	Course Name	Credits
07:206:260	African Diasporic Movement Practices 3	1.5
07:206:261	Classical/Traditional Movement Practices 3	1.5
07:206:262	Contemporary Fusion Movement Practices 3	1.5
07:206:263	Somatic Movement Practices 3	1.5
07:206:243	Improvisation 2	2
07:206:402	Laban/Bartenieff for Dance and Dance Education	3
07:206:101	*Concussion Awareness	0
07:206:100	**Dance Assembly	N.5
07:206:235	Choreography 1	1-2

Semester: Year 2 - Spring

Course Number	Course Name	Credits
07:206:264	African Diasporic Movement Practices 4	1.5
07:206:265	Classical/Traditional Movement Practices 4	1.5
07:206:266	Contemporary Fusion Movement Practices 4	1.5
07:206:267	Somatic Movement Practices 4	1.5
07:206:245	Performance Skills 2	2
07:206:325	****Kinesiology for Dancers	3
07:206:441	Dance History World	3
07:206:100	**Dance Assembly	N.5

Semester: Year 3 - Fall

Course Number	Course Name	Credits
07:206:346, 347, or 348	MP5 Intensive Study	2.5
07:206:346, 347, or 348	MP5 Intensive Study	2.5
07:206:334	Choreography 2	2
07:206:237	***Dance Production	3
07:206:101	Concussion Awareness	0
07:206:100	**Dance Assembly	N.5

Semester: Year 3 - Spring

Course Number	Course Name	Credits
07:206:356, 357, or 358	MP6 Intensive Study	2.5
07:206:356, 357, or 358	MP6 Intensive Study	2.5
07:206:345	Advanced Improvisation	2
07:206:442	Dance History 1900-Present ONLINE	3
07:206:237	***Dance Production	3
07:206:352	Teaching as an Artist	3
07:206:100	**Dance Assembly	N.5

Semester: Year 4 - Fall

Course Number	Course Name	Credits
07:206:416, 417, or 418	MP7 Intensive Study	2.5
07:206:416, 417, or 418	MP7 Intensive Study	2.5
07:206:450	Dance Capstone 1	2
07:206:101	*Concussion Awareness	0
07:206:100	**Dance Assembly	N.5

Semester: Year 4 - Spring

Course Number	Course Name	Credits
07:206:426, 427, or 428	MP8 Intensive Study	2.5
07:206:426, 427, or 428	MP8 Intensive Study	2.5
07:206:451	Dance Capstone 2	2
07:206:161	****Production Study	1
07:206:100	**Dance Assembly	N.5

- *Students are required to take 07:206:101 Concussion Wise EVERY Fall semester. This course is a pass/fail course and does not count towards total credits for graduation.
- **Students are required to pass 07:206:100 Dance Assembly EVERY SEMESTER. This is a pass/no credit course and does not count towards total credits for graduation.
- ***Dance Production--students may take this course in either the fall or spring semester during their junior year.
- ****These courses also fulfill liberal arts requirements.

Electives

8 credits of dance electives are required from the options below:

07:203:132 History of Broadway Dance Online	07:203:170 Yoga for Wellness
07:203:133 Dance in Istanbul Online: Whirling, Belly Dancing an Revolving around East & West	07:206:154 Pointe Class
07:203:134 Dance in Israel Online: Body, Ideology, and Culture	*07:206:155 Ballet Jumps & Turns
07:203:135 Dance Forms in Africa Online	07:203:190 Performance Studies
07:203:136 Dance in India Online	07:206:175 World Dance
07:203:160 Pilates Mat	07:206:274 Jazz Dance
07:206:311 Ballet 6	07:206:370 History & Theory of Integrated Dance
07:206:325 Neuroscience in Partnership with Dance	07:206:326 Adaptive Movement Through Dance
07:206:344 Video for Dance	07:206:447/448 Independent Dance Study
07:206:360 University DanceWorks (audition required)	07:206:495 Special Topics in Dance
07:206:363 Dance Repertory (audition required)	

* Ballet Jumps, Turns, & Partnering for incoming students requires two semesters (1 year) of ballet technique OR permission of instructor. Continuing BFA students require the completion of one semester of Ballet 6 OR permission of instructor.

Design 208 (MGSA)

DESIGN 208

Design studies at Mason Gross School of the Arts are grounded in graphic design and interaction design, reflecting the rapidly evolving nature of visual communication and technology. Students gain expertise in developing innovative ways of communicating ideas in a wide range of concrete and dynamic media. They acquire skills in typography, publication design, coding, and data visualization, while shaping content and form in both speculative and real-world situations.

The program encourages experimentation and a critical engagement with contemporary culture, equipping students for a lifetime of practice as digital and/or print designers. The curriculum prepares graduates to contribute to shaping the future direction of design. For design students, a capstone course will require students to shape a body of self-initiated work in their final year that becomes public, whether in the form of website, book, an app, or other appropriate format.

Students wishing to pursue the B.F.A. in design apply to the B.F.A. in visual arts and declare the design major during their sophomore year, after completing a common cross-disciplinary foundation year. Transfer students declare at their transfer review.

Design 208 (MGSA)

Major Requirements

Major Requirements

Design majors in the bachelor of fine arts (B.F.A.) program are required to complete a total of 87 credits as follows:

Foundation Courses (16 credits)

07:081:121-122 Drawing Fundamentals and 4-D Fundamentals (4,4)

07:081:227-228 Visual Thinking A and B (4,4)

Studio Concentration (40 credits)

A studio concentration course sequence of I-A and B, II-A and B, III-A and B, two seminars and either Design Practicum or a supervised internship.

Concentration Sequence: six 4-credit courses

07:081:328, 383 Design Seminar A and B (3,3)

07:081:385 Design Practicum or supervised internship (4)

Thesis Exhibition A and B (3,3 = 6 credits)

Studio Electives (31 credits)

In addition, students must complete a minimum of 33 credits of **liberal arts requirements** (see the Degree Requirements chapter) for a total of 121 credits required for graduation, including the Interdisciplinary Seminar Interplay 07:557:151, 1 credit (which is optional for transfer students). These liberal arts requirements do differ from the visual arts major and include:

01:082:105-106 Introduction to Art History (3,3)

One art history elective (3)

Contextual Studies requirement, choose from four choices (3 credits)

Filmmaking 211 (MGSA)

FILMMAKING 211

The Mason Gross School of the Arts offers a bachelor of fine arts (B.F.A.) degree in filmmaking.

The Rutgers Filmmaking Center offers a filmmaking degree to students in an innovative program with individualized training in fiction, experimental, and documentary film production taught by a faculty of professional filmmakers with a track record of producing award-winning films.

The Rutgers Filmmaking Center offers comprehensive technical and artistic training in a supportive environment, all within a firm grounding in the humanities. Students collaborate, take risks, and build upon a solid foundation to create original films. This program exposes students to a broad range of cinematic traditions and a wide array of concepts and approaches, so they can become informed filmmakers who can integrate theory with practice.

Students receive hands-on training in directing, cinematography, screenwriting, producing, field production, animation, editing, and postproduction technique while delving into filmmaking history, theory, and criticism. Blended with a wide array of liberal arts electives, students learn to be technically astute filmmakers who understand the fundamental skills of film language, know how to work collaboratively, and have the ability to create a film from conception, through development, shooting, and editing to a finished product.

We help students develop critical thinking skills, so they can analyze their work and the work of others and be able to interpret films through a variety of aesthetic, historical, and theoretical frameworks. Because the filmmaking center is located within a major research university, the filmmaking B.F.A. provides students access to vast intellectual resources and opportunities for cross-disciplinary learning.

Filmmaking 211 (MGSA)

Major Requirements

Major Requirements

Filmmaking majors in the bachelor of fine arts (B.F.A.) program are required to take the following courses/electives:

Foundation courses (14 credits)		
Semester	**Course**	**Credits**
Fall Year 1	07:211:191 Intro to Film Production I	4
Spring Year 1	07:211:192 Intro to Film Production II	4
Fall Year 1	07:211:205 Screenwriting	3
Spring Year 1	07:211:120 Cinematography	3

Filmmaking core courses (8 courses)		
Semester	**Course**	**Credits**
Fall Year 2	07:211:291 Intermediate to Film Production I	4
Spring Year 2	07:211:292 Intermediate to Film Production II	4
Spring Year 2	07:211:111 Sound for Film	3
Fall Year 3	07:211:391 Advanced Directing I	4
Spring Year 3	07:211:392 Advanced Directing II	4
Fall Year 3	07:211:231 Image Post Production	3
Fall Year 4	07:211:491 Thesis I	4
Spring Year 4	07:211:492 Thesis II	4

Filmmaking electives (21 credits)		
Semester	**Course**	**Credits**
	07:211:XXX	3
	07:211:XXX	3
	07:211:XXX	3
	07:211:XXX	3
	07:211:XXX	3
	07:211:XXX	3
	07:211:XXX	3

Visual Arts courses (2 courses)		
Semester	**Course**	**Credits**
	07:081:122 4D Fundamentals	4
	07:081:XXX	4

Additional Cinema Studies elective		
Semester	**Course**	**Credits**
	01:175:XXX	3

General/Visual Electives (12 credits)		
Semester	**Course**	**Credits**
		3
		3
		3
		3

Liberal Arts Requirements (33 credits)		
Part I: Areas of Inquiry (18 credits)		
Semester	**Course**	**Credits**
	01:082:106 Introduction to Art History: 1400 to Present	3
Fall Year 1	01:175:201 Intro to Film I	3
Spring Year 1	01:175:202 Intro to Film II	
Cinema Studies Elective (3 credits)		
	01:175:XXX	3
Social Science and History (6 credits)		
		3
		3
Natural Science Electives (6 credits)		
		3
		3
Part II: Cognitive Skills and Processes (12 credits)		
Writing and Communication (3 credits)		
	01:355:101/104 College Writing	3-4.5
2nd Writing or Literature course (3 credits)		
		3
Quantitative/Technical Skills (3 credits)		
		3

Music 702 (MGSA)

MUSIC 702

See Music in the Programs of Study and Courses for Liberal Arts and Sciences Students section for bachelor of arts (B.A.) program information.

The bachelor of music (B.M.) program offers four areas of concentration: performance, jazz studies, composition, and music education. Students are admitted specifically to one of these four areas. Any change in concentration must be made with the approval of the department. All students in the bachelor of music program must take a piano proficiency examination by the end of the second year of study and pass it in order to graduate. Students in the music education concentration are required to pass the piano proficiency examination by the end of the second year of study as part of the application process for acceptance into the Music Education Professional Sequence.

The course (07:701:100) Music Assembly must be successfully completed in each semester of registration in applied major lessons. Students who earn an unsatisfactory grade in Music Assembly in any semester will not be allowed to schedule a senior recital or register for Clinical Practice II. All bachelor of music students are also required to perform in Music Assembly in each semester of study.

Students in the music education concentration must complete all degree requirements before the Clinical Practice II semester. In addition, students may not be registered for any other courses during the semester in which they participate in Clinical Practice II unless preapproved by the Music Education Area Head Chair.

Music 702 (MGSA)

Major Requirements

Major Requirements

Instrumental Performance Concentration

Students in the instrumental performance concentration must take the following courses in music theory (23 credits):

- 07:700:121-122 Theory I,II (3,3)
- 07:700:123-124 Aural Skills I,II (2,2) **or** 07:700:153-154 Advanced Aural Skills I,II (2,2)
- 07:700:127 Introduction to Music Technology (1)
- 07:700:221 Theory III (3)
- 07:700:XXX Theory Elective (3)*
- 07:700:223-224 Aural Skills III,IV (2,2) **or** 07:700:253-254 Advanced Aural Skills III,IV (2,2)
- 07:700:329 Conducting I (2)

**This requirement can be satisfied with Theory IV or Jazz Theory*

Performance students must also take the following courses in music history (12 credits):

- 07:700:301-302 European Music Before 1800, European and American Music After 1800 (3,3)
- 07:700:203 Musics and Cultures (3)
- 07:700:419 or 420 Special Studies in Music History (3)

In addition to the requirements above, students in the instrumental performance concentration must pass the piano proficiency exam and also complete the following course of study (52 credits):

- 07:701:407,408 Contemporary Performance Seminar (1,1)
- chamber music courses (4)*
- large ensemble courses (8)*
- pedagogy courses (2)#
- applied major lessons (24)
- 07:557:151 Mason Gross Interplay (1)

Music electives (8) To fulfill the 8 credits of music electives, courses may be selected from any 300- or 400-level music courses not being counted toward the music major requirements, or 200-level music courses pending approval of the undergraduate adviser. Students may use Classroom Piano to satisfy 4 of the 8 music elective credits.

Free electives (3) To fulfill the 3 credits of free electives, courses may be selected from any music course or any nonmusic courses.

Students in the instrumental performance concentration must complete a minimum of 33 credits in liberal arts courses (see Degree Requirements), for a total of 120 credits required for graduation. All performance students present a recital in the senior year in partial fulfillment of their requirements for graduation. Acceptability of this recital is determined by a faculty jury in attendance.

*Bachelor of music students must enroll in a large ensemble in every semester of registration in Applied Major Lessons with the exception of composition majors after they have completed the required 6 semesters of large ensemble and piano performance majors after they have completed 4 semesters of large ensemble and are enrolled in *Art of Accompaniment (701:351, 352)* or *Studio Accompaniment (701:451, 452)*. The music department will assign all students to the ensemble of its choice.

#Pedagogy for piano majors is a total of 4 credits

Vocal Performance Concentration

Students in the vocal performance concentration must take the following courses in music theory (23 credits):

- 07:700:121-122 Theory I,II (3,3)
- 07:700:123-124 Aural Skills I,II (2,2) **or** 07:700:153-154 Advanced Aural Skills I,II (2,2)
- 07:700:127 Introduction to Music Technology (1)
- 07:700:221-222 Theory III (3)
- 07:700:XXX Theory Elective (3)*
- 07:700:223-224 Aural Skills III,IV (2,2) **or** 07:700:253-254 Advanced Aural Skills III,IV (2,2)
- 07:700:329 Conducting I (2)

**This requirement can be satisfied with Theory IV or Jazz Theory*

Performance students must also take the following courses in music history (12 credits):

- 07:700:301-302 European Music Before 1800, European and American Music After 1800 (3,3)
- 07:700:203 Musics and Cultures (3)
- 07:700:419 or 420 Special Studies in Music History (3)

In addition to the requirements above, students in the vocal performance concentration must pass the piano proficiency exam and also complete the following course of study (55 credits):

- 07:701:407,408 Contemporary Performance Seminar (1,1)
- 07:701:358 Stage Movement for Singers (2)
- 07:701:357 Acting for Singers (2)
- 07:701:211,212, 213, 214 Diction for Singers (1,1,1,1)
- 07:701:353, 354 Opera Workshop (4)*
- large ensemble courses (8)*
- pedagogy courses (4)
- vocal coaching (4)+
- applied major lessons (20)+
- 07:557:151 Mason Gross Interplay (1)

Music electives (2) To fulfill the 2 credits of music electives, courses may be selected from any 300- or 400-level music courses not being counted toward the music major requirements or 200-level music course pending approval by the undergraduate adviser. Students may use Classroom Piano to satisfy the music elective credits.

Free electives (2) To fulfill the 2 credits of free electives, courses may be selected from any music course or nonmusic courses not counted toward the major requirements.

Students in the vocal performance concentration must complete a minimum of 33 credits in liberal arts courses (see Degree Requirements) for a total of 123 credits required for graduation. All performance students present a recital in their senior year in partial fulfillment of the requirements for graduation. Acceptability of this recital is determined by a faculty jury in attendance.

*Bachelor of music students must enroll in a large ensemble in every semester of registration in Applied Major Lessons with the exception of Composition majors after they have completed the required 6 semesters of large ensemble. The music department will assign all students to the ensemble of its choice.

Music Education Concentration

Students in the music education concentration take the following courses in music theory (27 credits):

- 07:700:121-122 Theory I,II (3,3)
- 07:700:123-124 Aural Skills I,II (2,2) **or** 07:700:153-154 Advanced Aural Skills I,II (2,2)
- 07:700:128 Music Education Technology (1)
- 07:700:221 or 07:700:247 Theory III or Jazz Theory I (3)
- 07:700:222 or 07:700:248 Theory IV or Jazz Theory II (3)
- 07:700:223-224 Aural Skills III,IV (2,2) **or** 07:700:253-254 Advanced Aural Skills III,IV (2,2)
- 07:700:329-330 Conducting I,II (2,2)
- 07:700:341 Orchestration I (2)

Music education students must also take the following courses in music history (12 credits):

- 07:700:301-302 European Music Before 1800, European and American Music After 1800 (3,3)
- 07:700:203 Musics and Cultures (3)
- 07:700:419 or 420 Special Studies in Music History or Music in Historical & Cultural Context Elective courses (3)+

In addition to the requirements above, students must pass the piano proficiency exam and also complete the following course of study (59 credits):

- large and small ensemble courses (8)*
- music education courses (35 instrumental) (33 vocal/general)
- performance study courses (15)
- 07:557:151 Mason Gross Interplay (1)

There are two streams that music education majors may follow: vocal/general concentration, which requires 123 credits for graduation, and instrumental concentration, which requires a total of 125 credits for graduation. All music education students must present a 30-minute recital in the senior year in partial fulfillment of the requirements for graduation. The total number of requirements for each music education concentration includes 30 credits in liberal arts courses. The music education degree program is specifically designed so that students acquire course credits necessary to both graduate with a degree from Rutgers AND meet the teacher certification requirements for the state of New Jersey. Prior to acceptance into the Music Education Professional Sequence, students must either demonstrate adequate SAT/ACT scores or pass the Praxis Core Academic Skills for Educators Combined Exam (code:5751). In order to be certified as a licensed New Jersey educator, students must also complete and pass a series of exams as required by the state of New Jersey.

Students who take Jazz Theory I must continue on to Jazz Theory II. Students who take Theory III must continue on to Theory IV

+These 3 credits are included in the 30 liberal arts credits. See elective course options in the Requirement Checklist

*Bachelor of music students must enroll in a large ensemble in every semester of registration in Applied Major Lessons with the exception of composition majors after they have completed the required 6 semesters of large ensemble. The music department will assign all students to the ensemble of its choice.

Jazz Studies Concentration

Students concentrating in jazz studies must pass the piano proficiency exam and the following course of study (88 credits):

- 07:700:102 Introduction to Music History (3)
- 07:700:121-122 Theory I,II (3,3)
- 07:700:123-124 Aural Skills I,II (2,2) **or** 07:700:153-154 Advanced Aural Skills I,II (2,2)
- 07:700:127 Introduction to Music Technology (1)
- 07:700:223-224 Aural Skills III,IV (2,2) **or** 07:700:253-254 Advanced Aural Skills III,IV (2,2)
- 07:700:247-248 Jazz Theory I,II (3,3)
- 07:700:251-252 Keyboard Harmony for Jazz Majors (2,2)
- 07:700:293 Introduction to Jazz Improvisation Online (2)
- 07:700:203 Musics and Cultures (3)
- 07:700:305-306 Evolution of Jazz (3,3)
- 07:700:329 Conducting I (2)
- 07:700:347-348 Jazz Composition and Arranging (3,3)
- 07:700:371-372 Jazz Improvisation I (3,3)
- 07:700:471-472 Jazz Improvisation II (3,3)
- ensemble courses (12)*
- applied major lessons (16)
- 07:557:151 Mason Gross Interplay (1)

Students in the jazz studies concentration must complete a minimum of 33 credits in liberal arts courses (see the Degree Requirements chapter), for a total of 121 credits required for graduation. All jazz students present a recital in their senior year in partial fulfillment of the requirements for graduation. Acceptability of this recital is determined by a faculty jury in attendance.

*Bachelor of music students must enroll in a large ensemble in every semester of registration in Applied Major Lessons with the exception of composition majors after they have completed the required 6 semesters of large ensemble. The music department will assign all students to the ensemble of its choice.

Composition Concentration

Students in the composition concentration must take the following courses in music theory (31 credits):

- 07:700:121-122 Theory I,II (3,3)
- 07:700:221-222 Theory III,IV (3,3)
- 07:700:XXX Music Theory Elective (3)*
- 07:700:123-124 Aural Skills I,II (2,2) **or** 07:700:153-154 Advanced Aural Skills I,II (2,2)
- 07:700:223-224 Aural Skills III,IV (2,2) **or** 07:700:253-254 Advanced Aural Skills III,IV (2,2)
- 07:700:329-330 Conducting I, II (2,2)
- 07:700:341-342 Orchestration I, II (2,2)

**This requirement can be satisfied with Theory IV or Jazz Theory*

Composition students must also take the following courses in music history (12 credits):

- 07:700:301-302 European Music Before 1800, European and American Music After 1800 (3,3)
- 07:700:203 Musics and Cultures (3)
- 07:700:419 or 420 Special Studies in Music History (3)

Technology (10 credits)

- 07:700:127 Introduction to Music Technology (1)
- 07:700:284 Digital Audio Composition (3)
- 07:700:468 Scoring for Film and Visual Media (3)
- 07:700:469 Interactive Computer Music (3)

In addition to the requirements above, students must pass the piano proficiency exam and also complete the following requirements:

- 07:700: 375 Composition Practicum I-VIII (8)
- composition lessons (16)
- large ensemble courses (6)*
- chamber music (2)
- Music electives (2)
- 07:701:307 Rutgers New Music Workshop (2)
- secondary lessons (4)
- 07:557:151 Mason Gross Interplay (1)

Students in the composition concentration must complete a minimum of 30 credits in liberal arts courses (see Degree Requirements) for a total of 124 credits required for graduation. All composition majors must complete an annual portfolio review with the composition faculty and present a recital in partial fulfillment of the requirements for graduation.

*Bachelor of music students must enroll in a large ensemble in every semester of registration in Applied Major Lessons with the exception of composition majors after they have completed the required 6 semesters of large ensemble. The music department will assign all students to the ensemble of its choice.

Theater 966 (MGSA)

THEATER 966

See Theater in the Programs of Study and Courses for Liberal Arts and Sciences Students section for bachelor of arts (B.A.) program information and courses.

The bachelor of fine arts (B.F.A.) degree in theater is designed for students seeking intensive conservatory theater training in a liberal arts setting and requires a four-year residency for entering first-year students and transfer students. The program offers eight areas of concentration: acting, costume design, costume technology, dramaturgy, lighting design, scenic design, stage management and technical production. Students are auditioned and/or interviewed as part of the admission process and continue in their program each year by maintaining good artistic and academic standing in the program.

Theater 966 (MGSA)

General Information

General Information

Student Responsibility to Keep Informed

The Department of Theater makes special demands on students enrolled in the B.F.A. training programs because of the professional nature of the programs and the demands of the profession. Concentration-specific rules and policies are in the Theater Department Student Handbook and Appendices including the Student Handbook Appendix for Acting Students, the Design and Student Handbook Appendix for Production and Design students (Costume, Set, & Lighting Designers, Costume Technicians, Technical Directors, & Stage Management), and the Dramaturgy and Playwrighting Appendix. Students are responsible for understanding and following all rules and policies set forth in these documents, as well as those in the undergraduate university catalog.

Program and Class Fees

Students in acting and design are assessed professional program fees that support professional training and career transition. Some courses charge specific fees for tickets, models, or supplies. Should a student leave or be dismissed from the program, all fees are nonrefundable.

Repeated Courses

Theater arts B.F.A. students may repeat a liberal arts course taken at Rutgers in accordance with the regulation stated in the Academic Policies and Procedures chapter of the Mason Gross School of the Arts section of this catalog.

Bachelor of Arts

The theater arts department also offers a bachelor of arts (B.A.) major and minor in theater arts to liberal arts students enrolled in the School of Arts and Sciences. See Theater in the Programs of Study and Courses for Liberal Arts and Sciences Students section of this catalog for B.A. program information. All students interested in the B.A. Theater major or minor must complete an application available on the website.

Theater 966 (MGSA)

Study Abroad at Rutgers' Conservatory in London

Study Abroad at Rutgers' Conservatory in London

Rutgers Conservatory in London gives serious theater artists intensive conservatory training in London under the most accomplished theater artists in the United Kingdom. Through access to Shakespeare's Globe space, master teachers, scholars, and practitioners, this program fulfills the two-fold mission of both Rutgers, The State University of New Jersey, and Shakespeare's Globe by combining the best of conservatory training in a professional theater of international stature. Rutgers sends B.F.A. acting students abroad for conservatory study at Shakespeare's Globe. B.F.A. designers and costume technology students also are in residence at The Lyric Hammersmith in London for a semester in their third year. For more information on the curriculum please see the Concentration Requirements page in this catalog.

Theater 966 (MGSA)

Major Requirements

Major Requirements

B.F.A. Theater Major

Students must complete a minimum of 120 credits for graduation, which includes a minimum of 33 credits of liberal arts requirements (see the Degree Requirements chapter). However, students must complete all courses required by their program, which may require up to 140 credits for graduation depending on the area of study.

All students begin intensive foundation training in the first year augmented by College Writing and other liberal arts courses.

In addition to the general theater requirements, students must enroll in and complete one of eight concentrations described more fully in the next section of this catalog.

Theater 966 (MGSA)

Concentration Requirements

Concentration Requirements

In addition to the general theater requirements, students must enroll in and complete one of the following four concentrations:

1. ACTING

The acting program offers a rigorous and collaborative 4-year course of study for students who aspire to a career in the ever-evolving entertainment industry. Students are trained in various acting techniques, including Meisner, on-camera, devising, classics, and global theater with a commitment to new and emerging methodologies and practices.

Students will study at the Rutgers Conservatory at Shakespeare's Globe in London. The training concludes with a focus on the industry and launching of the artist's professional careers. Students are eligible for productions in the program in the second through final years of study.

The drama program is committed to equitable, representative, and evolving practices to support each student on their journey by continuing to learn, scrutinize, and adjust our program to facilitate training that is current, imaginative, and inspired by the needs of the students, the demands of the industry, and work that is yet to be created.

2. DESIGN: Costume, Lighting, and Scenic

Theater design students are part of a dynamic 4-year professional training program that includes a semester residency in London. Our program provides students with essential artistic and technical skills as well as a strong foundation in theater history and theory. The faculty are distinguished working professionals who provide students with one-on-one mentoring and prepare them to be effective artists and collaborators in the entertainment industry.

Areas of study include costume, lighting, and scenic design.

3. DRAMATURGY

The dramaturgy curriculum provides students with a strong multi/transdisciplinary background in performance practices, performance literature and theory, community/audience engagement, and the Humanities. The core course of study focuses on building the skills for production dramaturgy and is augmented by direct electives in history, foreign languages, and other non-drama courses to build a firm foundation in both theater and the liberal arts. Students in the dramaturgy concentration cultivate their intellectual prowess, analytical skills, and artistic passions through integral multidisciplinary involvement in the Mason Gross productions and classes in the conception and execution of productions, bringing their knowledge of performance history and dramatic structure,

their skills in script analysis and contextual research, and their capacity to engage in collaborative conversation into the rehearsal room. These skills also serve our audience as dramaturgy students practice the art of audience/community outreach and engagement.

The dramaturgy concentration specializes in production development, production support, critical writing, audience outreach, season planning, and artistic leadership. The transdisciplinary curriculum makes it an excellent program of study for students interested in performing arts history and theory, playwrighting and devising, cultural studies, and community outreach.

4. PRODUCTION: Costume Technology, Stage Management, & Technical Direction

Production students are part of a 4-year program designed to train students to be professionals in the fields of **costume technology**, **stage management**, or **technical direction**. The program combines integrated knowledge and respect for all aspects of theater at a variety of production levels to create artistically astute, well-versed, thoughtful production professionals. Core training and curriculum come together in production practice, which informs the process of each play. Working from a core artistic sensibility, production students support the work of the contributing artists as together they bring the performance to realization.

Visual Arts 081 (MGSA)

VISUAL ARTS 081

The Department of Art & Design offers bachelor of fine arts (B.F.A.) and bachelor of arts (B.A.) undergraduate degrees, as well as a minor in art.

See Art in the Programs of Study and Courses for Liberal Arts and Sciences Students section for the bachelor of arts (B.A.) program information and the art minor.

The bachelor of fine arts (B.F.A.) visual arts program is for students who want to become professional artists and who wish to pursue their specific professional goals within the stimulating intellectual climate of Rutgers University. The education offered by Mason Gross School of the Arts differs from an art school program that focuses exclusively on studio skills. At Mason Gross School of the Arts, studios within and across disciplinary artistic mediums and seminar discussions together confront students with a wide range of techniques, materials, visual languages, and cultural issues. Creation and critical analysis go hand in hand. The program understands that to be a surviving professional artist in the 21st century one should be educated to make informed choices, not only about aesthetic strategies, but also about who to work for and how art can function to serve not only oneself, but also the broader community and society at large.

Work toward the B.F.A. degree starts with foundation courses that introduce the techniques and materials as well as the artistic and cultural questions of contemporary artistic practice. Intermediate and advanced courses provide concentrated training in six major areas: drawing, media, painting, photography, print, and sculpture. Students

declare a concentration in one of these areas in their sophomore year, although they can take studio electives in other areas which foster an enriching interdisciplinary arts education. Transfer students declare at their Transfer review in their first term.

The B.F.A. in visual arts is committed to the development of both personal expression and cultural analysis through which a student prepares to face the aesthetic, social, and personal choices involved in being a professional artist.

Visual Arts 081 (MGSA)

Major Requirements

Major Requirements

Bachelor of fine arts (B.F.A.) visual arts majors are required to complete a total of 87 credits as follows:

Foundation Courses (16 credits)

07:081:121-122 Drawing Fundamentals A and 4-D Fundamentals (4,4)

07:081:227-228 Visual Thinking A and B (4,4)

Studio Concentration (27 credits)

A studio concentration course sequence of I-A and B, II-A and B, III-A and B, and a seminar in the concentration is required in one of the following options: design, drawing, media, painting, photography, print, or sculpture.

Concentration sequence: six 4-credit courses
Concentration seminar: 3 credits

Thesis and Exhibition A and B (3,3 credits)

Studio Electives (32 credits)

Art History Electives or a seminar in another concentration or cinema studies for media concentration students (3 credits)

Visual Arts Practice (3 credits Pass/Fail)* *Byrne Seminar may count as 1 VAP credit.*

In addition, students must complete a minimum of 33 credits of liberal arts requirements (see the Degree Requirements chapter) for a total of 121 credits required for graduation, including the Interdisciplinary Seminar Interplay 07:557:151, 1 credit (which is optional for transfer students). These requirements do differ from the design major and include:

01:082:105-106 Introduction to Art History (3,3 credits)

Two art history electives or cinema studies courses (3,3)

07:081:200-201 Seminar in Contemporary Art A and B (3,3 credits)

Visual Arts 081 (MGSA)

Art Minor

Art Minor

This track is for non-majors students who wish to explore their artistic interests alongside academic pursuits and professional goals within the creative environment of Mason Gross. It is comprised of diverse foundations courses essential to artistic practice, and not medium specific.

All Rutgers-New Brunswick undergraduate students are eligible to apply for approval to declare a minor in art. Space in this program is limited and not guaranteed. Admission is based on the number of applications received, approval from the student's unit of matriculation and availability in the required courses. Students may only apply to the art minor during the application period in the academic year prior to the fall term in which they will have the minor added to their transcript.

Note: New minor declarations begin in FALL term only.

Once declared, students must received a final grade of C or better for all required courses in the minor. Studio courses are sequential, and students are advised to complete the application to declare the minor no later than the second semester of their sophomore year which will allow for adequate time to complete the Art minor by their expected date of graduation.

Note: Typically, "A" studio classes are offered in the fall (07:081:121, 07:081:227 and 07:081:321) and "B" studio classes are offered in the spring (07:081:228).

Consult the website for more detail and application/program requirements.

Visual Arts 081 (MGSA)

Academic Advising

Academic Advising

The Office for Advising and Student Success provides all Mason Gross students with close and continuing academic advice. Nevertheless, students must assume full responsibility for conforming to the academic and Department of Art & Design regulations of the university and Mason Gross School of the Arts for meeting all degree requirements and for having the proper prerequisites for any course in which they register. Faculty and staff advisers are readily available for assistance.

Course Listing (MGSA)

COURSE LISTING

Explanation of Three-Part Course Numbers

Art 081 Courses

Dance 203 Courses

Dance 206 Courses

Filmmaking 211 Courses

Interdisciplinary 557

Music 700 Courses

Applied Music 701

Theater Arts 966 Courses

Explanation of Three-Part Course Numbers (MGSA)

Explanation of Three-Part Course Numbers

The number preceding each course title is divided into three parts. The first two digits are the administrative code (standing for a faculty or a school), the next three digits are the subject code, and the final three digits are the course code.

Administrative Codes

The undergraduate code for the Mason Gross School of the Arts is 07. For a complete list of administrative codes used in this catalog, see the beginning of the Programs of Study and Courses for Liberal Arts and Sciences Students section.

Subject Codes

A subject code indicates the subject matter of the course. Courses with the following subject codes are listed in this chapter. (This does not constitute a list of majors.)

081 Art, Studio

203 Dance

211 Filmmaking

557 Interdisciplinary

700 Music

701 Music, Applied

966 Theater Arts

Course Codes

The course code comprises the sixth, seventh, and eighth digits in all course numbers. Course codes from 100 to 299 indicate introductory and intermediate undergraduate courses. Codes from 300 to 499 indicate advanced undergraduate courses. (Courses coded from 500 to 799 are graduate courses.)

Two course codes separated by a comma indicate that each semester may be taken independently of the other (example: 07:700:203,204). Two course codes separated by a hyphen indicate that satisfactory completion of the first semester is a prerequisite to the second semester (example: 07:206:138-139); the first semester may be taken for credit without taking the second, except where a statement is added to indicate that both semester courses must be completed in order to receive credit.

Credits awarded for the successful completion of each course are indicated in parentheses following the course title. The notation BA indicates that the number of credits is determined by arrangement with the department offering the course.

The notation P0 indicates that the course is graded pass/fail and that the number of credits is zero.

Art 081 Courses (MGSA)

Art 081 Courses

The following courses serve as classes for the bachelor of arts (B.A.) and the bachelor of fine arts (B.F.A.) curricula.

07:081:105 ***Visual Arts Practice (VAP) (BA)***
Involves supervised practical experience within the Department of Art & Design's studios, computer, media or photography labs, and galleries, or in artistic organizations or contexts across the University and in the larger community. Substantive projects outside of the department may qualify. 1 credit = 42 service hours; 2 credits = 84 service hours.
Three credits are required of all B.F.A. visual arts majors; 2 credits are required of all B.A. art majors. Design majors do not complete VAP. Students must register for the course to earn academic credit.

07:081:121 ***Drawing Fundamentals (4)***
An introduction to drawing as a process of observation, perception, and idea development. Through a range of materials and techniques—pencil, charcoal, ink—students learn to translate three-dimensional space onto a two-dimensional surface using line, value, proportion, and gesture. The course emphasizes both representational and experimental approaches to drawing. Critiques and discussions address formal strategies, artistic intention, and meaning-making, while examples from historical and contemporary practices enrich each project. Students are expected to attend at least one field trip to contemporary art galleries in New York City.
Offered fall and spring. Art minor requirement.

07:081:122 ***4D Fundamentals: Time and Space (4)***
A studio introduction to time-based media and digital tools in contemporary art. Students work with video, sound, performance, and sequencing to explore duration, rhythm, movement, and narrative. Emphasis is placed on experimentation, collaboration, and developing a personal voice through emerging technologies. Techniques include camera work, editing, animation, and sound design, alongside readings, screenings, and critique. The course culminates in a public presentation of student projects.
Offered fall and spring. Required for Art minor.

07:081:200-201 ***Seminar in Contemporary Art A and B (3,3)***
An introduction to works of contemporary art from the mid 20th century to the present. Explores different approaches to the production and reception of contemporary art across painting, drawing, sculpture, performance, photography, video, and more. Considers how art disciplines cross-pollinate and some practices abandon the notion of a distinct medium altogether. Readings as well as podcasts, films, and museum visits will support the course lectures and discussions, which engage contemporary art critically and creatively.
Prerequisites: 01:082:105 and 01:082:106. 07:081:200 is a prerequisite for 07:081:201.

07:081:221 ***Drawing I-A (4)***
This course will explore the historical roots and contemporary application of the radical and conceptual process known as collage. Ideas of fracture, montage, image/object, process, and environment will all be explored as students develop their own vocabulary and studio practice. Historical models, relevant texts, and contemporary artists will be examined. Research, special projects, and group and individual critiques are an integral part of the course.
Prerequisite: 07:081:121. May take Drawing I-A and Drawing II-A (07:081:321) together.

07:081:222 ***Drawing I-B (4)***
This course introduces the use of color into the drawing practice. While drawing is most often taught as a series of value and/or mark-making relationships, this course will introduce tools and materials that facilitate an approach to using color that goes beyond the simple differentiation of form. Using a variety of methods and materials to introduce color into the drawing process, students will experiment with oil pastel, watercolor, colored pencil and found color material (collage) to explore how color affects the meaning and reading of a work of art. Assignments, readings, presentations, and screenings will all examine color from various viewpoints including (but not limited to) historical, conceptual, psychological, cultural, and ethnographic ideas related to color and its use in the drawing practice.
Prerequisite: 07:081:121 or permission of instructor. May take Drawing I-B with Drawing II-B (07:081:322) together.

07:081:227 ***Visual Thinking A: Form and Space (4)***
This course provides an introduction to the basic principles of visual thinking through the study of form, space, and material. Students explore both the formal and conceptual aspects of design, addressing how image, object, intentionality, and culture shape meaning in visual art and design. Projects are designed to increase students' technical and conceptual abilities through hands-on work in a variety of materials and approaches, with emphasis on spatial awareness, balance, direction, and scale. Critiques and discussions play a crucial role in analyzing work, and historical and contemporary art examples are introduced throughout the semester. Students are expected to make at least one trip to NYC to tour contemporary galleries.
Offered fall only. Visual Thinking A or B is required for Art minor.

07:081:228 ***Visual Thinking B: Color (4)***
This course introduces students to the formal principles of two-dimensional design and color theory through hands-on experimentation and perceptual analysis. Students investigate the physics, psychology, and cultural meanings of color, while learning to compose using line, shape, rhythm, pattern, and contrast. Projects emphasize both intuitive and structured design strategies, inviting students to explore abstraction, visual storytelling, and personal expression. Readings and critiques support visual literacy, intentional decision-making, and critical engagement with visual culture.
Offered spring and summer only. Visual Thinking A or B is required for Art minor.

07:081:231 ***Design I-A: Type and Typography (4)***
Introduction to typography, the practice of making verbal language visual. Builds visual awareness of letterforms and their composition in space through studio projects that engage with type as a means for clear communication and visual expression. In addition to studio work, this course demands absorbing technical and historical knowledge in order to develop a visual sensitivity for typographic form.

The practice of typography gives verbal language a visual form, material, and method of distribution. This course introduces the fundamental concept and terminology of type, such as typefaces, type sizes, leading, kerning, grids, guides, composition, space, color, and motion. This studio course builds technical and practical skills towards a fluency in setting and manipulating type within a contemporary digital environment. Students will understand and us fonts and typesetting software to create and analyze typographic prototypes for both print and screen.
Offered fall only.

07:081:232 ***Design I-B: Form and Meaning (4)***
Introduction to a visual communication design process. Work with both hand methods and digital technologies to develop original design solutions. Assignments integrate conceptual thinking with formal experimentation. Students explore problems dealing with visual metaphor, symbols, and the combination of type and image for making meaning.
Prerequisite: 07:081:231. Offered spring only.

07:081:243 ***Media I-A: Introduction to Media Art: Screen/Image/Sound (4)***
This introductory course focuses on the production and concepts of screen-based media artwork. Students learn about the interdisciplinary field of media art, which can include video art, installation, and video sculpture; artists' cinema; experimental film and video; participatory art; live media performance; and art for the internet. Students learn to navigate a landscape of continuously changing technologies and devices. The course includes lectures, workshops, technical demos, readings, critiques of student work, and screenings of artists' works. Students create a series of group and individual media art projects. No technical experience required.

07:081:244 ***Media I-B: Experimental Practices and Techniques (4)***
A course on experimental approaches to screen-based media art including experimental documentary and narrative, collage and montage, sampling, remixing, and abstraction. The course includes a series of technical workshops that may include 2-D animation, compositing, and other visual and digital tools and effects. Screening and discussions about media art in relation to art history and contemporary art. Includes lectures, workshops, technical demos, readings, critiques of student work, and screenings of artists' works. Students create a series of short video and sound artworks.
Prerequisite: 07:081:243.

07:081:251 ***Painting I-A (4)***
Introduces a range of technical and experimental approaches to painting with oil and/or acrylic in ways that relate to the history of Western Modernist painting. The course offers varied and dynamic approaches to the problems of structure, shape, materiality, and color, both in representation and abstraction. The development of formal coherence and imagery are guided and practiced through individual and group critiques, slide presentations of a rich cross-section of painters and painting practices, selected readings, and museum visits. This class also introduces students to the vocabulary and critical skills to be able to articulate what they are seeing and making.

07:081:252 ***Painting I-B (4)***
This course builds on the foundational skills, techniques, and modes of perception in Painting I-A through the development of Cubism and the post-Cubist figure in connection with developments in representation, followed by explorations into models of abstraction. Throughout, emphasis will be placed on the materiality of painting and how that central condition of the medium affects perception and meaning. The course consists of in-class exercises, out of class projects, individual mentoring and group critiques and discussion, slide presentations, and visits to museums in New York City. This class continues to introduce students to the vocabulary and critical skills to be able to articulate what they are seeing and making.
Prerequisite: 07:081:251; offered in the spring only.

07:081:261 ***Photography I-A: Introduction to Digital Photography (4)***
A rigorous introduction to digital photography, featuring the digital camera, digital image file development including camera RAW, and the presentation of photographs on screen and in print. This studio-based course explores photography by considering technical, creative, historical, cultural, and critical issues of the multifaceted medium of photography.

07:081:262 ***Photography I-B: Darkroom Photography (4)***
Explores the foundations of film photography with an emphasis on technique and aesthetic concerns, coupled with an introduction to the history of photography. Emphasizes mastery of the 35mm and large format film camera techniques, lighting, black-and-white film development, gelatin silver printing, visual literacy, editing, and presentation methods.

07:081:271 ***Print I-A: Silkscreen (4)***
In-depth exploration of silkscreen including hand-drawn, computer-generated positives, and production. The course encourages the combination of other print media and will include a short segment on print as a 3-D structure. Artistic development concerning composition, content, and conceptual ideas will be addressed through individual and group critiques.

Offered both fall and spring.

07:081:272 ***Print I-B: Relief (4)***
In-depth exploration of woodcut, linocut, reduction print; work will be in both black and white and printing of multicolored blocks including reduction block printing. The course encourages the combination of other print media. Artistic development concerning composition, content, and conceptual ideas will be addressed through individual and group critiques.

07:081:281 ***Sculpture I-A (4)***
Sculpture 1-A is the one of two introductory courses on the fundamentals of sculpture, utilizing traditional and nontraditional techniques. Students will develop an understanding of three-dimensional form through material processes and presentation and become technically and conceptually informed makers. By the end of the semester, students will become confident in the sculpture studio and making the three-dimensional forms they envision with fabrication processes including metal and mold-making in combination with various materials and tools. Projects are designed for students to develop their sculptural practice through making, group discussions, critiques and, most importantly, spending time in a safe and creative studio environment. The studio-based curriculum includes lectures, screenings and assigned readings to support historical and contemporary language around making sculpture. There is no prerequisite for this course.
Sculpture I-A is offered in the fall.

07:081:282 ***Scultpure I-B (4)***
Sculpture I-B is a continued introduction to the fundamentals of sculpture, utilizing traditional and nontraditional techniques. Assignments are designed to develop students¿ sculpture practice through making, group discussions, sketchbooks, models, and, most importantly, spending time in the safe and creative studio environment. Slide presentations and readings will be used to improve general understanding of historical and contemporary language around sculpture and installation. This class is an extension of Sculpture 1-A in that it will focus on material process and expand on an engagement and understanding of how technical craft, formal design, and conceptual underpinning are all integral to the creation of sculptures and installations.
Offered in the spring only.

07:081:303 ***Seminar in Media (3)***
A survey of contemporary media art including video art and installation, expanded and artists' cinema, experimental film and video, sound art, and art for the internet. Students are introduced to a range of media art practices that may include experimental narratives and documentaries, radical and activist media, multimedia installations, found footage collage and remix work, online art interventions, and live media performance. The course explores histories, theories, and critical writing on avant-garde media from the 20th century to the present.
Offered in Spring only. Open to all Visual Arts and Design majors.

07:081:306 ***Public Art: Place and Process (4)***
This course will center on contemporary practices of public art, introducing brief history, methods of fabrication, field visits to site and with stakeholders, administration, proposal development, readings, writings, presentations, discussions and critiques. Students will explore the process of creating a public work of art while developing a deeper understanding of their own artwork, methods, context and intention, ultimately producing a work in the public realm.
Prerequisites and Corequisites: 07:081:281 and 07:081:282.

07:081:310 ***Seminar in Photography (3)***
This course examines historical and contemporary discourse in photography. The course will include detailed discussions of major theoretical approaches to photography. Students encounter aspects of the history of photography and its interaction with other cultural forms through the development of historical, cultural, and political factors and their relationships to the present through key readings, lectures, screenings, and guest speakers.
No prerequisites. Offered fall only.

07:081:313 ***Ceramics/Sculpture (3)***
This course provides an introduction to ceramic sculpture with an emphasis on hand-building methods. Students will learn methods of building ceramic sculptures by techniques of pinch building, slab, coil, press hump mold construction, wheel, and slip casting. The history and theories of ceramics and related sculptural practices will be introduced alongside various methods of construction, surface treatment, glaze chemistry, and firing methodology. Students will also engage in presentations, critiques, discussions, field trips, and visiting lectures.
No prerequisites. Studio elective course.

07:081:321 ***Drawing II-A (4)***
This course examines the relationship of drawing to time and media-based practices, specifically through the history and techniques of animation. Exploring traditional and experimental animation, we will examine how drawing can mark space and movement to create an illusion of time. Starting from precinematic animation techniques through

the realm of the digital, we will examine the impact of technology both technically and conceptually. We will develop a critical understanding of animation and "the animated" as it relates to personal iconography/biography and social/political circumstances through the lens of the current zeitgeist.
Prerequisite: 07:081:121. Corequisite: 07:081:221

07:081:322 ***Drawing II-B: Graphic Narratives (4)***
This course examines how to visually tell a story through the medium of drawing. Using techniques associated with graphic novels, comix, storyboarding, and other sequential art, students will learn how to develop their own visual and literary narratives that carry personal, political, social, and/or global themes.
Prerequisite: 07:081:121 and 07:081:221. Corequisite: 07:081:222.

07:081:324 ***Figure Drawing (3)***
Working from a live, nude model, students explore how to accurately draw the figure. Observational accuracy, quality of line and tone, technique, and expression are all stressed as students become familiar with all aspects of drawing from the figure in pencil, ink, and charcoal.
Prerequisite: 07:081:121. Art minor requirement. Studio elective course. Offered spring only.

07:081:327 ***Seminar in Print (3)***
This seminar considers the history of print, paper, and collaboration from Guttenberg to the internet. The course focuses on the dissemination of printmaking and on the multiple in installation, paper, photography, sculpture, and book forms. Readings, lectures, slides, and film presentations familiarize students with current ideas, history, criticism, practices, and artists who deal with the multiple. The history of the relationship between the collaborative studio and the artist is explored through the Rutgers Print Collaborative, a working model for the collaborative shop housed adjacent to the print studios.
Offered every other year.

07:081:328 ***Design Seminar A: Histories (3)***
Exploration of historical and contemporary critical debates in graphic design. Through readings, lectures, research, and presentations, students investigate the ways historical, cultural, political, and economic factors have shaped design. Students situate their practice within the design discourse of today through an examination of the development of the discipline.
Prerequisites and Corequisites: 07:081:121. Open to both 081 (visual arts) and 208 (design) majors.

07:081:329 ***Seminar in Painting (3)***
This course consists of readings, presentations, and studio assignments pertaining to current painting practice and the precedents that created it. Through discussions in museums and galleries in the presence of painting, students practice looking and situating what we see with the help of the texts, and learn to engage painting discourse from within.
Offered fall only.

07:081:330 ***Seminar in Sculpture: Interdisciplinary Practices (3)***
This seminar is for students interested in contemporary sculpture particularly as it relates to interdisciplinary practices. Sculpture has become a broad range of practices with its door open to many possibilities. Examining contemporary sculpture within the context of its history and traditions and as an expanded discipline, we will explore different historic and topical areas from the mid-20th century to the contemporary moment. As a means of developing their studio practice, students will explore aesthetic, historical, cultural, and theoretical issues in relation to expanded sculpture. The course will map these analyses onto their own research interests through

written assignments, readings, presentations, and lectures, as well as studio visits of practicing artists and theorists, connecting histories of sculpture to current studio practices.
Typically offered spring only.

07:081:331 ***Design II-A: Systems (4)***
Explores complex multi-part design systems such as visual identities and books. Develops skills in research, visual experimentation, using digital and analog tools for print and screen. Consists of studio work, critiques, technical demonstrations, lectures, readings and class discussion.
Prerequisites: 07:081:231-232. Offered fall only.

07:081:332 ***Design II-B: Experimental Computation (4)***
Explores complex multi-part design systems such as visual identities and books. Develops skills in research, visual experimentation, and using digital and analog tools for print and screen. Consists of studio work, critiques, technical demonstrations, lectures, readings, and class discussions.
Prerequisites: 07:081:331. Offered spring only.

07:081:343 ***Media II-A: Media Art Installation and Expanded Cinema (4)***
This course focuses on making and displaying screen- and time-based media in galleries and other architectural environments. Students learn about sequencing in space as well as principles and practices of sound and exhibition design. The course explores how different spaces affect moving images, sound, and projections, and how moving images, sound, and projections can construct and alter space. Students learn about historical precedents and current practices, from pre-cinematic magic lantern shows to expanded cinema, and from video sculpture and site-specific installation art to multichannel video installations, urban screens, and artists' cinema. The course includes technical workshops on syncing multiple channels of video and surround sound. Students create their own media installations and environments.
Prerequisites: 07:081:243-244 or permission of instructor. Offered fall only.

07:081:344 ***Media II-B: Media and Performance (4)***
A course on various intersections between media and performance art. Topics may include performance for the camera, online performances and interventions, participatory art works, autobiography and video diaries,the filmed body as medium, and live video and cinema performance and events. Students create their own recorded or live media art projects.
Prerequisite: 07:081:343. Offered spring only.

07:081:351 ***Painting II-A (4)***
This course nurtures individual growth as a painter in technical mastery and conceptual understanding. Emphasis is placed on working in increasingly self-directed series. Selected readings and visits to exhibitions are required, as are group discussions and critiques.
Prerequisites: 07:081:251-252 or permission of the department. Painting II-A offered fall.

07:081:352 ***Painting II-B (4)***
This course nurtures individual growth as a painter in technical mastery and conceptual understanding, while drawing on and deepening the fundamentals of painting. Moving beyond historical and perceptual models discovered in I-A and I-B, Painting II-B explores different modes of play, experimentation, subject matter, painting histories, and processes. This course contains a combination of structured and self-initiated projects as students learn to listen to, activate and direct their creatives voices through painting. The semester will partake of working in series, thinking about painting in relation to its history and other art, while increasingly working independently

towards an ambitious and complex final project. The course will also consist of selected readings, presentations, demos, visits to exhibitions, as well as group discussions and critiques.
Prerequisites: 07:081:251-252; Painting II-B offered spring.

07:081:356 ***Seminar in Drawing (3)***
Designed for students in the drawing concentration, this seminar examines contemporary drawing within the context of its history and traditions and as a discipline where boundaries are fluid enough to explore drawing through the use of diverse media with nonspecific temporal and spatial boundaries. Drawing is considered in its relationship to a broad range of other disciplines including painting, sculpture, performance, installation, choreography, design, music, and architecture, among others. As a way of supporting the development of their studio practice, students will explore aesthetic, historical, cultural, and theoretical issues in relation to drawing as a medium, method, and practice through written assignments, readings, presentations, lectures, studio visits to practicing artists, and visits to galleries and museums.
Offered every year.

07:081:361 ***Photography II-A: Digital Image and Print (4)***
Features the refinement of digital photography with an emphasis on making exhibition-quality prints and building print portfolios. Through creative assignments, this studio-based course explores photography with particular focus on expressive, historical, and theoretical aspects of the ubiquitous medium.
Prerequisites: 07:081:261, or all students with Photoshop experience and permission of the instructor.

07:081:362 ***Photography II-B: Books (4)***
A course focused on refining your photographic images or images of your artwork for a book or catalog made in InDesign and printed on-demand; a slide presentation of the work; and a website or blog. Your project will be self-directed.
Prerequisite: 07:081:361. Offered spring only.

07:081:371 ***Print II-A: Intaglio (4)***
In-depth focus on intaglio, including engraving, drypoint, etching, aquatint, and spit bite. The course encourages the combination of other print media and will include a segment on photo polymer plates. Artistic development concerning composition, content, and conceptual ideas will be addressed through individual and group critiques.

07:081:372 ***Print II-B: Lithography (4)***
In-depth focus on lithography, including stones, aluminum plates, photo-litho plates, and color lithography. The course encourages the combination of other print media. Artistic development concerning composition, content, and conceptual ideas will be addressed through individual and group critiques.

07:081:381 ***Sculpture II-A (4)***
In this course, students will continue to explore concept and context through the materials and methods of traditional and non-traditional sculpture. Building on Sculpture I-A/B, this course will introduce digital fabrication skills and further build the connections between ideas and making. Emphasis will be on working directly in the studio to develop personal expression and skill. Slide presentations, readings and informal discussions will be used throughout the semester to unpack the fundamental conceptual and practical underpinnings of sculpture.
Prerequisites: 07:081:281-282. Sculpture II-A offered fall.

07:081:382 ***Sculpture II-B (4)***
In this course students will continue to explore concept and context through the material and methods of traditional and non-traditional sculpture. Emphasis will be on working directly in the studio to develop a personal expression and skill. This course will be an exploration of prescribing meaning to objecthood and becoming more aware of how it is we arrive at our intentions through making. We will be looking at references, in and outside of art, and discussing traditional and non-traditional sculptural methods to help us better understand what sculpture is and can be. Many of the projects throughout the semester will act as games to help us extract meaning from movies, readings, media and the everyday to apply to our personal practices in the studio. This course intends to develop a deeper look into the things around us to develop a better understanding of how we, as individual artists, make sense of the world through our studio practice.
Prerequisites and Corequisites: 07:081:281, 282, 381. Sculpture II-B offered spring only.

07:081:383 ***Design Seminar B: Contemporary Practice (3)***
Proposes diverse models for contemporary design practice through a series of lectures by guest designers and by related readings. Class discussions, assigned texts, and writing responses address the pragmatics of design, the designer's role as a social agent, and design and politics. Helps students to situate their own research and develop a critical design language to analyze their own and others' work. The course is intended to help students develop a personal philosophy of design and a sense of how they might practice as designers.
Open only to 208 (design) majors.

07:081:385 ***Design Practicum (3)***
This course provides practical design experience where students undertake appropriate real-world assignments in a noncommercial environment. This is an advanced production studio for students interested in collaborating with academics from other fields, university administrators, NGO representatives, and other designers. Students will engage in research, concept development, design, production, and presentation. Students are expected to work in close contact with peers and outside collaborators to produce visual projects that meet mutually agreed upon parameters. This class should be taken in the junior or senior year when students have sufficient technical and conceptual experience to benefit from the class.

07:081:391,392 ***Independent Study (2) (B.F.A.,B.A.)***

07:081:393,394 ***Internships (4) (B.F.A.,B.A.)***

07:081:413-414 ***Advanced Ceramics Sculpture (4,4)***
Students will continue to practice approaches to building basic three-dimensional forms with clay. The course will focus on experimental ways of working with clay to play and explore various approaches, materials, and methods of making. We will briefly cover the history of ceramics and begin to learn about contemporary artists working in the medium. My objective as an instructor is that by the end of the course each student will be confident in building with clay, will have explored the many ways of using the material and will have grown in their ability to articulate their ideas and discuss their work. I am committed to supporting your work with clay into your larger creative practice. We will go over different techniques, discuss readings, meet with visiting artists, look at ceramic work together and critique your work. In addition to all of that you will have studio time during each class.
Prerequisites: 07:081:313/314.

07:081:421,422 ***Drawing III-A, III-B (4,4)***
Through practice, experimentation, research, and use of a variety of media and methodologies, students will explore more complex approaches to their drawing practice. These may include: the use of image and text; time, sequence,

and narrative in drawing; and drawing as a performance practice, among others. Self-directed work in the studio and research and reading of critical texts are required.
Prerequisites: 01:081:221 and 222 (Drawing I-A and I-B) or corequisite 07:081:321 and 322 (Drawing II-A and II-B) or corequisite 07:081:451-454 (Painting III-A and III-B or Advanced Painting A or B) or by permission of the instructor. Drawing III-A offered fall; Drawing III-B offered spring only.

07:081:431 ***Design III-A: Design for the Digital Realm (4)***
This course trains students to research, analyze, prototype, and develop design concepts for dynamic digital media such as online, tablets, and mobile apps, for three distinct social and cultural contexts. The focus is on practice and experimentation to master UI/UX design. This course consists of three projects addressing experience design and its presentation. Today interaction online focuses on information through living, social platforms. We will go beyond an average user's perspective to critically examine the web through historical, political, and social lenses. This course encourages students to holistically approach the web and its constituent code as a living kit of parts waiting to be harnessed in novel and innovative ways. As digital technology industries rapidly alter ways of doing and thinking, design can amplify, shift, comment on, and/or criticize these changes. The role of designers today is not only to style content but to shape it, extracting information from abstract datasets, writing scenarios, and creating systems, all with a critical eye.
Prerequisites and Corequisites: 07:081:231, 232, 331, 332. Offered fall only.

07:081:432 ***Design III-B: Portfolio (4)***
Development of a diverse, refined body of work and format for its presentation. Lectures and readings survey current issues in design practice. Critiques and discussions underpin the process of defining and articulating the student's interests and approach to design.
Prerequisite: 07:081:431. Offered spring only.

07:081:441 ***Media III-A (4)***
Students work under the direction of faculty and in discussion with the class on producing self-directed, independently conceived media artworks that reflect their own interests and ideas. Students will proceed through all stages to fully realize their work--from research, proposal, production, postproduction to installation, screening, or other form of display. Ongoing group discussions, critiques, readings, and screenings related to students' creative projects.
Prerequisites: 07:081:343-344 or permission of instructor. Media III-A offered fall.

07:081:442 ***Media III-B (4)***
This is a class for intermediate-level and advanced students working in media. Students work under the direction of faculty and in dialogue with classmates on self-directed, independently conceived time-based media artworks that reflect your own interests and ideas. The class will give you support and structure as you continue to develop your independent creative voice and vision as an artist. You will be challenged to take risks by working in ways you don't usually work, trying new things, and pushing yourself beyond your habitual ways of making. You will work collaboratively with your peers on skill, concept, and idea sharing in order to develop and nurture peer-to-peer networks, peer-to-peer learning, collaboration, and mutual support. Students will also learn about and develop professional practice skills as you prepare for life and work after art school, including job search preparation, writing cover letters, resumes, artist statements, applying for art residencies, and more. The class will include individual and group discussions, peer-to-peer workshops, individual and group projects, critiques, readings, writing, and screenings, shaped around students' creative work and interests.
Prerequisites: 07:081:341-344 or permission of instructor. Media III-B offered spring only.

07:081:446 ***Advanced Media A (4)***
Students work under the direction of faculty and in discussion with the class on producing self-directed, independently conceived media artworks that reflect their own interests and ideas. Ongoing group discussions, critiques, readings, and screenings in media art.
Prerequisites: 07:081:441-442 or permission of instructor. Offered fall only.

07:081:447 ***Advanced Media B (4)***
This is a class for intermediate-level and advanced students working in media. Students work under the direction of faculty and in dialogue with classmates on self-directed, independently conceived time-based media artworks that reflect your own interests and ideas. The class will give you support and structure as you continue to develop your independent creative voice and vision as an artist. You will be challenged to take risks by working in ways you don¿t usually work, trying new things, and pushing yourself beyond your habitual ways of making. You will work collaboratively with your peers on skill, concept, and idea sharing in order to develop and nurture peer-to-peer networks, peer-to-peer learning, collaboration, and mutual support. Students will also learn about and develop professional practice skills as you prepare for life and work after art school, including job search preparation, writing cover letters, resumes, artist statements, applying for art residencies, and more. The class will include individual and group discussions, peer-to-peer workshops, individual and group projects, critiques, readings, writing, and screenings, shaped around students¿ creative work and interests.
Prerequisites: 07:081:446. Offered spring only.

07:081:451-452 ***Painting III-A and III-B (4,4)***
In this course, students will work in individual studios on self-directed projects, developing subject matter, content, and methodology through directed research. Selected readings and visits to exhibitions and lectures are required, as is participation in group discussions, presentations, critiques, and reviews.
Prerequisites: 07:081:351-352 or by permission of the area. Primarily for students who have concentrated in this area. Painting III-A offered fall; Painting III-B offered spring only. (This course is cross-listed with Advanced Painting A).

07:081:453-454 ***Advanced Painting A and B (4,4)***
Students in this course are engaged in mentored individual work toward their thesis and explore how to sharpen and sustain the questions that will carry their work beyond it. These are identified and tested through individual studio visits with the instructor, group critiques; discussions of lectures, texts, and exhibitions; instructor and student presentations; peer curation, and review assignments.
Pre or Corequisites: 07:081:451-452. Advanced Painting A offered fall; Advanced Painting B offered spring only.

07:081:455-456 ***Advanced Drawing A and B (4,4)***
Students in this course work on self-directed exploratory-based drawing projects under the mentoring of the instructor and within the engaged, critical dialogue of their peers. Students are expected to write a proposal and complete a cohesive body of work.
Pre- or corequisites: 07:081:321 or 322 (Drawing III-A or III-B); or 07:081:451-452 (Painting III-A or III-B). Advanced Drawing A offered fall; Advanced Drawing B offered spring only.

07:081:461-462 ***Photography III-A and III-B: Exhibition and Portfolio (4,4)***
In this course, students concentrate on individual artistic development by which they can develop an awareness and understanding of experimental and creative approaches to conceptual projects within the framework of

contemporary photographic art practice. Advanced theoretical studies and individual practical investigations are used to support an emerging independent work process culminating in a final body of work.
Prerequisites: 07:081:361-362. Photography III-A offered fall; Photography III-B offered spring only.

07:081:463-464 ***Advanced Photography A and B (4,4)***
Projects in this special topics class concentrate on the approach to specialized development in photography areas such as artists books, multimedia approaches, performance, installation, and photography-based public art. Individual and group work includes research and short- and long-term project development.
Prerequisites: 07:081:461-462. Advanced Photography A offered fall; Advanced Photography B offered spring only.

07:081:471 ***Print III-A: Letterpress (4)***
In-depth focus on letterpress including hand typesetting and polymer plates on the Vandercook press. The course will cover broadsides, artists' books, and chap books. Artistic development concerning composition, content, and conceptual ideas will be addressed through individual and group critiques.

07:081:472 ***Print III-B: Papermaking (4)***
In-depth focus on papermaking including Western style formation, working with Japanese fibers, three-dimensional pulp casting, coloring of pulps, stencils, watermarking, sizing, pressing, and drying. Artistic development concerning composition, content, and conceptual ideas will be addressed through individual and group critiques.

07:081:473 ***Advanced Print A: Graphic Impulse (4)***
This course makes the argument that the most suitable container for interdisciplinary language and process is printmaking. We will take under consideration the premise that printmaking constitutes a broad range of approaches that have the capacity to yield new form and new language when combined with other traditional techniques. We¿ll study and examine both historical and contemporary examples of artists output that have encouraged a necessary expansion of the medium of print beyond works on paper. Course lectures and demos will focus on five central themes: Print as Moving Image, Print as 3-Dimensional Form, Print as Substrate, Print as Picture, and Print as Architecture and Design. Assignments will describe conceptual and material conditions that participants must adhere to but will also allow ample rooms for experimentation and encourage a poly-medial process of arriving at the completed work.
Prerequisites: A minimum of one upper level print course.

07:081:474 ***Advanced Print B: Artists' Books (4)***
In-depth focus on handmade artists' books including Japanese stab binding, accordion structures, single and multiple signatures, Coptic, and alternative books. Artistic development concerning composition, content, and conceptual ideas will be addressed through individual and group critiques.
No prerequisites.

07:081:481-482 ***Sculpture III-A and III-B (4,4)***
In this advanced studio course, students will explore, define, and develop their creative work and research in expanded sculptural practices through studio assignments and prompts, writing, instructor and student presentations, professional material development, readings, and independent projects. Students will continue the development of their studio practice in an increasingly independent framework while being asked to define their decisions in group and individual discussions while most likely developing and presenting their work in a Thesis

exhibition. Students gain understanding of how their work is situated historically and discursively in the field through lectures, readings, and group and individual critiques.
Prerequisites: 07:081:381-382. Sculpture III-A offered fall; Sculpture III-B offered spring only.

07:081:483-484 ***Advanced Sculpture A and B (4,4)***
Students in this course will work on independently conceived sculpture projects which are developed in consultation with the instructor. Independent research and creative work are supported by group critiques, individual meetings with the instructors, lectures, readings, and class discussions.
Pre- or corequisites: 07:081:481-482. Advanced Sculpture A offered fall; Advanced Sculpture B offered spring only.

07:081:491,492 ***Independent Study (2) (B.F.A.,B.A.)***

07:081:493,494 ***Internships (4) (B.F.A.,B.A.)***

07:081:497-498 ***Thesis and Exhibition A and B (4,4)***
The culmination of undergraduate Art & Design creative research and practice, this year-long course provides methodologies, structure, and community to pursue advanced independent studio work and critique, leading to a group exhibition in the second semester. This year-long course is required for the B.F.A. in Visual Art and B.F.A. in Design degrees.
Open only to B.F.A. seniors.

Dance 203 Courses (MGSA)

DANCE 203 COURSES

07:203:101 ***Dance Appreciation (3)***
Dance Appreciation is an introduction to dance as an art form, wherein students study the historical, cultural, social, and performative contexts of diverse dance forms. Students engage with aesthetic, theoretical, and scholarly discourses aimed at illuminating how dance functions as a form of communication and personal, aesthetic expression. In addition, students explore the ways in which dance both reflects and comments upon contemporary society. Students develop fundamental dance literacy through critical analysis of dance in live and recorded formats; identify aesthetic concepts and ideas through written and visual media; demonstrate comprehension in their utilization of dance vocabulary and terminology; discuss influential choreographers and genres of dance; and articulate critical conclusions about the reciprocal relationship between dance, the arts, and societal concerns.
Please note: Students may not receive credit for both 07:203:101 and 07:203:131.

07:203:110 ***Street and Club Dances (2)***
The study of fusion dance evolving from traditional and contemporary African and African diasporic dance forms, including contemporary social dances. Students will be introduced to these dance forms through studio practice, video, masterclasses, and performance.
Open to BA majors, minors, and non-dance majors.

07:203:115 ***Introduction to Dance Studies (3)***
Introduction to the domain of dance practice and theoretical frameworks, within a humanities context that acknowledges the intersection of multiple intelligences. Students observe and describe dance as a performing art and as cultural intervention. Guest artists provide performance demonstrations on a variety of topics including

race/ethnicity, gender/sexuality, disability studies, screendance technology, and sound/lighting/costume design, among others. Descriptive and analytic writing required.
Open only to dance majors.

07:203:123 ***Modern Dance 1 (2)***
Introduction to the fundamentals of movement skills and body awareness in modern dance technique, improvisation, and composition.

07:203:124 ***Modern Dance 2 (2)***
Continued development of movement skills, improvisation, and composition in modern dance.
Prerequisite: 07:203:123 or permission of instructor.

07:203:131 ***Dance Appreciation (3)***
Dance Appreciation Online is an introduction to dance as an art form, wherein students study the historical, cultural, social, and performative contexts of diverse dance forms. Students engage with aesthetic, theoretical, and scholarly discourses aimed at illuminating how dance functions as a form of communication and personal, aesthetic expression. In addition, students explore the ways in which dance both reflects and comments upon contemporary society. Students develop fundamental dance literacy through critical analysis of dance in live and recorded formats; identify aesthetic concepts and ideas through written and visual media; demonstrate comprehension in their utilization of dance vocabulary and terminology; discuss influential choreographers and genres of dance; and articulate critical conclusions about the reciprocal relationship between dance, the arts, and societal concerns.
Please note: Students may not receive credit for both 07:203:101 and 07:203:131.

07:203:132 ***History of Broadway Dance Online (3)***
Explores the evolution of dance in musical theater and on Broadway. Course topics will include a historical survey of dance on Broadway; an examination of the reciprocal relationship of Broadway dance to economic and cultural change; and a close look at the power structure and organization of Broadway musicals. The evolution of Broadway dance steps and styles and the contribution of notable dancers will be examined.

07:203:134 ***Dance in Israel: Body, Ideology, and Culture (3)***
Survey of Israel's concert dance history, from roots in imported styles in the pre- and immediate post-state decades to the blossoming of a homegrown Israeli contemporary dance within the last few decades. Topics include aesthetic influences, significant artists, and recent innovations, with discussions about technical, stylistic, and thematic concerns. Throughout the course, dance is situated within a larger historical, sociopolitical context, and connections to politics, nationalism, religion, ethnicity, and culture are considered.

07:203:135 ***Dance Forms in Africa (3)***
Explores dance forms from different cultures in different blocks on the African continent. Through readings, viewings, and engagement with movement, students use skills of observation, movement learning, and contextual and comparative analysis, focusing on the social, cultural, religious, and political significance of African dance forms. Types and functions of traditional African dances, contexts of performance, and their unique characteristics will also be explored.

07:203:136 ***Dance in India (3)***
Covers a wide range of forms practiced in India in the 20th and 21st century, including folk dances, classical dance styles, contemporary choreography, and film dances, among others. Also looks beyond India, into the diaspora

and global contexts in which Indian dance forms are practiced. Methods include analysis of readings, video documentaries, dance films, and interviews, as well as concept mapping. Practical engagement with movement material and aesthetic principles included.

07:203:149 ***Ballet 1 (2)***
Introduction to ballet as an art form with an emphasis on traditional steps.

07:203:150 ***Ballet 2 (2)***
Practice in the development of ballet technical skill, body alignment, and concepts of ballet aesthetics.
Prerequisite: 07:203:149 or permission of instructor.

07:203:155 ***Introduction to Jazz Dance (2)***
Familiarizes nondance majors to technical and performance aspects of jazz dance. The course introduces students to a variety of jazz styles to provide a broad foundation from which to select future training opportunities.
Open to BA majors, minors, and non-dance majors.

07:203:160 ***Pilates Mat (1)***
Covers the 34 Pilates mat exercises as developed by Joseph and Clara Pilates. Variations and modifications for each of these exercises will also be taught in an effort to not only further explore the possibilities that the method offers, but to prevent injury and suit the needs of each student. Use of foam roller and magic circle props will be integrated into this practice.
Open to dance majors, minors, and non-majors.

07:203:170 ***Yoga for Wellness (2)***
In this course, students will learn the historical beginnings of yoga, gaining a broad understanding of the cultural significance of this practice. Basic Sanskrit, Hindu mythology, and the culture of India will also be discussed.
Open to dance majors, minors, and non-majors.

07:203:329 ***Dance Composition (2)***
Development of fundamental skills in choreography.
Pre- or corequisite: 07:203:142. Open only to B.A. dance majors and dance minors.

07:203:350 ***Performing Climate Change (3)***
This course provides a conceptual framework and creative practicum for students who wish to engage with climate change through the performing arts. The course is open to students of all disciplines. The prerequisites are an interest in climate change and a willingness to active the creative imagination.

07:203:363 ***B.A. and Minor Modern Dance Repertory (2)***
Study and performance of original or repertory works, both historical and contemporary, by guest or resident choreographers.
Open only to B.A. dance majors and dance minors.

Dance 206 Courses (MGSA)

Dance 206 Courses

07:206:100 ***Dance Assembly (N.5)***
Grade based on attendance. Required of all B.F.A dance majors for eight semesters of enrollment as a declared major.

07:206:126 ***Rhythm for Dancers (2)***
Analysis of rhythmic structure relative to movement. Sight-reading note values, movement dictation, and composition.
Prerequisites: 07:203:123 and 124. Open to dance majors only.

07:206:130 ***African Diasporic Movement Practices 1 (1.5)***
African Diasporic Movement Practices brings forward for dancers the origins of Black African Diasporic derived dance forms and fusions and their value in dance training. Forms and fusions of forms will be identified and contextualized culturally and historically in order to provide students with skills essential to embody and physically master the movement practice. The dance form's social and cultural roots will be studied as essential to movement practice. Studio work, readings, and self-reflections will help students to understand the physical, intentional, and expressive values by which a dancer is understood to be proficient in the form.
Open only to B.F.A. dance majors.

07:206:131 ***Classical/Traditional Movement Practices 1 (1.5)***
Dance forms centered in codified movement vocabularies emerging from global, temporal, and cultural contexts. Example forms include: Classical Ballet, Kathak, Chinese classical dance, and forms based on or derived from Cunningham, Fosse, Cole, Graham, Horton, Limon, Luigi, and Taylor Techniques.
Open only to B.F.A. dance majors.

07:206:132 ***Contemporary Fusion Movement Practices 1 (1.5)***
Studio course in which students engage both physically and theoretically with contemporary movement practices that draw from at least two forms of dance. The course situates the individual forms and fused practice within historical, social, and cultural lenses to provide an understanding of lineage, to accurately represent the values of the practice, and to help students recognize their individual relationship to the practice.
Only open to B.F.A. dance majors.

07:206:133 ***Somatic Movement Practices 1 (1.5)***
Movement practices that emphasize wellness, functional efficiency, and injury prevention through embodied experience and integration of body/mind/spirit. Example practices include: Alexander Technique, Bartenieff Fundamentals, Feldenkrais Method, Franklin Method, Functional Movement Training, Klein Technique, Pilates, and Yoga.
Open only to B.F.A. majors.

07:206:142 ***Dance Improvisation 1 (2)***
Introductory experience in dance improvisation including the use of kinetics, movement design, and spatial sensing as potential sources of movement and partner interaction.
Open only to dance majors and minors.

07:206:145 ***Performance Skills 1 (2)***
Development of performance skills for first-year B.F.A. dance majors. Students are engaged in an extensive rehearsal process with a guest or faculty choreographer in order to introduce them to generative improvisational and compositional strategies for the creation of original works of choreography.
Open only to B.F.A. majors.

07:206:146 ***African Diasporic Movement Practices 2 (1.5)***
African Diasporic Movement Practices brings forward for dancers the origins of Black African Diasporic derived dance forms and fusions and their value in dance training. Forms and fusions of forms will be identified and contextualized culturally and historically in order to provide students with skills essential to embody and physically master the movement practice. The dance form's social and cultural roots will be studied as essential to the movement practice. Studio work, readings and self-reflections will help students to understand the physical, intentional and expressive values by which a dancer is understood to be proficient in the form.
Open only to B.F.A. dance majors.

07:206:147 ***Classical/Traditional Movement Practices 2 (1.5)***
Through engaging in a new Classical/Traditional form, Movement Practices 2 inwardly builds, outwardly expands, and develops variation in learning from Somatic Movement Practices 1. Students continue to find connections among the five course goals and learning outcomes listed below. Students will add to their movement vocabulary and also continue to unearth personal voice through a non-hierarchical nexus of learning.
Open only to B.F.A. dance majors.

07:206:148 ***Contemporary Fusion Movement Practices 2 (1.5)***
Through engaging in a new Contemporary Fusion form, Movement Practices 2 inwardly builds, outwardly expands, and develops variation in learning from Contemporary Fusion Movement Practices 1. Students continue to find connections among the five course goals and learning outcomes listed below. Students will add to their movement vocabulary and continue to unearth personal voice through a non-hierarchical nexus of learning. Students will investigate another Contemporary Fusion form that draws from at least two forms of dance. This is a studio course in which students engage both physically and theoretically with such contemporary movement practices.
Open only to B.F.A. dance majors.

07:206:149 ***Somatic Movement Practices 2 (1.5)***
Somatic Movement Practices 2 focuses on theoretical and embodied understanding of selected somatic practice(s) with a special focus on application to dance training and performance. Students will examine somatic theories and principles and how they manifest in somatic practices that emphasize internal physical perception and experience.
Open only to B.F.A. dance majors.

07:206:154 ***Pointe Class (1)***
Class includes participation in a ballet barre and center work. The focus will be on the practice and principles of the classical ballet vocabulary with an emphasis on strengthening foundational skills in pointe technique. Advice will be given on how students can best prepare and maintain their pointe shoes.
Open to dance majors only. B.A. dance majors and dance minors with permission of instructor only.

07:206:155 ***Ballet Jumps and Turns (1)***
Class includes participation in a ballet barre and center work. The focus will be on the practice and principles of classical ballet jumps and turns.
Open to B.F.A. dance majors only. B.A. dance majors and dance minors with permission of department only.

07:206:161 ***Production Study (1-2)***
Crew assignments and production support for department dance performances.
Dance majors and dance minors to complete 1 credit; B.F.A. dance majors to complete 2 credits.

07:206:235 ***Choreography 1 (2)***
Introduction to the choreographic process. Solo forms and group choreography.
07:206:243 or permission of the instructor. Open only to B.F.A. dance majors.

07:206:237 ***Dance Production (3)***
Theoretical and practical applications of computer, lighting, audio, and technical theater skills necessary to produce, promote, and direct dance productions. Students develop computer skills in graphic design and sound design/editing as well as computer lighting consoles and theatrical lighting equipment in two professional theaters. Students study lighting design and stage management for dance in theory and practical application around a department production.

07:206:243 ***Dance Improvisation 2 (2)***
Exploration of dance improvisation as the source of movement for choreography.
07:206:142 or permission of the instructor. Open only to B.F.A. dance majors.

07:206:245 ***Performance Skills 2 (2)***
Continued development of performance skills for second-year B.F.A. dance majors. Students are challenged to further refine their technical skills and advance their performance abilities through a collaborative, creative process with a guest or faculty choreographer.
07:206:145 or permission of the instructor. Open only to B.F.A. majors.

07:206:260 ***African Diasporic Movement Practices 3 (1.5)***
African Diasporic Movement Practices 3 inwardly builds, outwardly expands, and develops variation in learning from Movement Practices 2. Students will elevate connections among the five course goals and learning outcomes and incorporate an additional goal towards communication of their individual identities, perspectives and artistry. Students apply skills, approaches to movement, and contexts learned in Movement Practices 1 and 2 to train in a new African Diasporic-derived form as an informed dancer in the movement practice. Students will add to their movement vocabulary and artistic strategies as they navigate the use of their year one Movement Practices training to illuminate embodied communication and strengthen performance in the form. Leadership skills will also be developed.
Open only to B.F.A. dance majors.

07:206:261 ***Classical/Traditional Movement Practices 3 (1.5)***
Students apply skills, approaches to movement, and contexts learned in Movement Practices 1 and 2 to train in a new Classical/Traditional form as an informed dancer in the movement practice. Students will add to their movement vocabulary and artistic strategies as they navigate the use of their year one Movement Practices training to illuminate embodied communication and strengthen performance in the form. Leadership skills will also be developed. Students will deeply investigate this codified, Classical/Traditional form and its value in their dance training. Forms and fusions of forms will be identified and contextualized culturally and historically in order to provide students with skills essential to embody and physically master the movement practice. The form's traditions, modes of study, movement vocabularies, and prescriptive grammars will also be studied and expressed
Open only to B.F.A. dance majors

07:206:262 ***Contemporary Fusion Movement Practices 3 (1.5)***
Through engaging in a new Contemporary Fusion form, Movement Practices 3 advances the artistic and kinesthetic investment of inwardly building, outwardly expanding, and developing variation in learning from Contemporary Fusion Movement Practices 1 and 2. Students will investigate a Contemporary Fusion form that draws from at least two forms of dance. This is a studio course in which students engage both physically and theoretically with contemporary movement practices. The course situates the individual forms and fused practice within historical, social, and cultural lenses to provide an understanding of lineage, to accurately represent the values of the practice, and to help students recognize their individual relationship to the practice. The course emphasizes the progression from internal investigation to external expression.
Open only to B.F.A. dance majors.

07:206:263 ***Somatic Movement Practices 3 (1.5)***
Somatic Movement Practices 3 continues to focus on theoretical and embodied understanding of selected somatic practice(s) with a special focus on application to dance training and performance. Students will examine somatic theories and principles and how they manifest in somatic practices that emphasize internal physical perception and experience. Distinctive forms enable students to better understand how they can promote wellness and self-knowledge, and prevent injury through continued and varied experiences with and reflective thinking about somatic practices.
Open only to B.F.A. dance majors.

07:206:264 ***African Diasporic Movement Practices 4 (1.5)***
Through engagement in a new form, African Diasporic Movement Practices 4 continues to advance the artistic and kinesthetic investment in inwardly building, outwardly expanding, and developing variations in learning from African Diasporic Movement Practices 1, 2 and 3. Students elevate increasingly sophisticated connections among the six course goals and learning outcomes listed below and apply skills, approaches to movement, and contexts learned in Movement Practices 1 and 2 to train in a new African Diasporic-derived form as an informed dancer in the movement practice.
Open only to B.F.A. dance majors.

07:206:265 ***Classical/Traditional Movement Practices 4 (1.5)***
Continued study and training in dance forms centered in codified movement vocabularies, emerging from global temporal and cultural contexts. Example forms include: Classical Ballet, Bharatanatyam, Chinese classical dance, and forms based on or derived from Cunningham, Fosse, Cole, Graham, Hawkins, Horton, Limon, Luigi, and Taylor Techniques.
Open only to B.F.A. dance majors.

07:206:266 ***Contemporary Fusion Movement Practices 4 (1.5)***
Through engagement in a new Contemporary Fusion form, Movement Practices 4 continues to advance the artistic and kinesthetic investment of inwardly building,¿outwardly expanding, and developing variation in learning from Contemporary Fusion Movement Practices 1, 2 and 3. Students investigate this additional Contemporary Fusion form that draws from at least two forms of dance. This is a studio course in which students engage both physically and theoretically with contemporary movement practices. The course situates the individual forms and fused practice within historical, social, and cultural lenses to provide an understanding of lineage, to accurately represent the values of the practice, and to help students recognize their individual relationship to the practice. The course emphasizes the progression from internal investigation to external expression.
Open only to B.F.A. dance majors.

07:206:267 ***Somatic Movement Practices 4 (1.5)***
Somatic Movement Practices 4 continues to focus on theoretical and embodied understanding of selected somatic practice(s) with a special focus on application to dance training and performance. Students will examine somatic theories and principles and how they manifest in somatic practices that emphasize internal physical perception and experience. Distinctive forms enable students to better understand how they can promote wellness and self-knowledge, and prevent injury through continued and varied experiences with and reflective thinking about somatic practices.
Open to only B.F.A. dance majors.

07:206:274 ***Jazz Dance (2)***
Various styles and techniques in the idiom of jazz dance.
May be repeated for credit. Open only to dance majors and minors.

07:206:277 ***Latino and Hispanic Dance Forms (2)***
Studio course includes technique and performance of selected dance forms within their historical and cultural contexts. Dance forms may include indigenous, diasporic, and hybrid dances from the Caribbean, Mexico, and South America; classical Spanish and Flamenco dance; and Filipino dances derived from Spanish influence.
May be repeated for credit if a new culture.

07:206:312 ***Advanced Ballet (2)***
Studio-based course with barre and center format. We will call upon our curiosities and sense of play to examine and embody classical ballet vocabulary through the applications of somatic practices, repertory, and improvisation techniques. Class material will increase with complexity of vocabulary, tempos, and spatial pathways over the course of the semester. Journaling and class discussions will include, but are not limited to: the role of ballet a Eurocentric form in the 21st century, the potential for ballet class to be an individual and/or collective practice, and applications of tools/approaches learned in this class to other dance forms.
Classical/Traditional Movement Practices 2 or Ballet 2

07:206:319 ***Sound and Movement (3)***
Analysis of the relationships of music and dance in content, form, and structure.
B.A. dance majors complete 07:203:126 prior to enrollment.

07:206:325 ***Kinesiology for Dancers (3)***
Functional human anatomy and the study of the scientific basis of human movement as they relate to dance training. Course includes somatic studies of diverse movement disciplines.
Open only to dance majors.

07:206:326 ***Adaptive Movement Through Dance (3)***
A hybrid integrated dance studies/studio course that introduces how to teach modified movement techniques for special populations. The course integrates lecture/studio course training to teach students how to use various types of adaptive movement methods, including ballet, modern, jazz, tap, ballroom, musical theater choreography, and the Brain Dance to create a series of rhythmic patterns. These patterns offer flow and consistency to enhance the weight shifting and transitional steps to promote a progression of skills. Total body integration methods such as Bartenieff Fundamentals, Alexander Technique, Feldenkrais Method, Yoga, and other forms of kinesthetic learning will be introduced. Populations with a variety of both congenital and acquired disabilities will be discussed to summarize their specific needs for having access to an appropriate adaptive movement class.
07:206:325

07:206:334 ***Choreography 2 (2)***
Continued development of solo and group choreographic processes with emphasis on movement invention and experimental forms.
07:206:235. Open only to B.F.A. dance majors.

07:206:341 ***Advanced Jazz (2)***
Advanced Jazz expands on artistic and kinesthetic investment in jazz dance and jazz dance-infused practices. Students elevate increasingly sophisticated connections among the six course goals and learning outcomes listed below and apply skills, approaches to movement, and contexts learned in Movement Practices 1 and 2 or Jazz 1 and 2, to train in a new jazz dance form. Continuing the expansion of their movement vocabulary, students will further illuminate their personal voice through visible expression. Jazz dance forms and fusions of forms are identified and contextualized culturally and historically, and in connection to other forms, in order to provide students with skills essential to embody and physically master the advanced practice.
African Diasporic Movement Practices 2 or Jazz 2

07:206:343 ***Advanced Modern (2)***
Practice in advanced skills in modern dance. The purpose of this course is to prepare the mind and body of the dancer for a wide range of movement possibilities: forms, qualities, dynamics and intention. The course is designed to enhance the student's self-awareness, so as to recognize the ways in which lineage, individual habits and tendencies, and individual preferences/biases are present in the body. Mindful approach to enhancing the self-awareness from which movement is executed is essential with an emphasis in breath, body alignment and mental focus. The course works towards building proficient dance technique that integrates physical mastery, somatic awareness, conceptual understanding, emotional investment and musicality.
Contemporary Fusion Movement Practices 2 or Modern 2

07:206:344 ***Video for Dance (2)***
Communication through dance as a video art. Emphasis on video shooting and editing techniques, environmental controls, choreographed and improvisational dance movement structures used in the creation of short dance films. Smaller projects lead to a final dance on film project for each student.
Open only to dance majors.

07:206:346 ***African Diasporic Movement Practices 5 (2.5)***
Intensive study and training in dance forms derived from or informed by Africa and/or the Black African Diaspora. Development of improvisational and choreographic skills in the form with direct connections to repertory performance opportunities. Example forms include: West African, Afro-Fusion, Hip-Hop, Jazz, Street Dance, Dunham-based Technique.
Open only to B.F.A. dance majors.

07:206:347 ***Classical/Traditional Movement Practices 5 (2.5)***
Intensive study and training in dance forms centered in codified movement vocabularies, emerging from global temporal and cultural contexts. Example forms include: Classical Ballet, Bharatanatyam, Chinese classical dance, and forms based on or derived from Cunningham, Fosse, Cole, Graham, Hawkins, Horton, Limon, Luigi, and Taylor Techniques.
Only open to B.F.A. dance majors.

07:206:348 ***Contemporary Fusion Movement Practices 5 (2.5)***
Intensive study and training in contemporary movement practices that draw from at least two forms of dance. Individual forms and fused practice are situated in historical, social, and cultural contexts. Example forms include: Release Techniques, Yorchha, Bollywood, Contemporary Ballet.
Open to B.F.A. dance majors.

07:206:349 ***Somatic Movement Practices 5 (2.5)***
Intensive study in a Somatic Movement Practice that emphasizes wellness, functional efficiency and injury prevention through embodied experience and integration of body/mind/spirit. Development of creative and practical skills for use of the form with direct connections to diverse applications.
Open only to B.F.A. dance majors.

07:206:352 ***Teaching as an Artist (3)***
A pedagogical introduction into the nuances and skill set necessary to effectively teach dance to different ages and levels, in differing environments (i.e. K-12, studio, professional company, etc.). Through an active performer lens, students will deconstruct and examine the specialized attributes and knowledge essential for teaching and integrate them to become well-rounded and successful teaching artists.
Open only to B.F.A. dance majors.

07:206:356 ***African Diasporic Movement Practices 6 (2.5)***
Intensive study and training in dance forms derived from or informed by Africa and/or the Black African Diaspora. Development of improvisational and choreographic skills in the form with direct connections to repertory performance opportunities. Example forms include: West African, Afro-Fusion, Hip-Hop, Jazz, Street Dance, Dunham-based Technique.
Open only to B.F.A. dance majors.

07:206:357 ***Classical/Traditional Movement Practices 6 (2.5)***
Intensive study and training in dance forms centered in codified movement vocabularies, emerging from global temporal and cultural contexts. Development of improvisational and choreographic skills in the form with direct connections to repertory performance opportunities. Example forms include: Classical Ballet, Bharatanatyam, Chinese classical dance, and forms based on or derived from Cunningham, Fosse, Cole, Graham, Hawkins, Horton, Limon, Luigi, and Taylor Techniques.
Open only to B.F.A. dance majors.

07:206:358 ***Contemporary Fusion Movement Practices 6 (2.5)***
Intensive study and training in contemporary movement practices that draw from at least two forms of dance. Development of improvisational and choreographic skills in the form with direct connections to repertory performance opportunities. Individual forms and fused practice are situated in historical, social, and cultural contexts. Example forms include: Release Techniques, Yorchha, Bollywood, Contemporary Ballet.
Open only to B.F.A. dance majors.

07:206:360 ***University DanceWorks (2)***
Performance experience in the student touring dance company.
B.F.A. dance majors in third and fourth year only. May be repeated for credit. Audition required.

07:206:363 ***Dance Repertory (2)***
Study and performance of historical and contemporary repertory by guest or resident choreographers.
B.F.A. dance majors by audition only. May be repeated for credit.

07:206:402 ***Introduction to Laban Movement Analysis (3)***
A systematic study of Laban's theoretical model describing concepts and principles of human movement. Includes an overview of Bartenieff Fundamentals (BF), an integrative tool for reeducating the body.
Open only to dance majors.

07:206:410 ***Neuroscience in Partnership with Dance (3)***
Neuroscience in Partnership with Dance will explore how many regions of the brain are affected by dance. The four main regions of the brain will be presented and deconstructed to understand how they function and control the nervous system within the body. Students will explore, in lecture and studio laboratory settings, how rhythmic and patterned sequences of dance movement can create new connections within the brain. Students will research the growing field of dance neuroscience and new applications. Students in the Exercise Science concentration at the Kinesiology and Health Department may enroll in this course by completing equivalent pre-requisites, by petition.

07:206:431 ***Dance History--World Survey Online (3)***
Study of dance in diverse cultures and times through film, video, reading, lectures, discussion, and directed research. Activity fee for films and field trips.
Please note: Students may not receive credit for both 07:206:431 and 441.

07:206:432 ***Dance HIstory--1900 to Present Online (3)***
Dance artists and dance masterpieces in the Western theater tradition from 1900 to the present. Study of the influences on contemporary concert dance of diverse cultural, artistic, and social movements through film, video, reading, lectures, discussion, and directed research. Activity fee for films and field trips.
Please note: Students may not receive credit for both 07:206:432 and 442.

07:206:441 ***Dance History--World Survey (3)***
Study of dance in diverse cultures and times through film, video, reading, lectures, discussion, and directed research. Activity fee for films and field trips.
Please note: Students may not receive credit for both 07:206:431 and 441.

07:206:442 ***Dance History--1900 to Present (3)***
Dance artists and dance masterpieces in the Western theater tradition from 1900 to the present. Study of the influences on contemporary concert dance of diverse cultural, artistic, and social movements through film, video, reading, lectures, discussion, and directed research. Activity fee for films and field trips.
Please note: Students may not receive credit for both 07:206:432 and 442.

07:206:447-448 ***Independent Study in Dance (BA)***
Reading and/or studio research determined by the student and adviser with the consent of the department committee for independent study.
Open only to junior and senior B.F.A. dance majors with permission of the department. Students may only take up to two independent studies in dance per year.

07:206:450 ***Dance Capstone 1 (2)***
Dance Capstone 1 is the first semester of a two-semester sequence for seniors in which students develop and implement a Capstone project across an academic year. Through this faculty-mentored process, students will build on previous content knowledge and experiences to select and research a specific area of interest from the following areas: Choreography, Performance, Somatic Studies, Dance Education, or Learner-Designed Research.
Enrollment in this class must be approved by the Academic Advisor and Student Success Counselor.

07:206:451 ***Dance Capstone 2 (2)***
Dance Capstone 2 is the second semester of a two-semester sequence for seniors in which students continue to develop and implement a Capstone project in their final semester. Through this faculty and peer-mentored process, students will research and present a specific area of interest from the following concentrations: Choreography, Performance, Somatic Studies, Dance Science, or Learner-Designed Research. Enrollment in this class must be approved by the Undergraduate Coordinator.
Enrollment in this class must be approved by the Academic Advisor and Student Success Counselor.

07:206:495 ***Special Topics/Dance (BA)***
Intensive study of a single topic from a variety of perspectives including technical, creative, production, educational, and theoretical inquiry.
Department approval required before registration.

Filmmaking 211 Courses (MGSA)

Filmmaking 211 Courses

07:211:110 ***Introduction to Filmmaking (3)***

Have you ever thought deeply about what it takes to make a movie? Have you ever wanted to learn the tools and techniques of the film maker, transforming your research, creative practice, idea, or experience into a film? Whether you are a scientist or painter, a journalist or poet, this rigorous introduction to filmmaking will teach you the foundational methods you need to stage, shoot, and edit sounds and images into works of film art. Through readings, film screenings, technical workshops, classroom discussions and critiques, and production assignments, we will learn to use film to study, story, and experiment. Our focus will span narrative, documentary, and avant-garde practices and will use this unique interdisciplinary course as an opportunity to examine how film intersects with art, science, scholarship, and entertainment.

07:211:111 ***Sound (3)***
Introduces students to the fundamentals of producing audio for the moving image. Explores emerging techniques and strategies of sonic practice while also emphasizing underlying principles that have defined the film industry for the past century. Students will learn the essentials of recording audio in the field, editing, mixing and sound design, with particular emphasis on acquiring critical listening skills. Students produce a series of short projects culminating with an ambitious final project.

07:211:120 ***Cinematography (3)***
In this class, students will work with digital cameras to learn composition, lighting, lenses, and filters. They will study the language of film with a focus on visual storytelling. Students will become proficient in technical aspects of shooting digital cinema, both for documentary and narrative scenarios.

07:211:191 ***Introduction to Film Production I (4)***
Through a series of short film and sound exercises this introductory course puts basic film theory, language, and dramatic structure for the screen into action. During the course, students will study formal devices such as camera framing, lighting, sound, dialogue, and editing choices.

07:211:192 ***Introduction to Film Production II (4)***
In this course, students will continue learning the basics of film language through a series of short film exercises. Each exercise will explore a specific approach or formal device. Using specific feedback exercises, students will learn to engage critically in each other's work.

07:211:205 ***Screenwriting (Short Film) (3)***
This introductory course allows students to learn the fundamentals of screenwriting while developing a short 12-16 page screenplay. Students will learn about dramatic structure, development of character, writing dialogue, developing a theme, and concept as it applies to writing a short screenplay. The students will create "video drafts" from their screenplay to provide them with the opportunity to visually explore creative ways to drive the narrative beyond the word on the page. This interaction between writing and production allows the screenwriter to explore visual language and visual storytelling.

07:211:211 ***Advanced Sound (3)***
This advanced audio course explores creative production and postproduction techniques for sound design. In this course, students will learn to design sound for an array of applications, from composition to sound for moving-image to sound installation. We also learn DIY and experimental strategies for sound production in the field. Students will work with ProTools digital audio workstations and field recorders to produce a range of projects oriented around a set of unique design challenges.

07:211:212 ***Digital Field Production (3)***
This intent of this course is to give students a comprehensive understanding of group-oriented Digital Field Production which can be applied to both fiction and documentary production strategies. Students will receive training on various camera systems and audio equipment. This is a hands-on field-production course that covers single- and multi-camera shoots in multiple settings and locations. Students will work in small groups in a wide variety of real-world production situations. Students will learn production skill sets and the importance of collaborative processes in both the pre-production and production stages of filmmaking.

07:211:217 ***Horror Film Production (3)***
This production course is a deep consideration of horror as both subject and cinematic/artistic form. Horror has been dismissed for its "crude" aesthetics; criticized for the pleasures it takes in violence, misogyny, racism, escapism, etc.; and lauded as a potential vehicle for subversion and critique. Class viewings will include a wide array of narrative fiction ("canonical", Hollywood, B-movies, cult films, arthouse, foreign, etc.), experimental films, and documentary, as well as works of video art, performance, photography, and radio. Class readings draw from film studies, cultural studies, psychoanalysis, and fiction. Utilizing an interdisciplinary approach to filmmaking, students will produce one nonfilmic work (audio, performance, or creative writing), a non-narrative "horror" short film, and one final film.

07:211:220 ***Advanced Cinematography (3)***
This is an intensive hands-on production course, intended to serve as a venue through which students will expand upon the skills they have acquired through Cinematography (211:120). In this course, students will learn more

sophisticated lighting techniques, advanced composition, color, and different lens options. Students will study films for specific techniques, then attempt to shoot using those in class, then follow up with a group homework shoot that will be presented in the class.

07:211:230 ***Animation 2-D (3)***
Introduces the basic terminology, concepts, and principles of 2-D animation intended to illustrate or reinforce narrative concepts. It covers three distinct techniques within 2-D animation: animating for the web, stop motion animation, and 2-D, vector-based animation. While focusing on technical aspects of 2-D animation, this course takes into consideration the historical perspective, current technologies, and applications of animation within documentary and fiction film.

07:211:231 ***Image Postproduction (3)***
This course is designed to provide a workshop opportunity for students to develop their post-production skills. We will explore a set of tools, concepts, and methods covering both primary and intermediate aspects of digital video post-production. Over the course of the semester, we will delve into editing, compositing, sync sound, color correction/grading, and exporting techniques. The class time will be comprised of lectures, readings, exercises, and screenings to help students build a technical and aesthetic foundation in digital post-production.

07:211:291 ***Intermediate Film Production I (4)***
This course provides students with the opportunity to continue to gain theoretical and practical experience in the craft of conceptualizing and directing a film. Students will put film theory, language, grammar, and dramatic structure for the screen into action. This course builds on the fundamentals of film language and basic visual grammar, concentrating on collaboration, staging, shooting, and editing. Through lectures, readings, and screenings, students will engage in discussions regarding various formal approaches to cinema. By the end of the semester, students will have produced and directed four assignments guided by formal restrictions.

07:211:292 ***Intermediate Film Production II (4)***
This course provides students with the opportunity to expand upon theoretical and practical experience in the craft of conceptualizing and directing films. Students produce, direct, and edit three exercises and a final project of their choosing. Thematic restrictions will guide each exercise. Students learn to work in groups and share the responsibilities in the filmmaking process. Through lectures, readings, and screenings, students will engage in discussions regarding various formal approaches to cinema.

07:211:293 ***Directing the Actor (3)***
This is a workshop course designed to develop techniques for directing engaging and believable on-screen performances. Exercises and assignments will emphasize the relationship between the director and actor. Through script analysis, rehearsals, and scene performances, students will learn the fundamentals of the acting process and gain the necessary skills to communicate their objectives and intentions with actors effectively.

07:211:294 ***Introduction to Producing (3)***
This course will introduce students to the multiple responsibilities of a film producer and will explore how producers ensure all legal, financial, and safety requirements while also helping fulfill the film's creative and commercial potential. This course will also cover: pre-production, production, and how to prepare: budgets, shooting schedules, hiring crew, and tracking costs, and negotiating contracts.

07:211:295 ***Special Topics in Digital Filmmaking (BA)***
Explores in depth a unique topic in filmmaking. Topic determined by the program.

07:211:300 ***Short Film Repurposed (3)***
Intensive postproduction course where students will explore the possibilities of moving images from multiple artistic and conceptual perspectives. The course will engage with the tradition of science documentary filmmaking, as well as with found footage/appropriated filmmaking. In the first part of the course, students will complete a short documentary film focusing on the needs of scientists and/or science communication. For the second part, using the raw footage of their science films, students will make another film that is conceptually and artistically different. Students will be exposed to found/appropriated footage filmmaking and be expected to produce innovative and critical works from the images and obstructions presented in this course.

07:211:301 ***Sensory Ethnography (3)***
This course introduces students to Sensory Ethnography as both a research method and aesthetic approach to filmmaking. Through in-class screenings, production workshops, and seminar, students are exposed to the key terms and debates fundamental to ethnographic filmmaking, the films, and filmmakers crucial to its evolving practice, and the tools and techniques used to produce sensory films. The course will continually interrogate the relationships between film form, content, and the ethnographic method. Students will produce two short production assignments, a detailed written treatment, and a sensory ethnography film.

07:211:305 ***Screenwriting: Feature Film I (3)***

This course allows students to advance their screenwriting abilities while developing a feature-length screenplay. During this course, students will continue their learning of the fundamentals of screenwriting and apply those principles to the development of a step-outline and the first act of a feature-length screenplay (approximately 25-30 pages). The class will be a mixture of lecture, screenplay analysis, discussion of viewed films, and workshopping of the students' Step-Outline and Screenplays with peer review.

07:211:306 ***Short-Form Series Filmmaking (3)***
Gives students hands-on experience as a producer, writer, director, and editor of their own short-form serialized narratives. Students will learn how to conceptualize and structure a Short-form Series. They will write two screenplays or documentary treatments: the pilot and episode #1. The students will gain theoretical and practical experience in producing, directing, and editing as they work to complete these episodes through pre-production, production, and post-production.

07:211:307 ***AI and New Technologies in Filmmaking (3)***
This online synchronous course focuses on giving students real-world learning experiences with cutting-edge technologies in machine learning, generative AI, and other spaces, in combination with storytelling fundamentals, to help students navigate the next great tech revolution in cinema.

07:211:308 ***Community Engaged Filmmaking (3)***
What does a filmmaking practice rooted in ethical and caring community engagement look like? What tools and techniques are needed to create compelling films with community partners? What is the metric of a successful community film collaboration? In this rigorous introduction to community engaged filmmaking, students will learn to identify and collaborate with community partners to create captivating and impactful films. Through readings, film screenings, classroom discussions, production workshops, and community endeavors, students will explore crucial stylistic and social characteristics of community film and will learn strategies for sharing authorship and engaging community members. Students will be exposed to a wide range of ethical considerations and fiction and non-fiction approaches.

07:211:320 ***Essay Filmmaking (3)***
Film critic Alexandre Astruc created the term camera-stylo to suggest a new means of writing through cinema, in which the camera would serve as a pen, creating arguments, mediation and inquiries. Film essays are usually a hybrid of different forms, often playing with documentary and fictional narrative conventions, and tend to be driven by theme rather than plot. Through lectures, in-class discussions, and feedback sessions, students will develop a deep understanding of the essay film, its history, and the possibilities for its future practice. The goal is for students to study, negotiate, and engage the essay film¿s many potentialities as a means towards honing their own artistic practices. Students will produce two short essay film exercises and one 8-12 minute final film that addresses or responds to the materials covered in the class.

07:211:325 ***Blurred Boundaries: An Introduction to Fact/Fiction Filmmaking (3)***
This course will examine filmmaking techniques that blur boundaries between fact and fiction. Students will explore the evolution of fact/fiction blurring through film movements such as direct cinema, cinema verité, realism and surrealism, ethno-fiction, slow cinema, auto-documentary, and found footage, among others. Students will create three assignments and a final film that utilizes similar techniques. This course will provide students with a foundational understanding of film form and grammar while challenging the assumption that film techniques can be reduced to film truths. Students will learn approaches to filmmaking that seek to craft uncertain and enigmatic film experiences.

07:211:330 ***Animation 3-D (3)***
This course introduces the basic terminology, concepts, and principles of 3-D animation. It is designed to remove the complexities of modern digital 3-D development tools by examining each segment individually and reinforcing it with in-class workshops and weekly assignments. This course takes into consideration the historical evolution of 3-D animation, the current technologies, and applications of animation within documentary and fiction film.

07:211:337 ***Experimental Film (3)***
Production course based on an overview of key works and ideas that have informed "avant-garde" and "experimental" film, from their beginnings in the early years of cinema through the present day. While the emphasis is placed on non- narrative works, which generally stress nonlinear and/or abstract expression via form, color, and movement, the course also considers narrative and documentary films that utilize the experimental form to challenge, question, and problematize traditional kinds of cinematic storytelling. Through in-class workshops and assignments, students will learn the fundamentals of experimental film production, including shooting on/working with 16mm, hand-processing, darkroom techniques, etc. Students will produce three short-film exercises and a final film.

07:211:375 ***Documentary Lab Production (3)***
In this course students will be working exclusively on projects developed at the Documentary Film Lab. As they craft advanced non-fiction film projects, students will learn - depending on the production schedule of projects at the Lab: pre-production, research methods, pre-conceptualization, methodologies of production, film portraiture, interviewing methods, non-fiction story structure, editing and post-production. Students will develop and refine their documentary filmmaking skills with support and direction from a faculty instructor.

07:211:391 ***Advanced Directing I (4)***
This advanced course is designed to enable students to produce from conception to completion a short fiction film. In class, students will workshop every project through all the stages of production. Crew members for shoots can be drawn from within the course; each student is required to crew a minimum of 3 projects in addition to their directing

project. An understanding of historical and aesthetic issues that have shaped the development of narrative film will comprise a significant part of the course. The class will consist of continuous feedback sessions throughout the development of each student's script, rough cut, and final cut.

07:211:392 ***Advanced Directing II (4)***
In this advanced course, students enrolled in the course will complete a documentary film. In class, students will workshop every project through all the stages of production and discuss the general stylistic approach of each film. An understanding of historical and aesthetic issues that have shaped the development of documentary film will comprise a significant part of the course. Students will participate in various dynamic feedback exercises, which will encourage intellectual and artistic investment in each other's projects. A collaborative spirit of participation and discussion is essential as students engage with each student's work and collectively develop critical viewing skills.

07:211:491,492 ***Senior Thesis I,II (4,4)***
This two-semester culminating filmmaking workshop provides the framework and opportunity for senior B.F.A. film students to write, produce, direct, and edit a short thesis film. In this class, students will workshop every aspect of this project with student feedback. In the final semester, students will present their latest cut to faculty members for a thesis review panel. By the end of the semester, students will have produced, directed, and edited a short film that can be submitted to film festivals.

07:211:495 ***Independent Study (1-4)***
In this independent study, students working on an individual project will have the chance to develop and refine their filmmaking skills with one-on-one support and direction from professional faculty. Students are offered supervision and instruction in all areas of filmmaking from technical to narrative structure as they craft their advanced film projects.

07:211:498 ***D. Filmmaking Internship (3)***
Immerse yourself in the world of media through our internship course. This program offers students the opportunity to work alongside professionals at media companies, gaining valuable insights into the industry's operations. Enhance your understanding of production, marketing, and distribution in a collaborative, real-world environment. Develop the skills and connections in the media and entertainment sectors, allowing you to build a strong professional network and gain practical knowledge.

Interdisciplinary 557 (MGSA)

INTERDISCIPLINARY 557

07:557:121 ***Introduction to Environmental Arts (3)***
Introduction to Environmental Arts Online is a three-credit, interdisciplinary course that examines the unique role Environmental Arts plays in tackling the conversations and complexities of our current planetary moment. Accompanied by a selection of content by thought leaders spanning the arts, humanities, and sciences, coursework encourages students to think critically about themes such as empathy, curiosity, sustainability, site-specificity, community, transformation, environmental justice, collaboration, and art-as-research. Multi-disciplinary studio assignments with fieldwork components and critiques offer practical application of course concepts and invite students to experiment with ways environmental arts can facilitate feelings, ideas, wisdom, and conversation.

07:557:131 ***Introduction to Arts in Health (3)***
Introduction to Arts in Health is a three-credit, interdisciplinary course that explores the emerging, experimental field of Arts in Health. While there are many directions and priorities across the field, the National Organization for Arts in Health (known colloquially as NOAH) shares a definition that emphasizes the expansive field's focused "dedication to using the power of the arts to enhance health and well-being in diverse institutional and community contexts." Throughout the semester, students will study the historical and contemporary roles that art and creative work have played in fostering a culture of health and well-being, explore how arts and cultural policy can be reconceived as health policy, and create art and cultural work that may contribute to good health. At the same time, we'll practice holding questions, dilemmas, tensions and disturbances present across our cultural industries that exacerbate harms to public health.

07:557:141 ***Introduction to Arts Leadership (3)***
This course uses research, journalism, and case studies from multiple creative forms to discover and develop the universal technical skills, values, and structures that guide strong arts leaders. Whether it's artist entrepreneurs or cultural anchor institutions, the capacity, strength, and sustainability of the arts are based on leadership practices that adhere to inspired mission, creative practice, and innovative business principles. The best arts leaders identify and implement effective operating models inspired by creative values that effectively nurture arts practice, engage audiences, and maintain enthusiastic stakeholders, regardless of scope or scale.

07:557:151 ***Mason Gross Interplay (1)***
Mason Gross Interplay is designed to introduce first-year students to the artistic disciplines represented in MGSA, to foster relationships between and within departments, and to help students develop the skills needed to collaborate.
Graded pass/no credit. Required for all BFA/BM incoming first-year students. Optional for BFA/BM incoming transfer students.

07:557:201 ***Practical Finance for Entrepreneurial Creatives Online (3)***
The course teaches personal and entrepreneurial financial management concepts. It is designed for nonbusiness majors who have already commenced or are contemplating single- multi-person ventures.

Music 700 Courses (MGSA)

MUSIC 700

07:700:100 ***Fundamentals of Aural Skills (3)***
Intended for first-year Mason Gross music majors who did not place into Music Theory I and/or Aural Skills I. The course covers fundamentals of written music theory and ear-training skills including note reading, key signatures, major and minor scales, intervals, solfege, and melodic and rhythmic dictation.

07:700:101 ***Introduction to Music (3)***
For students with little or no background in music. Basic concepts for intelligent listening to all kinds of music. Emphasis on aspects of sonority, rhythm, melody, harmony, and structure.

07:700:102 ***Introduction to Music History (3)***
Introductory historical survey of styles, genres, forms, and composers in music from antiquity to the present.
Prerequisite: 07:700:101 or 103 or equivalent.

07:700:103 ***Introduction to Music Theory (3)***
Rudiments of music: intervals, scales, key signatures, modes, chords, rhythm, and meter. Development of aural skills.
No previous musical experience required. Intended for nonmajors.

07:100:104 ***Introduction to Music Analysis (3)***
Exploration of basic analytical techniques that reveal principles of musical structure; examples drawn from the medieval period through the 20th century; introduction to various types of music notation and score reading; further development of aural skills.
Prerequisite: 07:700:103 or equivalent. Intended for nonmajors.

07:700:105 ***Making Music with Computers: Introduction to Digital Audio (3)***
An introduction to computer music technology with a focus on creative composition projects integrating studies in electronic music theory and history, digital signal processing (DSP), performance practice, and aesthetics.

07:700:110 ***Introduction to Music Education (1)***
This introductory survey course is designed for undergraduate music education majors, or those considering adding music education, to explore various topics related to teaching, learning, and social issues in music education. Students will also challenge their positions and experiences, as well as the dominant narratives affecting their assumptions and beliefs about music teaching and learning. Those who are not currently music education majors but wish to add or change their major may interview with music education faculty at the end of the semester.

07:700:121 ***Theory I (3)***
Model counterpoint and introduction to tonal harmony. For students intending to major in music.
Prerequisite: Demonstrated understanding by entrance examination of rhythmic/pitch notation, intervals, scales, and key signatures. Corequisites: 07:700:123, 127.

07:700:122 ***Theory II (3)***
Tonal harmony through modulation.
Prerequisite: 07:700:121

07:700:123-124 ***Aural Skills I,II (2,2)***
Intensive work in sight-singing; dictation of melody, rhythm, and harmony; score reading; and keyboard harmony.

07:700:127 ***Introduction to Music Technology (1)***
Fundamental skills in music technology: computer-based notation, MIDI sequencing, and digital-audio techniques.
Corequisites: 07:700:121, 123. For students intending to major in music.

07:700:128 ***Music Education Technology (1)***
Fundamental skills in music education technology: computer-based notation, MIDI sequencing, and digital-audio techniques.
Corequisites: 07:700:121, 123. For students intending to major in music education.

07:700:131 ***Introduction to Music Online (3)***
See 07:700:101.

07:700:133 ***Introduction to Music Theory Online (3)***
See 07:700:103.

07:700:134 ***Introduction to Music Theory Short Course Online (2)***
An intensive introductory study of music theory including the fundamental principles and concepts of music: pitch, rhythm and meter, notation, keyboard layout, scales, and keys.

07:700:135 ***Making Music with Computers: Introduction to Digital Audio Online (3)***
An introduction to computer music technology with a focus on creative composition projects integrating studies in electronic music theory and history, digital signal processing (DSP), performance practice, and aesthetics.

07:700:153-154 ***Advanced Aural Skills I,II (2,20)***
Advanced track of intensive work in sight-seeing; diction of melody, rhythm, and harmony; score reading; and keyboard harmony.
Corequisites: 07:700:121-122. For students intending to major in music.

07:700:203 ***Musics and Cultures (3)***
An introduction to musics in diverse cultural contexts through readings, listenings, and analysis. Students will learn about traditional, popular, and protest music, examining them in consideration with issues of cultural transformation, socio-political environments, hybridity, gender, race, circulation, and technological mediation. Students will also examine music cultures in and around New Jersey. Through deep listening and reading, students will learn of diverse musical cultures, as well as develop musical vocabulary to critically engage with both familiar and unfamiliar sounds.

07:700:210 ***Foundations of Music Education (3)***
Introduction to the historical and philosophical background for school music in the United States. Discussion of current practices and teaching roles at all grade levels and subjects. Includes field experience.
For Mason Gross School of the Arts music education students only.

07:700:211,212 ***Studies in Music History (3,3)***
Musical styles and genres in different historical periods. May be repeated for credit with differing course content.
Prerequisite: 07:700:101 or 103 or equivalent.

07:700:221 ***Theory III (3)***
Chromatic harmony of the 18th century.
Prerequisites: 07:700:121,122; or equivalent.

07:700:222 ***Theory IV (3)***
Analysis of 20th-century music.
Prerequisite: 07:700:221.

07:700:223-224 ***Aural Skills III,IV (2,2)***
Continued work in sight-singing; dictation of melody, rhythm, and harmony; score reading; and keyboard harmony.
Corequisites: 07:700:221-222 or permission of instructor.

07:700:230 ***Music in Film Online (3)***
This course examines music created for film from both the historical and analytic perspectives. Topics covered include music of composers from the 1930s to the present.

07:700:231,232 ***Special Topics Music History Online (3,3)***
See 07:700:211,212.

07:700:233 ***American Popular Song Online (3)***
Study of the evolution of music that is uniquely American from colonial days to the 1970s.

07:700:234 ***From Jazz to Hip-Hop: African-American Music in the 21st Century Online (3)***
The exploration of the relationship between jazz and other African-American musical traditions from the early 1900s to the present.

07:700:235 ***Rock and Roll: Origins to Present Online (3)***
The exploration of the history of rock-and-roll music from a wide array of perspectives, emphasizing the formation and development of the genre as the result of exchange and interaction across cultural, racial, and economic boundaries, as well as its role in social change.

07:700:237,238 ***Studies in Major Composers I,II (3,3)***
Studies of selected compositions by a major composer. Specific composer varies from semester to semester. May be repeated for credit with differing course content.
Prerequisite: 07:700:101 or 103 or equivalent.

07:700:239 ***Rock and Roll: Origins to Present Online Short Course (3)***
The exploration of the history of rock-and-roll music from a wide array of perspectives, emphasizing the formation and development of the genre as the result of exchange and interaction across cultural, racial, and economic boundaries, as well as its role in social change.

07:700:241 ***Studies of World Music Online (3)***
An introduction to the study of the intersection of music and culture as exhibited in diverse regions across the globe.

07:700:242 ***Country Music: A Cultural and Musical Survey Online (3)***
A study of country music's historical development including a thorough investigation of the cultural, social, and musical implications of country music's 21st-century resurgence.

07:700:243 ***Introduction to the History of Opera Online (3)***
An introduction to the operatic genre from the 17th century to the present day, this course explores how opera serves as a lens through which a variety of cultural, performative, and historical issues may be examined.

07:700:247-248 ***Jazz Theory I,II (3,3)***
Rudiments of jazz improvisation and composition: Lydian chromatic scales, jazz modes, seventh chords, rhythm, intervallic retention, and meter; sight-reading and dictation in jazz idioms.
Prerequisites: 07:700:122 and 124.

07:700:253-254 ***Advanced Aural Skills III,IV (2,2)***
Continued work in the advanced track of sight-singing; diction of melody, rhythm, and harmony; score reading; and keyboard harmony.
Corequisites: 07:700:221-222.

07:700:261 ***Vocal Technique for School Choirs (1)***
Fundamentals of singing; methods for class vocal instruction for elementary and high schools.
Pre- or corequisite: 07:700:121 or examination. For Mason Gross School of the Arts music education students only.

07:700:263 ***School Music: String Instrument Techniques (1)***
Fundamentals of playing and teaching the string instruments; survey of materials for use in the schools.
Pre- or corequisite: 07:700:121. For Mason Gross School of the Arts music education students only.

07:700:265 ***School Music: Woodwind Instrument Techniques (1)***
Fundamentals of playing and teaching the woodwind instruments of the orchestra and band.
Pre- or corequisite: 07:700:121. For Mason Gross School of the Arts music education students only.

07:700:267 ***School Music: Brass Instrument Techniques (1)***
Fundamentals of playing and teaching the brass instruments of the orchestra and band.
Pre- or corequisite: 07:700:121. For Mason Gross School of the Arts music education students only.

07:700:269 ***School Music: Percussion Instrument Techniques (1)***
Fundamentals of playing and teaching the percussion instruments of the orchestra and band.
Pre- or corequisite: 07:700:121. For Mason Gross School of the Arts music education students only.

07:700:284 ***Digital Audio Composition (3)***
An introduction to the digital audio workstation as well as basic concepts of computer music, sound, and electroacoustic composition. Students will develop compositional skills through their own creative projects as well as the study of a wide range of electronic/computer music.
Prerequisite: 07:700:105 or 127 or 135.

07:700:287 ***Choral Music Education Labaratory (1)***
Practical conduction and performance of repertoire for K-12 ensembles.

07:700:290 ***Rock and Roll as Culture Phenomenon: History and Development of Rock and Related Genres (3)***
Survey of the influence of rock and roll with a focus on the artists and music that reflected and influenced American society.

07:700:291 ***Jazz Appreciation (3)***
Survey of the relationships between jazz and other African-American musical traditions from the early 1900s to the present.

07:700:292 ***Introduction to Musics of the World (3)***
An introduction to the study of the intersection of music and culture as exhibited in diverse regions across the globe.

07:700:293 ***Introduction to Jazz Improvisation Online (2)***
Provides core theoretical and practical competency in jazz improvisation to meet basic expectations within the Mason Gross jazz curriculum. Principle topics include vertical and horizontal harmonic structures, aural recognition of intervals and chords, inversions, neighbor tones and embellishments, basic scales and modes, and their application in an improvised line.
Intended for first-year jazz studies majors.

07:700:295,296 ***Special Topics in Music (3,3)***
Studies in musical genres such as symphony, concerto, or choral music; repertoires (music and theater or music since 1945); or cultures (American music, African-American music, music and society, or women and music). May be repeated for credit with differing course content.
Prerequisite: 07:700:101 or 103.

07:700:301 ***European Music Before 1800 (3)***
Study of styles and forms of Western music from antiquity to 1800.
Prerequisite: 07:700:122. Intended primarily for music majors.

07:700:302 ***European and American Music After 1800 (3)***
Study of styles and forms of Western music from 1800 to the present.
Prerequisite: 07:700:122. Intended primarily for music majors.

07:700:305-306 ***Evolution of Jazz (3,3)***
History of jazz. First semester: African and African-American origins to the 1930s; basics of improvisation; development of aural ability to distinguish forms and styles. Second semester: jazz of the 1940s to the present.
Prerequisites: 07:700:122 and 124, or permission of instructor. Intended for Mason Gross School of the Arts jazz studies majors.

07:700:310 ***Business of Music (2)***
Study of issues concerning entry into the music profession such as music publishing, professional management, ethics, and music publishing and recording.

07:700:311 ***Art of Production I: Recording (3)***
Study of the practical applications of recording technology: acoustics, microphones, audio consoles, and recording techniques. Through reading, listening, and hands-on projects, students will develop the necessary skills to record individual instruments and ensembles using both mono and stereo microphone techniques, as well as develop critical listening skills and the ability to aurally evaluate a variety of recording techniques from practitioners in the field.
Prerequisite: 07:700:105 or 127 or 135.

07:700:312 ***Art of Production II: Mixing (3)***
Study of the practical applications of digital audio editing and mixing, including principles of digital audio, advanced signal processing, advanced audio console/digital audio workstation skills, editing, mixing, and mastering. Through reading, listening, and hands-on projects, students will develop the necessary skills to edit, mix, process, and master stereo and multitrack recordings, as well as develop critical listening skills and the ability to aurally evaluate a variety of mixing and processing techniques in professionally produced recordings.
Prerequisite: 07:700:311.

07:700:322 ***Music Analysis (3)***
Analysis of music from different historical periods and culture.
Prerequisite: 07:700:321.

07:700:323 ***Aural Skills V (2)***
Work in sight-singing; dictation of melody, rhythm, and harmony; score reading; and keyboard harmony.
Prerequisite: 07:700:222. Intended primarily for B.Mus. music education students.

07:700:329-330 ***Conducting I,II (2,2)***
Fundamentals of conduction and organization of school choruses, bands, and orchestras.
Prerequisite: 07:700:222.

07:700:341 ***Orchestration I (2)***
Study and demonstration of instruments of the orchestra; writing idiomatically for individual instruments; scoring for small ensembles.
Prerequisite: 07:700:222. Intended primarily for B.Mus. music education students.

07:700:342 ***Orchestration II (2)***
Study of selected scores; writing for various ensembles and for symphony orchestra.
Prerequisite: 07:700:341.

07:700:347-348 ***Jazz Composition and Arranging (2,2)***
Fundamentals of jazz composition and arranging, beginning with arrangements for two or three winds and rhythm sections; and culminating in compositions and arrangements for large ensembles in early, modern, and popular jazz idioms.
Prerequisites: 07:700:247-248 and 251-252.

07:700:353 ***Advanced Aural Skills V (2)***
Advanced work in sight-singing; dictation of melody, rhythm, and harmony; score reading, and keyboard harmony.
Prerequisite: 07:700:224 or 254.

07:700:371-372 ***Jazz Improvisation I (3,3)***
Jazz techniques involving chord nomenclature, melodic development, turnbacks, cycles, the blues, scale coloring, rhythmic patterns, and harmonic concepts.
Prerequisites: 07:700:247-248 and 251-252.

07:700:375 ***Composition Practicum (1)***
A project-based course for undergraduate composition majors in collaboration with students from the dance, digital film, theater, and other departments.

07:700:381 ***Materials and Methods for General Music Education (3)***
A hands-on activity approach to classroom music programs. Conventional as well as Orff and Kodaly procedures. Fieldwork.
Prerequisite: 07:700:210.

07:700:382 ***Materials and Methods for Choral Music Education (3)***
Topics include the boy's changing voice, high school choral classes, instrumental music programs, and implications of the revised copyright law.
Prerequisite: 07:700:210.

07:700:384 ***Materials and Methods for Instrumental Education (3)***
Pedagogical techniques for instrumental music in K-12 curricula.
Prerequisite: 07:700:210. Intended for music education majors.

07:700:386 ***Instrumental Music Education Labaratory (1)***
Practical conducting and performance of repertoire for K-12 ensembles. Sections in choral and instrumental emphases offered in alternate years.
Prerequisite: 07:700:210.

07:700:387 ***Choral Music Education Labaratory II (1)***
Practical conducting and performance of repertoire for K-12 ensembles. Sections in choral and instrumental emphases offered in alternate years.
Prerequisite: 07:700:210.

07:700:389 ***Inclusive Learning in Music Online (3)***
Skills and techniques for teaching music to diverse student populations. Emphasis is on neurological, physical, and behavioral diversity, but other aspects of student diversity are also addressed. Strategies for teaching music in both inclusive and self-contained music classrooms.
Prerequisite: 05:300:383. Corequisite: 07:700:381, 382, 383, 384 or 483.

07:700:390 ***Music Internship***
Music Internship is open to Bachelor of Music students who are in good academic standing and have completed 2 years of Applied Major Lesson. Internships may take place in organizations or companies whose work involves any of the following aspects of music: theory, musicology, publication, production, or performance. Scheduled internship hours may not interfere with other courses scheduled in the internship semester. Internship content and hours must be approved of and sponsored by the undergraduate coordinator, and the course may only be taken once.

07:700:419,420 ***Special Studies in Music History (3,3)***
Intensive study of a single topic from a variety of perspectives; reading, discussion, and oral and written reports.
Prerequisites: 07:700:301-302. Intended for music majors.

07:700:459 ***Sound in Video Games (3)***
Introduces students to the world of video game music, from creating sound effects, working with voiceover, to using middleware to create interactive and adaptive soundscapes.

07:700:460 ***Special Topics: Instrumental Music Education (1)***
Selected topics related to instrumental music education. A variety of subjects will be taught on a rotating basis. May be repeated for credit with differing content.

07:700:461 ***Special Topics: Advanced Vocal Techniques for School Choirs (1)***
Advanced techniques of vocal instruction for secondary and elementary school choirs. Intended for music education choral students only.
Prerequisites: 07:700:210 and 261. Intended for music education majors.

07:700:463 ***Special Topics: Vocal Music Education (1)***
Selected topics related to K-12 vocal music education. A variety of subjects will be taught on a rotating basis. May be repeated for credit with differing content.
Prerequisite: 07:700:210. Intended for music education majors.

07:700:464 ***Special Topics: Choral Literature for School Choirs (1)***
A study of choral literature appropriate for elementary, middle, and high school choirs. Focus on concert programming and repertoire selection for developmental, intermediate, and advanced school choirs.
Prerequisites: 07:700:210 and 07:701:300. Intended for music education majors.

07:700:467 ***Special Topics: Jazz for Music Educators (1)***
Techniques, repertoire, and resources for teaching instrumental jazz in secondary schools.
Prerequisite: 07:700:210. Intended for music education majors.

07:700:468 ***Scoring for Film and Visual Media (3)***
Introduction to the production and compositional techniques required for film and other visual media. Students will also gain a basic understanding of film scoring history through readings and in-class screenings.
Prerequisite: 07:700:284.

07:700:469 ***Interactive Computer Music (3)***
Students will develop systems for interactive computer music composition and performance as well as gain practical, hands-on experience with real-time digital signal processing, sound synthesis, and basic programming culminating with a final performance/presentation of a concert-length piece or installation.
Prerequisite: 07:700:105 or 127 or 135 or permission of instructor.

07:700:470 ***Electroacoustic Music Instrumental Design (3)***
Students will develop skills in acoustic/electroacoustic musical instrument design, acoustics, and physical properties of materials, as well as design and construct electroacoustic musical instruments, developing skills in basic electronics, circuit design, sensors, electro-mechanical transduction, human-computer interaction, and interface design culminating with a performance featuring these invented instruments.
Prerequisite: 07:700:105 or 127 or 135 or permission of instructor.

07:700:471-472 ***Jazz Improvisation II (3,3)***
Jazz techniques exploring forms in jazz from 1925 to the present; the study of cadences; the Lydian chromatic concept as applied to defining specific devices and as manifested in various compositions.
Prerequisites: 07:700:371-372.

07:700:477 ***Special Topics: Directing the School Musical (1)***
Techniques, literature, and resources for staging productions of musical theater, jazz, and show choir in the secondary school.
Prerequisite: 07:700:210. Intended for music education majors.

07:700:478 ***Special Topics: Marching Band (1)***
Techniques of designing marching band routines.
Prerequisite: 07:700:210. Intended for music education majors.

07:700:479 ***Special Topics: Wind Ensemble Literature (1)***
Prerequisite: 07:700:210. Intended for music education majors.

07:700:480 ***Clinical Practice II: Seminar (1)***
Examination of problems relevant to contemporary elementary and secondary music education. Concerns relevant to student teaching emphasized. Opportunity to address problems encountered while student teaching.
Corequisite: 07:700:487. Open only to students in a teacher education program who have been admitted formally to student teaching.

07:700:483 ***Clinical Practice I: Seminar (1)***
Examination of problems relevant to contemporary elementary and secondary music education, to process what is learned during the part-time student teaching placement, preparation for full-time student teaching and the required certification portfolio (edTPA).
Corequisite: 07:700:484.

07:700:484 ***Clinical Practice I (4)***
Part-time student teaching in approved schools under the supervision of members of the faculty.
Corequisite: 07:700:483.

07:700:487
Full-time student teaching in approved schools under the supervision of members of the faculty.
Corequisite: 07:700:480. Open only to students in a teacher education program who have been admitted formally to student teaching.

07:700:493,494 ***Independent Study (BA,BA)***
Supervised research in music composition, education, history, or theory.
Prerequisite: Permission of instructor.

07:700:495 ***Senior Honors Tutorial (3)***
Prerequisite: Permission of department.

Applied Music 701 (MGSA)

APPLIED MUSIC 701

Applied Music 701 (MGSA)

Applied Music Elective Courses

Applied Music Elective Courses

07:701:251 ***Bassoon Reed Making (1)***
Elective weekly class providing instruction in bassoon reed making techniques and tools.

07:701:252 ***Oboe Reed Making (1)***
Elective weekly class providing instruction in oboe reed making techniques and tools.

Applied Music 701 (MGSA)

Ensembles

Ensembles

Participation in all ensembles requires an audition or permission of the instructor.

07:701:301 ***Helix! (1)***
A small ensemble that performs music of the 20th and 21st centuries, including newly written works by composers in the Rutgers graduate composition program.

07:701:303 ***Rutgers Baroque Players (1)***
An ensemble dedicated to the performance of Baroque music.

07:701:304 ***Rutgers Interactive Music Ensemble (1)***
An ensemble incorporating technology including laptops, controllers, sensors, and robots with acoustic instruments.

07:701:307 ***Rutgers New Music Workshop (1)***
An ensemble intended for undergraduate composition majors to learn and work on various skills related to their original compositions and undergraduate performers who wish to play contemporary music.

07:701:308 ***Rutgers University String Ensemble (1)***
An ensemble which studies and performs chamber orchestra repertoire without a conductor.

07:701:311,312 ***Rutgers University Kirkpatrick Choir (1,1)***
A select mixed choir that surveys and performs a broad spectrum of music, sacred and secular, from all periods. Occasional performance of large works with orchestra.

07:701:313,314 ***Rutgers University Collegium Musicum (1,1)***
A small ensemble dedicated to the performance of Renaissance music.

07:701:319,320 ***Rutgers Chamber Jazz Ensemble (1,1)***
Study and performance of jazz for small mixed instrumental ensembles.

07:701:321,322 ***Rutgers Jazz Ensemble I (1,1)***
Exploration and performance of traditional and contemporary jazz for a large ensemble.

07:701:323,324 ***Rutgers Symphony Orchestra (1,1)***
Study and performance of major orchestral repertoire.
Registration for this ensemble is for string students only.

07:701:325,326 ***Rutgers Percussion Ensemble (1,1)***
Study and performance of music for percussion ensemble.

07:701:327,328 ***Rutgers Brass Ensemble (1,1)***
Study and performance of the literature for brass ensemble. Emphasis is placed on mastering the principles of brass playing within an ensemble.

07:701:330 ***Rutgers Concert Band (1)***
Study and performance of music for concert band. Emphasis on improving performance skills.

07:701:331,332 ***Rutgers Jazz Ensemble II (1,1)***
Exploration and performance of traditional and contemporary jazz for a large ensemble.

07:701:333,334 ***Rutgers University Voorhees Choir (1,1)***
A soprano/alto choir that performs music of all periods and styles; regularly tours.

07:701:337 ***Rutgers Marching Band (1)***
Study of precision marching techniques and other skills relating to the football band. Performance at university football games and other events.

07:701:338 ***Rutgers Pep Band (1)***
Wind/percussion band that plays at sport team events.

07:701:339,340 ***Rutgers University Choir (1,1)***
A mixed choir that performs music of all periods and styles. Occasional performance of large works with orchestra.

07:701:343,344 ***Rutgers Symphony Band/Rutgers Symphonic Winds (1,1)***
Study and presentation in concert of major works for wind band. Emphasis on performance techniques.

07:701:345,346 ***Rutgers Symphony Orchestra/Rutgers Wind Ensemble (1,1)***
Study and presentation in concert of major works for wind ensemble. Emphasis on performance techniques.
Registration for this ensemble is for brass/woodwinds/percussion students only.

07:701:347,348 ***Rutgers Sinfonia (1,1)***
Study and performance of orchestral repertoire.

07:701:349,350 ***Rutgers University Glee Club (1,1)***
Study and performance of music for tenor/bass voices.

07:701:353,354 ***Opera Workshop (1,1)***
Study and performance of operatic literature.

07:701:355,356 ***Chamber Music (1,1)***
Study and performance of music for small mixed instrumental ensembles.

07:701:401 ***Introduction to Instrumental Studio Teaching (1)***
Instruction and practice in teaching one's own instrument in individual lessons, with guidance from instructors about methods and repertoire for developing specific components of playing at various levels (beginner, intermediate, advanced). Guidance in the establishment and maintenance of the business of a private studio, including bookkeeping, communication, resources, professional organizations, etc.

07:701:419,420 ***Chamber Jazz Ensemble (1,1)***
Study and performance of jazz for small mixed instrumental ensembles.

07:701:455,456 ***Chamber Music (1,1)***
Study and performance of music for small mixed instrumental ensembles.

Performance Study

Performance Study

Permission for Instrumental/Voice Lessons and Applied Major Lessons are by audition only. Bachelor of music (B.M.) students, depending on the area of concentration and their class year, receive 1, 2, or 3 credits per semester. Bachelor of arts (B.A.) students receive 1 or 2 credits per semester.

First Year

07:701:100 Music Assembly (N1) Required of all bachelor of music students in each semester of registration in Applied Major Lessons. Grade based on attendance.

07:701:103 Instrumental/Voice Lesson (1)

07:701:159 Classroom Piano I (1) *Beginners only. Priority given to music majors.*

07:701:160 Classroom Piano II (1) *Priority given to music majors.*

07:701:175,176 Applied Major Lesson: first-year-level

07:701:201-202 Diction for Singers (1,1) *Intended for vocal music education majors.*
The study of pronunciation of Italian, French, German, and English as applied to singing, utilizing the International Phonetic Alphabet. *07:700:201 is a prerequisite of 07:701:202.*

07:701:204 Secondary Lesson, Alternate (1) *Intended for composition majors.*

07:701:211 Diction I English/Latin (1) *Intended for vocal performance majors.*

07:701:212 Diction II Italian (1) *Intended for vocal performance majors.*

Second Year

07:701:100 Music Assembly (N1) Required of all bachelor of music students in each semester of registration in Applied Major Lessons. Grade based on attendance.

07:701:203 Music Education Secondary Lesson (1) *Intended for music education majors.*

07:701:204 Secondary Lesson, Alternate (1) *Intended for composition or music education majors.*

07:701:213 Diction III French (1) *Intended for vocal performance majors.*

07:701:214 Diction IV German (1) *Intended for vocal performance majors.*

07:701:259 Classroom Piano III (1) *Priority given to music education majors.*

07:701:260 Classroom Piano IV (1) *Priority given to music education majors.*

07:701:275,276 Applied Major Lesson: second-year-level

Third Year

07:701:100 Music Assembly (N1) Required of all bachelor of music students in each semester of registration in Applied Major Lessons. Grade based on attendance.

07:701:302 Vocal Coaching (1) Required for third-year undergraduate vocal performance majors, this course supplements Applied Major Lessons and includes the exploration and coaching of vocal repertory involving interpretation of music and text, historical context, and diction.

07:701:351-352 Art of Accompanying (1,1) Study of ensemble techniques for pianists. Performance with singers and instrumentalists.

07:701:357 Acting for Singers (2) Improvisation and exercises to free the body and imagination, to develop acting skills. Basic stage technique, terminology, tools for determining circumstance, action, and intention using monologues, arias, and scene work.

07:701:358 Stage Movement for Singers (1) Focus on the study of rhythm, coordination, movement vocabulary, dance positions, partner work and stage representation while incorporating Opera dance forms such as the Minuet, Waltz, Gavotte, Pas de Basque, Polonaise, etc. Readings from texts will reinforce studio class work, as well as historical background of movement.

07:701:375,376 Applied Major Lesson: third-year-level

Fourth Year

07:701:100 Music Assembly (N1) Required of all bachelor of music students in each semester of registration in Applied Major Lessons. Grade based on attendance.

07:701:400 Senior Recital (0)

07:701:401 Introduction to Instrument Studio Teaching (1)
Supervised by the appropriate faculty, senior performance majors study pedagogical methods and materials and teach private lessons to nonmajors or music education students learning a secondary instrument. *Open only to senior bachelor of music performance majors, except by special permission. This is a two-semester requirement. Instrumental majors other than percussion and piano take one semester of Introduction to Instrumental Studio Teaching (07:701:401) and one semester of the Instrumental Techniques course in their area.*

07:701:402 Vocal Coaching (1) Required for fourth-year undergraduate vocal performance majors, this course supplements Applied Major Lessons and includes the exploration and coaching of vocal repertory involving interpretation of music and text, historical context, and diction.

07:701:407-408 Contemporary Performance Seminar (1,1)
Study and performance of contemporary music.

07:701:413,414 Percussion Pedagogy (1,1)
Supervised by the appropriate faculty, senior performance majors study pedagogical methods and materials and teach private lessons to nonmajors or music education students learning a secondary instrument. *Open only to senior bachelor of music performance majors, except by special permission. 07:701:413 is a prerequisite to 07:701:414.*

07:701:415,416 Voice Pedagogy (2, 2)
In the first semester, senior performance majors study pedagogical methods and materials; in the second semester, students review methods and materials and, supervised by the appropriate faculty, teach private lessons to nonmajors or music education students learning a secondary instrument. *Open only to senior bachelor of music performance majors, except by special permission. 07:701:415 is a prerequisite to 07:701:416.*

07:701:451-452 Studio Accompaniment (1,1)
Piano accompaniment in a vocal or nonpiano instrumental studio studying the repertoire of the student with whom the accompanist is paired. *Prerequisites: Four semesters of large ensemble and 07:701:351, 352.*

07:701:459,460 Keyboard Pedagogy (2,2)
Supervised by the appropriate faculty, senior performance majors study pedagogical methods and materials and teach private lessons to nonmajors or music education students learning a secondary instrument. *Open only to senior bachelor of music performance majors, except by special permission. 07:701:459 is a prerequisite to 07:701:460.*

07:701:475,476 Applied Major Lesson: fourth-year-level

07:701:499 Individual Study (BA)

Theater Arts 966 Courses (MGSA)

Theater Arts 966 Courses

07:966:103 *Theater Colloquium (0)*
Theater Colloquium is a multidisciplinary weekly event that includes: sharing of ideas, information, and inspirations; professional and academic panels and workshops; guest artists; discussions and performances.
Attendance is mandatory and the course is taken for pass/fail credit. Open to 966 majors only. Course repeated.

07:966:105 *Drawing Practice: Theater Design (2)*
This course is an exploration into drawing techniques for both lighting and scenic design. Scenic, Lighting, and Production students will learn to "see" better, by the use of simple exercises that employ the conditions of visual reality transferred to the flat surface by flat planes and straight lines. Model Fee associated with course.
Prerequisite: Open only to 966 design majors or by permission of instructor. Course repeated for credit.

07:966:106 *Costume Rendering (2)*
The goals of this course are to provide students with specific drawing and media experiences that build the skills necessary to render costume illustrations and concept presentations that meet industry standards. They will obtain the artistic techniques essential to designing costumes for theatre, television, and film. They will gain experience communicating their ideas both visually and verbally.
Open to 966 majors only.

07:966:123 *Theater Practice (2)*
Sections include assignments in one of the production shops: set, lighting, and costume or a run crew assignment on one show. Attending one MGSA strike is mandatory in the semester. A minimum of 90 hours is required to pass the course, but some production running assignments may require up to 150 hours.
Two semesters are required for all 966 production majors and B.A. theater majors.

07:966:124 ***Theater Practice for Designers and Actors (1)***
This course allows the students to experience different areas of the Production experience including the production shops, backstage crew, or understudying on one show. This is a lab course that must be taken twice consecutively covering one full academic year. For B.F.A. Design & Production majors, over the course of the year, they will be assigned 1 run crew assignment and spend 7 weeks in each of the 3 production shops: Scene Shop, Costume Shop, & Light Shop. For the B.F.A. Actors, over the course of the year, they will be assigned to work crew on one show and understudy on one show.
Two semesters are required for all 966 designers and one majors.

07:966:132 ***Auditioning I (1)***
Discussions, demonstrations, practices and exercises will develop an awareness and ownership of the habits consistent with strong audition technique.
Open to 966 majors only.

07:966:135 ***On Camera Acting I (2)***
This course introduces the skills necessary to work as an actor in the film and television industry. Students will gain a greater understanding of the tools and techniques used to tell visual stories, the actors' role in the filmmaking process and a greater appreciation for the cinematic arts overall.
Open to 966 majors only.

07:966:201 ***Production Planning (3)***
We will explore the role of the Technical Director, this will include this history of the job, communication with the creative team, other departments and the scene shop staff; time management; and leadership and other skills necessary for the successful execution of a scenic design. The class will work in a progression from the designer's concept to closing.
Open to 966 majors only.

07:966:202 ***Stage Management Forum (1)***
This class is set up as a series of full Stage Management Area seminars designed to give students an opportunity to unpack their thoughts about stage management as well as discuss topical stage management-related readings and theater industry news. Most discussion topics are not determined in advance of the semester's onset, in an effort to hold space for topics to arise.
Open to 966 majors only.

07:966:209 ***Introduction to Stage Lighting Technology (2)***
This class teaches basic skills in Stage Electrics to prepare the student to work in Theatre production safely and effectively. Through hands-on exercises and quizzes, students will learn standard professional practice in Stage Lighting and gain an understanding of this area theatrical production. Students will be prepared to move on to more advanced levels of training in Stage Lighting if interested.
Open to 966 majors only.

07:966:215 ***Introduction to Design (3)***
This is an introductory course in basic theatrical design and production. Lectures cover a wide range of topics relating to the technical and aesthetic aspects of designing scenery, costumes, and lighting for the stage. Assigned projects will cover basic elements of design as well as the vital role research plays in developing a design for the

stage, and weekly design journal will encourage the habit of seeing (and considering) visual design in the world around you.
Open only to 966 design and production majors or by permission of instructor.

07:966:216 ***Introduction to Design (3)***
The second semester of Introduction to Design focuses on research and the realized set, costume, and lighting design process for one complete design project.
Prerequisites: 07:966:215. Only open to 966 production majors or by permission of instructor.

07:966:219 ***Introduction to Scenic Construction (2)***
Students will be taught techniques and terminology that will prepare them for working in a scene shop; constructions of scenic elements will be covered. Working with power tools and learning the basics of theatrical scenery construction while working safely and in a timely fashion.
Only open to B.F.A. students or by permission of instructor.

07:966:220 ***Advanced Scenic Construction (2)***
This course serves as a continuation and enhancement of the basic concepts covered in Introduction to Scenic Construction. The fall semester will delve deeper into rigging techniques and systems, intermediate millwork and joinery, and welding.
Prerequisites: 07:966:219. Only open to 966 students or by permission of instructor.

07:966:222 ***Auditioning II (2)***
Discussions, demonstrations, practices and exercises will develop an awareness and ownership of the habits consistent with strong audition technique.
Prerequisites: 07:966:132. Open to 966 majors only.

07:966:225-226 ***Voice & Speech I (2,2)***
Introducing the practices of developing one's vocal mechanism and speech skills to apply to acting and performance.
Open to 966 acting students only.

07:966:230-231 ***Movement I (2,2)***
Basic development of the body for the stage.
07:966:230 is a prerequisite for 07:966:231. Open only to 966 acting students.

07:966:232-233 ***History of Costume and Décor I-II (2,2)***
This introductory research course explores the major cultural ideas, events, and styles from antiquity through the 21st century--how ideas travel through history being adopted, adapted, then accessed and acknowledged by theatrical artists is the foundation of our work in this course. We engage in multidimensional exploration of both material and nonmaterial culture, as well as an appreciation of aesthetics from both around the globe and throughout history will be introduced. Lectures and lab work will utilize a range of research methods. Student researchers will begin to develop not only a foundational knowledge of global architecture, dress, and objects, they will learn to thoughtfully, question and synthesize the ideas and concepts used to create identity, narrative, and culture while applying these findings within their own theatrical disciplines.
Open to 966 design and production students or by permission of instructor.

07:966:234 ***Introduction to Dramaturgy (3)***

In this seminar we will examine and discuss a few of the seminal works which are viewed as the foundation of modern dramaturgy. Students read from a selection of works. Our primary source is the text in whatever form.

07:966:235 ***On Camera Acting II (2)***
This course teaches skills necessary to work as an actor in the film and television industry.
Open to 966 majors only.

07:966:242 ***Introduction to Stage Lighting (2)***
A seminar/lab course discussing and applying stage lighting practices. The course is focused on the technologies used in entertainment lighting design. Topics include: theatrical lighting fixtures, optics, photometrics, color theory, programming computer light boards, practical lighting skills, script analysis, research, and theoretical design.
Open only to 966 theater majors or by permission of instructor.

07:966:244 ***Elements of Design I (3)***
In this class students look at text analysis from the point of view of production preparation and process (from page to stage), giving strategies for how to read a play effectively, finding foundations for choices, understanding character and atmosphere in the context of the whole play, as well as methods for addressing the needs of different genres, playwrights and theatrical texts.
Open only to 966 design and production majors.

07:966:245-246 ***History of Architecture and Decorative Arts (2,2)***
This is an introductory course on basic period styles. Weekly lectures introduce vocabulary and main points of identification, along with field trips to the Cloisters, Metropolitan Museum of Art, Frick Collection, and other museums where students do sketch assignments covering appropriate historical periods. Students are responsible for all public transportation and entrance fees.
Open only to 966 design majors or by permission of instructor. Prerequisites: 07:966:215-216.

07:966:249 ***Introduction to Stage Management (3)***
This course is designed to introduce students to core stage management concepts.
Open to 966 and BA Theater majors as availability allows. Priority given to Stage Management majors.

07:966:250 ***Fundamentals of Stage Management (3)***
This course is designed to ensure that first year student stage managers understand the essentials of script analysis and common stage management tasks from the perspective of all members of a stage management team, with an emphasis on the connection between these tasks and the stage manager's role as communicator, leader, and facilitator.
Prerequisites: 07:966:249. Open to 966 majors only.

07:966:251 ***Fundamentals of Drafting (3)***
An introductory course focusing on the practice and craft of hand drafting for the theater.
Open only to 966 design and production majors or by permission of instructor.

07:966:257 ***Accent I (1)***
This course introduces the student actor to all relevant topics regarding accents for performance, including tangible and abstract components of accents, the relationship between accent and identity, as well as the historical context

surrounding performance, language standardization and accent. Throughout the semester, the student actor will apply these aspects of accent work to a monologue in an accent other than their own.
Open to 966 majors.

07:966:260 ***Stage Management Beyond Theater (1.5)***
This course is designed to expand the conversation about stage management beyond the major focus of theater practice.
7 week minicourse. Open to 966 majors only.

07:966:261 ***Intimacy Coaching in Theater (1.5)***
This course is designed to provide the stage manager with an understanding of the techniques and safety measures employed when staging intimacy. Through both discussion and practical learning, we will establish how to create and maintain the safe and equitable room needed for this work. We will explore the spectrum of staging emotional and physical intimacy, choreography building, theatrical effects, interdepartmental collaboration, and safety issues.
7 week minicourse. Open to 966 majors only.

07:966:268 ***Opera and Production (3)***
This class is an introduction to opera for students coming from a theatre background. The course will cover opera as a unique performing art form (its history, structure, composers, and varied styles) as well as its culture, process, and theatrical/technical aspects. Extensive listening and viewing of audio and video recordings will be used to provide examples of the form. Attendance at a final dress rehearsal at the Metropolitan Opera House in NYC will be arranged as part of the course.
Open to 966 majors only or by permission of instructor.

07:966:271-272 ***Acting I (3,3)***
The first year is the student's introduction to an immersive conservatory environment. Students will have the opportunity to explore their inner emotional life and develop a personal point of view, as well as a solid technique through which to express that point of view. This structure allows the student to become intimately acquainted with their own instrument and how they process and experience things in the imaginary world. All of the first year work is about the actor as a unique individual, working as themselves under imaginary circumstances.
Open only to 966 acting students.

07:966:274 ***Costume Construction (2)***
This is an introductory course where you will learn fundamental sewing skills that are used in constructing costumes for theater. The course begins with learning both hand sewing and machine sewing techniques. Once you have completed a sample binder displaying these skills you will construct a ballet bodice utilizing the techniques covered earlier and further expand on your costume construction skills to include cutting, uses of flatlining, boning and more advanced sewing techniques.
Open to 966 design and production majors or by permission of instructor.

07:966:277 ***Production Properties (2)***
This course is an introduction to the world of stage properties. The class will cover responsibilities, paperwork, research, programs, and additional duties typically performed by a prop master, as well as focusing on creating props by using different materials commonly found in prop shops.
Course fee to cover materials. Open only to 966 design and production majors or by permission of instructor.

07:966:280 ***Introduction to Production Management (3)***
A production manager is the person who oversees the creation of the production from beginning to end; this includes people, resources, facilities, money, calendar, the list goes on. Simply put by Jay Sheehan, "The goal of a production manager is to make sure the project happens on time, on budget, safely and with everyone speaking to each other in the end."
Open to 966 majors only.

07:966:305 ***Advanced Stage Lighting Technology (2)***
Technical and mechanical aspects of stage lighting including electrical theory, practical wiring, equipment maintenance, and safety practice. Applications to stage, film, and touring situations.
Open to 966 majors. Prerequisites: 07:966:209 or 07:966:242 and permission of instructor.

07:966:306 ***Aesthetics of Space (3)***
The Aesthetics of Space is an interdisciplinary and immersive exploration of the sensory and philosophical aspects theatrical spaces in various historical and cultural contexts. This course delves into the intricate relationship between human perception, spatial design, and the creation of meaningful environments. This course is designed to deepen your understanding of how the physical environment and spatial context contribute to the storytelling and artistic expression.
Open to 966 majors and BA Theater 965 majors/minors only.

07:966:308 ***Introduction to Projection Design (3)***
Introduction to Projection Design is a broad overview of the discipline of projection design in live performance. Topics covered will include modes of projection design and conceptualization process, content creation, and playback systems. Students will breakdown scripts, create storyboards, and build sample pieces of content during the semester, culminating in a final project.
Open to 966 majors only.

07:966:309-310 ***Costume Design I (3, 3)***
This is a year-long introductory course on the fundamentals of costume design. In the first term we focus on “Observation, Research, Elements of Design and Character analysis”. Covering methods, materials, and techniques used in the process of theatrical storytelling. Providing working understanding of the theatrical design process, synthetic thinking and creative problem solving. Part two is designed to enhance critical thinking skills, fostering creativity, innovation, inquiry, and text analysis. Through a combination of theoretical concepts and practical exercises, students will learn to generate and communicate visual ideas by exploring the realms of identity, narrative, and world building. The course emphasizes the development of analytical, evaluative, and synthesizing abilities, enabling observation, interpretation and expression of ideas effectively through written, oral, and visual communication that are required in theatrical design.
Open only to 966 design and production majors or by permission of instructor.

07:966:311 ***Draping I (3)***
In this course, students will obtain a basic knowledge of pattern drafting based on draping to an individual, starting with the dress form and fitting it to a specific body. The text we will be using focuses on feminine-presenting bodies. We will use draping techniques to learn pattern manipulation for garments post-1920s.
Prerequisite: 07:966:390. Open only to 966 design and production majors or by permission of instructor.

07:966:312 ***Draping II (3)***
The objective of this course is to focus on the fit of clothing and costumes to individuals. You will learn how to identify fit issues in a fitting setting and how to correct the pattern. Bias construction, flat-patterning, working with stretch, and giving direction will be explored.
Prerequisites: 07:966:311. Open only to 966 design and production majors or by permission of instructor.

07:966:313-314 ***Set Design I (3,3)***
This course is an introduction to the set designer's role in the creation of a theatrical design. Through analysis and interpretation of dramatic prompts and text, we will fully explore the scenic design process. This will include the technical skills necessary to conceptualizing and realizing the design including: model-making, drawing, drafting, and the presentation of design ideas in addition to script analysis, research and dramaturgy. Students will also examine the work of scenic designers that have made a significant impact on the field of theatrical design.
Open only to 966 design majors or by permission of instructor.

07:966:315 ***Principles of Stage Management (3)***
The course is designed to build on the foundation of stage management essentials through a process of elaboration and expansion, continuing to explore the evergreen question: how do stage management building blocks function in practice in the field at each stage of production?
Open only to 966 stage management students or by permission of instructor. Prerequisites: 07:966:249-250.

07:966:316 ***Scene Painting (2)***
Scene Painting uses specific projects to introduce you to the traditional skills of Theatrical Scene Painting. The exercises progress in complexity, using perspective drawing of architecture and landscape, grid and scale layout, color mixing and matching of hue and value; various "broken color" texture techniques such as spraying, spattering, and glazing, as well as basic wood grain and marble techniques. The principles of Trompe l'oeil painting are introduced: using bamboos and straight edges for 'lining' to create the illusion of dimensional molding, the concept of a 45° light source, and directional shadows. As time permits, simple aging techniques may also be explored.
Open to 966 majors only.

07:966:317 ***On Camera III (2)***
This course teaches skills necessary to work as an actor in the film or television industry.
Prerequisites: 07:966:235. Open to 966 majors only.

07:966:323 ***Theater Practice (BA)***
This is a B.F.A. lab course that expands the students' experience in their concentration as a vital part of the construction crew in either the Scene, Costume, or Electrics Shops.
Prerequisite: 07:966:124. Not open to first-year students. The course is repeated.

07:966:325-326 ***Acting II: Technique (3,3)***
Scene study and the basis of characterization. To discover and explore: the various styles and approaches as it applies to performance. Reinforcing the training from the first year in the program. Consistent habits for breaking down and studying a script. To become conversant about the profession.
Prerequisites: 07:966:271-272. Open only to B.F.A. II actors.

07:966:327-328 ***Voice & Speech II (2,2)***
The goal of this semester is for the actor to explore their own instrument. All levels of voice production are covered through daily warmups and rehearsals for a new play. The student will learn to lead the warmup for the company.

We will work with monologues and scenes where the actor will explore their body, sound, and effect in the space. We will also explore physical risk in order to expand vocal and physical range and its relationship to emotional vulnerability. The vocal and physical vigor of the course will stretch limitations and deepen our connection with our body, voice, and presence in the space. The semester draws from other techniques such as Fitzmaurice, Lecog, Lessac, Clown, Linklater, Bartenieff, and Skinner.
Prerequisites: 07:966:225-226. 07:966:327 is a prerequisite for 07:966:328. Open only to B.F.A. II actors.

07:966:331 ***Devising I (2)***
Discussions, demonstrations, practices and exercises will develop an awareness and ownership of the habits consistent with developing and creating new works.
Open to 966 majors only. Prerequisites: 07:966:325-326.

07:966:332 ***Devised Theatre (2)***
Discussions, demonstrations, practices and exercises will develop an awareness and ownership of the habits consistent with developing and creating new works. This work includes: adaptations of novels, using current events and the news to inspire work, and generating new ideas. The students will discover non-traditional ways of creating theatre.
Open to 966 majors only. Prerequisites: 07:966:331

07:966:333-334 ***Movement II (2,2)***
Emphasis on stage challenges such as period movement; use of objects; awareness of space, energy, and time. Use of the body to develop characterization.
Prerequisites: 07:966:230-231, 07:966:333 is a prerequisite for 07:966:334. Open only to B.F.A. II actors.

07:966:335-336 ***Costume Design II (3,3)***
This is an upper level course for graduating costume designers and technicians. In this course, we continue the application of methods, materials, and techniques used in the creative storytelling process. Character analysis, costume research and rendering, and fabric swatching will be the focus, providing students with a working understanding of the theatrical design process as well as the essential skills needed to design costumes for live performance.
Open only to 966 design majors or by permission of instructor. Prerequisites: 07:966:309-310.

07:966:339-340 ***Technical Direction I & II (3,3)***
Principles and practice of Technical Direction and the role of the Technical Director within the context of a collaborative process.
Prerequisites: 07:966:220, 07:966:339 is a prerequisite for 07:966:340. Open only to 966 production and design majors.

07:966:343-344 ***Fundamentals of Lighting Design (3,3)***
Basic theory and practice of lighting design including script analysis, physics of light and color, and light plots.
Prerequisites: 07:966:242. Open only to 966 design and production majors or the permission of instructor.

07:966:347 ***Design Collaboration (3)***
This is an advanced course in theatrical design in which design students of all concentrations (scenic, costume and lighting) will be asked to complete projects in collaboration with each other and a visiting director. Students will work in teams to create a fully developed and holistic design for a specific production and space.
Open to 966 majors only. Prerequisites: 07:966:310 or 07:966:314 or 07:966:344.

07:966:350 ***Fabric Dyeing (2)***
In Fabric Dyeing, one will learn the basics of fabric dyeing including color matching, ombré, shibori, resist-dyeing, fabric painting and distressing using a variety of dyes including union dyes, fiber specific dyes, and fabric paint. Safety issues and concerns will also be addressed.
Open only to 966 design majors or by permission of instructor.

07:966:351 ***Costume Crafts (2)***
This course will introduce the student to each of the areas of costume crafts, which include but are not limited to a variety of materials. Millinery basic techniques may also be explored.
Open only to 966 design majors or by permission of instructor.

07:966:356 ***Accent II (2)***

Continuing the work begun in Accent I, this course introduces the student actor to all relevant topics regarding accents for performance, including tangible and abstract components of accents, the relationship between accent and identity, as well as the historical context surrounding performance, language standardization and accent. Throughout the semester, the student actor will apply these aspects of accent work to a monologue in an accent other than their own. Students will learn 3-5 accents over the course of the semester.

Prerequisites: 07:966:257

07:966:357-358 ***Portfolio Preparation Part 1 and Part 2 (1, 1)***
This course prepares the B.F.A. design student to present themselves and their design work in the professional portfolio formats required by the industry. Taught by members of the design faculty, the student is guided in resume preparation, cover letter writing, business cards, and digital portfolio creation. In this course, students will either start a new portfolio or update a current portfolio. This will include completing an online website portfolio and a digital portfolio.
Open only to 966 design majors.

07:966:359-360 ***Directed Study (BA,BA)***
This course allows students to work and study on a project independently which provides the opportunity to develop and refine their theater skills with one-on-one support and direction from professional faculty.
Open only to 966 majors with permission of concentration adviser.

07:966:361 ***Sound Technology for the Theater (2)***
Basic theory and practice for use of sound in the theater. Fees: cost of media.
Prerequisites: 07:966:215-216 or permission of instructor. Open to 966 majors only.

07:966:363 ***Auditioning III (2)***

Discussions, demonstrations, practices and exercises will develop an awareness and ownership of the habits consistent with strong audition technique. This course will have a particular focus on in-person auditions, heightened text, stage and filmed auditions.

Prerequisites: 07:966:222

07:966:371 ***Script Analysis for Actors (2)***
The ability to read and analyze a script is essential to the theatre-maker. In this class, we explore and apply the fundamental dramaturgical tools needed to move from the page to the stage. The goal of the course includes--distinguishing the architecture of diverse dramatic works; identifying the types and uses of stage directions; recognizing and activating punctuation, silences and pauses; learning to tell the difference between atmosphere and mood; understanding how to discern and express character through textual clues; and determining the most effective research methods required by a variety of texts.
Open only to 966 students or by permission of instructor.

07:966:372 ***Advanced Text: Dramatic Structure (2)***
Course builds on concepts and skills learned in Script Analysis for Actors and applies them to close reads of two dramatic works and an intensive reading of two others, enabling the actor to get the most out of the first readings of a play. How do different works demand different or similar approaches? What is the nature and function of research in the artistic process?
Open only to 966 students or by permission of instructor.

07:966:390 ***Advanced Costume Construction (3,3)***
This hands-on course is a continuation of Costume Construction and teaches the basic skills and terminology that are used in costumes. Throughout the semester students will learn advanced hand- and machine-sewing techniques used to stitch historical and modern costumes.
Prerequisite: 07:966:274. Open only to 966 design majors or permission of instructor.

07:966:400 ***On Camera Acting IV (2)***

This course teaches skills necessary to work as an actor in the film and television industry, by focusing on the different styles, genres and techniques needed to
successfully audition, create and work in television and film.

Prerequisites: 07:966:317

07:966:401 ***Dramaturgy: Outreach and Community (3)***

In this course we will work to delve into the world of community engagement and what that means for theatres today. In the current theatrical landscape, many times we acknowledge the importance of the impact our work will have on our audiences, but in this course we will go further. Who are the audiences we consider and how do we define this? We know that art does not exist in a vacuum, therefore do we consider the communities in which our art exists? Throughout the semester we will learn about the current practices of institutional dramaturgs and the work they do to define and invite the communities into their respective theatrical spaces and the many ways that this work can express itself.

07:966:403-404 ***Voice & Speech II and III (2,2)***
Continuing intermediate level practice of voice and speech, as well as the beginning of advanced work. Depending on need, various texts may be used during class, including monologues, scenes, poetry, and text from current production assignments. Introduction to extreme voicing, technical skills in voice modulation, working in variable venues, and adjustment of personal process to meet changeable production demands. The course will explore how artistic choices, including genre, medium, style, and other aesthetic considerations, influence use of voice and speech skills. Students will demonstrate high levels of consistency in their application of voice and speech skills

from prerequisite courses, including: strong vocal and physical range, emotional vulnerability, and deep connection with vocal and physical presence. Development of stamina and sustainable practice/process will continue through vigorous in-class work. This is the fifth semester in a multi-year curriculum of voice and speech.
Open to 966 majors only. Prerequisite: 07:966:327-328. 07:966:403 is a prerequisite for 07:966:404.

07:966:405-406 ***Acting III (3,3)***
Actors will come to understand and discover how to imaginatively apply all the techniques they have acquired for working from their own truth to the actual process of rehearsing and then performing a play. The goal is to develop and reinforce a creative, collaborative and free way of working that enables the actor to build and sustain a multi-dimensional, spontaneous performance that springs from the unique demands and circumstances of the play.
Prerequisites: 07:966:325-326, 07:966:405 is a prerequisite for 07:966:406. Open to 966 majors only.

07:966:407 ***Scene Painting II (2)***
Advanced techniques in scene painting.
Prerequisite: 07:966:316. Open only to B.F.A. students or by permission of instructor.

07:966:408 ***Projection Design II (3)***

In this Fall semester course, students will continue to explore and develop an understanding of how projection can be integrated into the theatrical space. We will look at examples from theater, dance, opera, and the art world. Students consider the specific gravity of projected media as a storytelling tool and create storyboards and video projects. Emphasis is on exploring and interrogating the text, project research, technical knowledge, paperwork standards, and thinking in pictures. We consider the image in "isolation", within the context of other imagery, moving images, image supported by music or sound, and ultimately within a larger theatrical context of script, scenery and lighting. The format of the class includes: lectures, discussions, group work, projects, presentations, and critique.

07:966:410 ***Stage Combat (1)***
Course geared for directors and stage managers on the physical aspects of stage violence from unarmed fighting to the use of weapons. Emphasis on safety.
7 week minicourse. Open to 966 majors only.

07:966:411 ***Production Techniques (3)***
This is a required lab course that expands the student's experience in their concentration as a vital part of the construction crew in either the Scenic, Costume, or Electrics Shops.
Open only to 966 design and production majors. Prerequisite: 07:966:323. Course repeated.

07:966:417-418 ***British Art and Culture (3,3)***
British history, art, and architecture studied on site as part of Rutgers' Conservatory at in London to provide historical, social, and religious contexts for Shakespeare's plays.
Open only to 966 students studying in London.

07:966:419-420 ***Topics in Technical Direction (BA,BA)***
This course serves to further expand the knowledge of concepts needed to work as a Technical Director. The course will include laboratory and independent research. There will be a number of projects that each student will need to independently take to completion, using the tools and skills that have been learned as a Technical Direction Student
Open only to 966 students or by permission of instructor. Prerequisites: 07:966:219-220.

07:966:421 ***Dramaturgy Practicum (BA)***

Dramaturgy assignments for Rutgers Theater Company productions.

07:966:422 ***Production and Design Projects (BA)***
Realizing production design in the areas of costumes, sets, sound, and lights, as assigned by the faculty.
Course may be repeated for credit. Open only to 966 design and production majors.

07:966:423 ***Stage Management (3)***
The course is designed to build on the foundation of stage management essentials established in 'Principles of Stage Management' (07:966:315) through a process of elaboration and expansion, continuing to explore the evergreen question: how do stage management building blocks function in practice in the field at each stage of production?
Prerequisite: 07:966:315. Open only to 966 stage management majors.

07:966:424 ***Stage Management Projects (BA)***
Production work assigned by semester in a stage management role. Production work may be on a Theater Department production or outside the Theater Department (e.g. with Dance or Music, as common but not exclusive examples). Production work assigned by the Head of Stage Management is the only production work that will count toward course credit.
Open only to 966 stage management majors. Prerequisite: 07:966:315.

07:966:425 ***Acting IV (4)***
Advanced acting technique and preparation for the profession.
Prerequisites: 07:966:325-326. Open only to 966 acting students.

07:966:427-428 ***Shakespeare's Plays in Context (3,3)***
Intensive study at Rutgers' Conservatory of Shakespeare's Globe in London of 20 classical Shakespearean plays over the course of a year.
Open to 966 students studying in London.

07:966:430 ***Performance (BA)***
Student-generated performance projects consisting of a variety of public and workshop performances.
Open to 966 acting majors only.

07:966:431-432 ***Movement III (2)***
The arc of the movement curriculum has been designed to release the constrictions of the actor’s instrument and to free the actor’s emotional life. The specific technique explored in the first half (meaning the first two years) of the training is The Williamson Technique, and the core of what you explored the last two years. The advanced exploration of this work will be articulated in the fall and spring semesters of the third year. Moving on to Movement III was dependent upon your becoming the embodiment of the work and skills of Movement I & Movement II.
Prerequisites: 07:966:333-334, 07:966:431 is a prerequisite for 07:966:432. Open to 966 majors only.

07:966:443-444 ***Advanced Stage Management (3,3)***
This class explores the stage manager's process with a focus on the science, art, and skills of stage management. Activities in and outside of the classroom will be utilized in fine-tuning a stage manager's ability to intuit the varying needs of a project, organize themselves accordingly, create effective and efficient schedules, run tech, and support the artistic process.
Open only to 966 stage managers. Prerequisite: 07:966:423.

07:966:447 *Draping III (3)*
In this course, students learn how to replicate period gowns prior to the 1920s by draping and flat-patterning techniques. This will include the construction of one complete finished set of period undergarments and period gowns in muslin.
Open to 966 majors only. Prerequisites: 07:966:312.

07:966:448 *Millinery (2)*
To learn the basics of millinery using beginning techniques of patterning and constructing hats with a variety of materials including: fabric, wire, buckram, felt, and straw.
Open to 966 majors only.

07:966:451 *Tailoring (3)*
Students will obtain a basic knowledge of tailoring techniques by constructing men's suits. This will include patterning, fitting to an individual, and constructing a suit jacket.
Open to 966 majors only. Prerequisites: 07:966:312.

07:966:455 *Costume History Seminar (3)*
In-depth study of western period clothing with emphasis on primary research sources. This course explores how costume designers interpret historical research. We will synthesize world events, cultural history, and relationships between dress, identity, economics, social history, and technology. We will use the visual, applied, and performing arts in order to gain insight into the design process and how historical garments have been represented in different periods in history.
Open only to 966 design students or by permission of instructor. Prerequisites: 07:966:232-233.

07:966:456 *Costume History Seminar (3)*
This is an upper level seminar course for B.F.A. costume designers and technicians. A detailed study of western dress specifically focuses on the study garments, styles, trends and influences of the 18th- 21st century. The study of the garments, their history and fashion theory will guide us. In this current age of information, knowledge is abundant, and yet the acquisition and interpretation of historical sources through research continues to elude the developing and ever discerning eye of early career costumers. Ideas, styles have always been adopted, and adapted, yet the acknowledgment has not. Utilizing a broad range of research methods, student researchers will develop and present their findings, on the many ways clothing aids in presentation of identity and narratives.
Open only to 966 design students or by permission of instructor. Prerequisites: 07:966:455.

07:966:460 *Scene Design II (3)*
This is an advanced course in Set Design, in which students will be asked to complete a semester-long project designing a large scale (multi-scene) opera. The course will culminate in the presentation of a finished 1/4" scale model along with a drafted master floor plan, scene-by-scene floor plans, and CL section drawings.
Prerequisites: 07:966:313-314. Open only to 966 design majors.

07:966:464-465 *Lighting Design I (3,3)*
An introduction to topics essential for entering the profession and establishing a professional practice. This course will raise awareness of allied disciplines that offer a diversity of opportunities for graduating students, where the analytical and technical skills acquired through their lighting design education are equally valued. The semester's work includes production of final design and technical documents for a play or musical of their choosing, along with a professional portfolio.
Prerequisites: 07:966:343-344, 07:966:464 is a prerequisite for 07:966:465. Open only to 966 design majors.

07:966:467 ***Advanced Stage Management Project (BA)***
Production work assigned by semester in a stage management role. Production work may be on a theater department production or outside the theater department (with the dance or music departments, as common but not exclusive examples). Production work assigned by the Head of Stage Management is the only production work that will count toward course credit.
Open only to 966 majors.

07:966:468-469 ***Computer Drafting I (2,2)***
Object-based computer drafting using industry standard computer programming including but not limited to Vectorworks and AutoCAD.
Open only to 966 design and production majors.

07:966:470 ***Computer Illustration I (2)***
Digital Rendering and Costume Design introduces students to the Adobe Photoshop computer program, as a tool for illustration and graphic design. This course will provide instruction on the basic operations of the program, as well as specific graphic design techniques used to create costume design illustrations.
Open only to 966 design and production majors.

07:966:471 ***Computer Illustration II (2)***
Computer illustration programs including PhotoShop for scenic and lighting rendering.
Open only to 966 design and production majors.

07:966:473-474 ***Production Practicum (BA,BA)***
Senior project or internship arranged with specialty adviser and production student adviser.
Open only to 966 production students.

07:966:476 ***Video/Auditioning (1)***
On-camera acting and auditioning techniques.
Open to 966 acting majors only.

07:966:480 ***Auditioning/Career Transition (1)***
Preparation for graduating actors in the business of business.
Open only to 966 acting students.

07:966:483 ***Advanced Topics in Stage Management (3)***
By taking this course, students will study advanced topics in stage management and learn about the real world (i.e., non-academic) context in which our work takes place: including union membership and inter-union relationships, and the nuances of freelancing and interviewing. The student stage manager will complete this course ready for graduation and entry into the work force.
Prerequisites: 07:966:444. Open to 966 majors only.

07:966:488-489 ***Computer Drafting II (2,2)***
Advanced computer drafting using industry standard computer programming including but not limited to Vectorworks.
Prerequisites: 07:966:468 or 07:966:469. Open to 966 majors only.

07:966:490-491 ***Acting in London (12,12)***
Classical acting and voice training, British culture, and literature in residence at Rutgers' Conservatory at Shakespeare's Globe in London program.
Open only to 966 acting students studying in London.

07:966:492 ***Theater Design in London (12)***
The design program introduces students to UK theater practices by completing a series of increasingly challenging, professionally-oriented studio projects. They are encouraged to form and present their artistic vision for productions in response to both Shakespeare and contemporary play texts through cross-disciplinary collaboration with directors, other designers and technicians. They will also create and pursue a personally-crafted research project that makes the most of London's rich resources.
Open only to 966 design students studying in London.

07:966:496 ***Professional Development Seminar (1)***
Students are provided with a comprehensive integration of career development approaches, entrepreneurial strategies, and explorations of regional, national, and global markets, movements, and players. With the guidance of theater faculty, alumni, and outside guests, this class also considers the business of being an artist, from the presentation of oneself as a working professional to the handling of different contracts, finances, and a freelance lifestyle.
Open only to 966 majors.

Administration and Faculty (MGSA)

ADMINISTRATION AND FACULTY

Administration

Faculty

Administration (MGSA)

ADMINISTRATION

Jason Geary, Dean

Ellen Bredehoft, Associate Dean for Academic Affairs

Annabelle Luu, Associate Dean for Finance and Administration

Marshall Jones, Associate Dean for Equity

Faculty (MGSA)

FACULTY

Faculty (MGSA)

Department of Art & Design

Department of Art & Design

Chair: Jacqueline Thaw

Associate Chair: Steffani Jemison

Professors:

Atif Akin, B.S., M.Sc., Middle East Technical (Ankara, Turkey)

Gerry Beegan, M.A., Middlesex (UK)

Barbara Madsen, B.F.A., Brigham Young; M.F.A., Drake

Hanneline Røgeberg, B.F.A., San Francisco Art Institute; M.F.A., Yale

Associate Professors:

Marc Handelman, B.F.A., Rhode Island School of Design; M.F.A., Columbia

Steffani Jemison, B.A., Columbia; M.F.A., School of the Art Institute of Chicago

Julie Langsam, B.F.A., SUNY (Purchase); M.F.A., Queens College

Miranda Lichtenstein, B.A., Sarah Lawrence; M.F.A., California Institute of the Arts

Jeanine Oleson, B.F.A., School of the Art Institute of Chicago; M.F.A., Rutgers

Jacqueline Thaw, B.A., Brown; M.F.A., Yale

Didier William, B.F.A., Maryland Institute College of Art; M.F.A., Yale

Assistant Professors:

Mark Thomas Gibson, B.F.A., The Cooper Union; M.F.A., Yale

Heather Hart, B.F.A., Cornish College of the Arts; M.F.A., Mason Gross School of the Arts, Rutgers

Sue Huang, B.S., Georgetown University; M.F.A., University of California, Los Angeles (UCLA)

Cheon Pyo Lee, B.F.A., The School of the Art Institute of Chicago; M.F.A., Yale, School of Art

Mark McKnight, B.F.A., San Francisco Art Institute; M.F.A., University of California, Riverside

Tepper Endowed Chair:

Chat Travieso, B.F.A., Maryland Institute College of Art; M.A., Yale

Department of Dance

Department of Dance

The Department of Dance is a member of the National Associate of Schools of Dance.

Chair: Gerald Casel

Associate Chair: Barbara Angeline

Professors:

Gerald Casel, B.F.A., The Juilliard School; M.F.A., Wisconsin (Milwaukee)

Jeffrey Friedman, B.A.Arch., Oregon; C.L.M.A., Utah; Ph.D., California (Riverside)

Associate Professors:

John Evans, B.A., Western Washington; M.A., Ohio State

Chien-Ying Wang, B.F.A, Northern Illinois; M.F.A., Ohio State

Assistant Professors:

Ani Javian, B.A., Connecticut College; M.F.A., Ohio State

Alessandra Williams, B.A., Macalester College; M.A., Ph.D., California (Los Angeles)

Associate Professors of Professional Practice:

Frederick Curry, B.A., Alabama; M.A., New York; C.M.A., Laban/Bartenieff Institute of Movement Studies (New York)

Assistant Professors of Professional Practice:

Cristina Marte, B.F.A., Montclair State; M.A., New York

Assistant Teaching Professors:

Barbara Angeline, B.A., California (Irvine); M.A., New York

Pam Tanowitz, B.F.A., Sarah Lawrence College; M.F.A., Ohio State

Faculty (MGSA)

Department of Music

Department of Music

The Department of Music is a member of the National Association of Schools of Music.

Director: Amanda Eubanks Winkler

Associate Director: Maureen Hurd

Graduate Adviser: Robert Grohman

Undergraduate Advisor: Ellen Leibowitz

Distinguished Professor:

George B. Stauffer, Musicology; B.A., Dartmouth; M.A., Bryn Mawr; M.Ph., Ph.D., Columbia

Nancy Yunhwa Rao, Music Theory; B.A., National Taiwan Normal; M.M., Ph.D., Michigan

Professors:

Robert Aldridge, Composition; B.A., Wisconsin (Madison); M.M., M.M.A., New England Conservatory; Ph.D., Yale

Ralph Bowen, Jazz Saxophone; B.M., M.M., Rutgers; A.D., Indiana

Amanda Eubanks Winkler, Musicology; B.M., Illinois State; M.A., Ph.D, University of Michigan

Conrad Herwig, Jazz Trombone; B.A., Goddard; M.A., Queens

Kynan Johns, Conducting; B.M., Elder Conservatorium (Adelaide, Australia); M.M., Sydney Conservatorium, Rubin Academy

Douglas Johnson, Musicology; B.A., Goddard; M.A., Ph.D., California (Berkeley)

Min Kwon, Piano; B.M., Curtis Institute of Music; M.M., D.M.A., The Juilliard School

Associate Professors

Stephanie Cronenberg, Music Education; B.M.E., Wingate; M.A., Maryland (College Park); Ed.M., Harvard; Ph.D., Illinois (Urbana-Champaign)

Christopher Doll, Music Theory and Composition; B.A., Case Western Reserve; M.M., Cincinnati Conservatory; Ph.D., Columbia

Barbara González-Palmer, Piano; B.M., Oberlin Conservatory of Music; M.M., The Juilliard School

Ching-Chun Lai, Director of Orchestral Activities and Engagement; M.M., New England Conservatory; D.M.A., Wisconsin-Madison

Maureen L. Hurd, Clarinet; B.M., Iowa State; M.M., M.M.A., D.M.A., Yale

Todd Nichols, Director of University Bands and Athletic Bands, Music Education and Wind Bands; B.A., College of New Jersey; M.M., Messiah; D.M.A., Rutgers

Judith Nicosia, Voice; B.M., Ithaca; M.M., Indiana

Jonathan Spitz, Cello; B.M., Curtis Institute of Music

Joseph Tompkins, Percussion; B.M., Eastman School of Music; M.M., Manhattan School of Music

Brandon Williams, Director of Choral Activities; B.A., Western Illinois; M.M.Ed., Illinois (Urbana-Champaign); D.M.A., Michigan State

Kraig Alan Williams, Wind Ensemble and Aural Skills; B.M., California State (San Bernardino); M.M., California State (Northridge); D.M.A., Texas (Austin)

Assistant Professors:

Julia Baumanis, Wind Bands; B.M., M.M., Ph.D., Florida State

Nicholas Chong, Musicology; B.A., Yale; M.M., Cincinnati; M.A., M.Ph., Ph.D., Columbia

Kenneth DeCarlo, Trumpet; B.M., Manhattan School of Music

Robert Grohman, Piano; B.M., B.A., Northwestern; M.M., Mannes School of Music; D.M.A., Rutgers

Scott Ordway, Music Theory; B.A., Puget Sound; M.M., Oregon; Ph.D., Pennsylvania

Marjoris Regus, Music Education; B.M., M.M., The University of Utah

Marc Stasio, Jazz Piano, Composition and Arranging, Jazz Studies; B.M., Berklee College of Music; M.M., Rutgers

Kristen Wallentinsen, Music Theory; B.M., Arizona; M.M., Massachusetts (Amherst); Ph.D., Western Ontario

Shelley Zhang, Ethnomusicology; B.Mus., M.A., University of Toronto; Ph.D., Pennsylvania

Instructors:

Karina Bruk, Piano; B.M., M.M., Manhattan School of Music; D.M.A., Rutgers

Mikhaela Mahony, Director of Opera, B.A., Barnard, M.F.A., Columbia

Part-Time Faculty:

Andrew Adelson, Oboe; B.M., M.M., Juilliard School

Anthony Alms, Graduate Studies; B.A., University of Wisconsin-Eau Claire; M.M., Boston; Ph.D., City University of New York

Robert Ameen, Jazz Drums; B.A., Yale

Alan Baer, Tuba; B.M., Cleveland Institute of Music

Noreen Baer, Trombone; B.M., M.M., California State (Long Beach); D.M.A., Southern California

Robert Bernotas, Jazz Appreciation; B.A., Rutgers; M.A., Ph.D., Johns Hopkins

Anthony Branker, Jazz Studies; B.A., Princeton; M.M., Miami; Ed.M., Ed.D., Columbia

Abe Burton, Jazz Saxophone; B.M., The Hartt School

David Chapman, Musicology, B.M., Rhode Island; M.M., Yale; Ph.D., Rutgers

Yun Kyung Choo, Classroom Piano; B.M., M.M., The Juilliard School; G.P.D., Peabody; D.M.A., Rutgers

Andrea Christie, Performance Studies; B.M., British Columbia; M.M., D.M.A., SUNY Stony Brook

Sooyun Chung, Vocal Studies; B.M., Oberlin; M.M., University of Cincinnati College Conservatory of Music

Tim Cobb, String Bass; B.M., Curtis Institute of Music

Paul Cohen, Saxophone; B.M., Baldwin-Wallace; M.M., D.M.A., Manhattan School of Music

Paul Conrad, Classroom Piano; B.M., M.M., Rutgers

Kenneth Davis, Jazz Bass and Jazz History; B.A., Northeastern Illinois; M.A., Rutgers

Mark Dover, Clarinet; B.M., Michigan; M.M., Manhattan School of Music

Melissa Dunphy, Composition; BM.M., West Chester; Ph.D., Pennsylvania

Orin Evans, Jazz Piano; B.M., Rutgers

Bart Feller, Flute; B.M., Curtis Institute

Kathleen Foster, Viola; B.M., University of Utah; M.M., Mannes

Solomon Guhl-Miller, Musicology, B.M., M.M., Peabody, Ph.D., Rutgers

Amanda Harberg, Composition; B.M., M.M., The Juilliard School; Ph.D., Rutgers

Kaoru Hinata, B.M., Northwestern; M.M., A.D., Yale

Nathan Hughes, Oboe; B.M., Cleveland Institute of Music; M.M., The Juilliard School of Music; Metropolitan Opera Orchestra

Sungwon Hwang, Aural Skills; B.M., M.M., Eastman School of Music; D.M.A., Rutgers

Mark Hyczko, Aural Skills; B.A., B.M., Rutgers; M.M., Mannes College of Music

Taina Kataja-Urrey, Voice; B.M., Sibelius Academy (Finland); Diploma, Hochschule für Musik und Darstellende Kunst (Austria)

Ahran Kim, Classroom Piano; B.M., New England Conservatory; M.M., Manhattan School of Music

Dawn Kotoski-Shicoff, Voice; B.M., M.M., Manhattan School of Music

Louis Levitt, String Bass; B.M., A.D., Cincinnati Conservatory of Music

Victor Lewis, Jazz Drums, Nebraska

Alex Lough, Music Technology, M.M., Florida

David Martin, Music Education; B.A., Rutgers; M.M., Northwestern; Doctoral Studies, Eastman; D.M.A., Rutgers

Jessica Morel, Aural Skills; B.M., Indiana; M.M., University of Nevada Las Vegas; D.M.A., North Texas

Angelique Mouyis, General Music Studies; B.M., M.M., University of the Witwaterstrand, Johannesburg; M.F.A., New York University; Ph.D., Rutgers

Leah Gale Nelson, Violin, B.M., Roosevelt University, Chicago Musical College; M.M., Mannes

Alex Norris, Jazz Trumpet; B.M., Peabody; M.M., Manhattan School of Music; D.M.A., Miami

Roger Nye, Bassoon; B.M., Eastman School of Music; M.M., Southern California, School of Music

Louie Ocampo, Vocal Studies; M.F.A., Ohio State

MyungJin Oh, Musicology, B.M., Academic Musical College of the Moscow State Conservatory; M.M., Manhattan School of Music; D.M.A., Rutgers

Hirono Oka, Violin; San Francisco Conservatory; Curtis

Daniel Panner, Viola; B.A., Yale; A.D., Curtis Institute; M.M., The Juilliard School; D.M.A., CUNY

David Peel, Horn; B.M., M.M., Miami

John Perry, Piano; B.M., M.M., Eastman School of Music

Todd Phillips, Violin; B.M., The Juilliard School

Susan Quittmeyer, Voice; B.M., Illinois Wesleyan; M.M., Manhattan School of Music

Anthony Rideout, Music Education, M.A., Montclair; D.M.A., Rutgers

Sasha Romero, Trombone; B.M., Baylor; M.M., Rice

Gregg Rossetti, Percussion; B.A., Muhlenberg; M.A., Montclair State; Ph.D., Rutgers

Carol Sharar, Strings; B.M., Montclair State; M.M., William Paterson

John Sheppard, Trumpet; B.M., Manhattan School of Music

Leelanee Sterrett, Horn; B.M., Wisconsin (Madison); M.M., Yale

Dave Stryker, Jazz Guitar

Ian Sullivan, Percussion; B.M., Michigan; M.M., The Juilliard School

Brennan Sweet, Violin; B.M., A.D., Indiana

André Tarantiles, Harp; B.M., M.M., Indiana

Mark Timmerman, Bassoon; B.M., Curtis Institute

Michael Truesdell, Percussion; B.M., Lawrence; M.M., D.M.A., The Juilliard School

Timothy Urban, Aural Skills; B.S., M.S., M.M., SUNY (Binghamton); M.F.A., Sarah Lawrence; M.A., Ph.D., Rutgers

Vladmir Valjarevic, Piano; B.M., M.M., Mannes School of Music; P.S.D., Geneva Conservatory (Switzerland); D.M.A., Rutgers

Jessica Valiente, Jazz Studies; B.A., Barnard College, Columbia; M.A., D.M.A., The Aaron Copland School of Music, Queens College, The City University of New York

Aaron VanderWeele, Euphonium; LTCL, Trinity College London

Jennifer Wharton, Bass Trombone; B.M., New England Conservatory

David Wolfson, Theory; B.M., Cleveland Institute of Music; M.A., Hunter; Ph.D., Rutgers

Michael Zavorskas, Music Technology; B.A., Stevens Institute of Technology; M.M., Rowan

Zhuo Zhao, Theory; B.A., M.A., Inner Mongolia; M.M., New England Conservatory

Carmit Zori, Violin; B.M., Curtis Institute

Faculty (MGSA)

Department of Theater

Department of Theater

Chair: David Gordon

Associate Chair: Christopher Cartmill

Director of Design and Production: Jenn Stauffer

Head of Acting: Cameron Knight

Head of Costume Design: Valerie Marcus Ramshur

Head of Costume Technology: TBD

Head of Dramaturgy: Christopher Cartmill

Head of Lighting Design: Don Holder

Head of Scenic Design: Lee Savage

Head of Stage Management: Anne McPherson

Head of Technical Production: Jenn Stauffer

Head of M.F.A. Playwriting: Kathleen Tolan

Professors:

David Esbjornson, B.A., Gustavus Adolphus; M.F.A., New York

Don Holder, B.S., Maine; M.F.A., Yale; Honorary Doctor of Arts, Muhlenberg

Marshall Jones III, B.A., Rutgers; M.A., New York

Associate Professors:

Ellen Bredehoft, B.F.A., Idaho; M.F.A., Boston

Christopher Cartmill; B.A., Washington and Lee; M.F.A., Virginia

David P. Gordon, B.F.A., New York

Cameron Knight, B.F.A., Rutgers; M.F.A., Maryland

Valerie Marcus Ramshur, B.A., Bennington; M.F.A., New York

Jenn Stauffer, B.A., Macalester

Kathleen Tolan, B.A., SUNY (Empire State); M.F.A., Brooklyn

Assistant Professors of Professional Practice:

Deb Jackel, B.F.A., Rutgers

Danielle Liccardo-Massood, London Academy of Music and Dramatic Art

Anne McPherson, B.A., Reed ; M.F.A., Yale

Lee Savage, B.F.A., Rhode Island School of Design; M.F.A., Yale

Ann-Louise Wolf, B.F.A., UNCSA; M.F.A., with Distinction, Royal Central School of Speech and Drama

Lecturers:

Karen Alvarado, B.A., Texas A&M Corpus Christi; M.F.A., Rutgers

Jen Ash, B.A. & B.S., University of Texas at Austin

Valeria A. Avina, B.A., Graceland; M.F.A, Iowa

Kyle Bahl, B.F.A., University of Nevada; William Esper Studio

Shane Ballard, Fashion Institute of Technology

Jeff Bender, B.F.A, Michigan

William Carden, St. Lawrence, Brandeis

Elizabeth Hope Clancy, B.A., William and Mary; M.F.A., Yale

Chris Cragin-Day, B.A., Oklahoma Baptist; M.F.A., Baylor

David Dannenfelser, B.A., William Paterson; M.A., New York; M.F.A., Sarah Lawrence

Colleen Dolan, B.F.A., Rutgers

Kate Douglas, B.F.A., New York

Jerilyn Jurinek, B.A., School of the Art Institute of Chicago; M.F.A., Columbia

Jessica Kahkoska, B.A., Northwestern

John Keller, B.A., Holy Cross; M.F.A., Rutgers

Joleen Addleman Loyd, B.F.A., University of North Carolina School of the Arts

Kasson Marroquin, B.F.A., University of North Texas; M.F.A., University of California San Diego

Pat McCorkle, B.A., Rutgers; M.A., New York

David Murin, B.F.A., New York

John Narun, B.F.A., Northwestern

Greg Perri, B.A., Binghamton; M.F.A., Rutgers

Sari Ruskin, B.A., M.A., City College of New York; Ph.D., Long Island

Alexandra Speith, B.F.A., Carnegie Mellon

Cat Tate Starmer, M.F.A., Yale

Denise Wagner, B.F.A., Suny (Purchase); M.F.A., North Carolina (Chapel Hill)

Christine Whalen, B.A., Rutgers

Shannon White, B.F.A., Rutgers

Antu Yacob, B.A., Minnesota-Duluth; M.F.A., Rutgers

Professors Emeriti:

Lee Blessing, B.A., Reed; M.F.A., Iowa

Eileen Blumenthal, B.A., M.A., Brown; Ph.D., Yale

F. Mitchell Dana, B.F.A., Utah State; M.F.A., Yale School of Drama

William Esper, B.A., Case Western Reserve; Neighborhood Playhouse School of the Theater; teaching training with Sanford Meisner

Vickie Esposito, B.A., Rutgers; M.F.A., Minnesota

John Jensen, B.S., Oregon; Pratt Institute and Lester Polakof School of Stage Design

Virginia Johnson, B.S., Moorhead State; M.A., Bowling Green

Kevin Kittle, B.A., Caldwell; M.F.A., Rutgers

Eric Krebs, B.A., M.A., Rutgers

Barbara Marchant, B.A., Fort Wright; teaching training with William Esper

Joseph F. Miklojcik Jr., B.S., Northwestern; M.A., Connecticut

R. Michael Miller, B.F.A., M.F.A., Washington

Amy Saltz, B.A., Wisconsin

Faculty (MGSA)

Rutgers' Conservatory in London

Rutgers' Conservatory in London

Rutgers' Acting Conservatory at Shakespeare's Globe in London

Director: Cameron Knight

Director in Residence: Philip Cumbus

Instructors:

Sam Adams, Dramatherapist

David Antrobus, Theater Criticism

Joseph Atkins, Singing, Composer and Musical Directing

Jimmy Garnon, Global Performance Practice

Anna Healey, Movement

Cory Hippolyte, Text and Monologues

Federay Holmes, Acting

Abi Kessel, Intimacy Director

Gemma Maddock, Voice

Kate Maravan, Meisner Technique

Huw Prall, Wester European Historical Dance

Senior Globe Research Lecturer, Texts and Contexts

Rutgers' Design Conservatory in London

Program Director: Michael Pavelka

Art and Design Co-Directors: James Perkins & Victoria Smart

Instructors:

Sam Adams, Dramatherapist

David Antrobus, Theater Criticism

David Farley, Technical Design Support

Sally Ferguson, Project Lighting Design

Prema Mehta, Project Lighting Designer

Richard Sharples, Visual Art

Karen Shannon, Millinery

Jenny Tiramani, Director of The School of Historical Dress

Will Tosh, Texts and Contexts

Faculty (MGSA)

Filmmaking Faculty

Filmmaking Faculty

Chair: Patrick Stettner, M.F.A., Columbia

Professors:

Caroline Key, M.F.A., California Institute of the Arts

Danielle Lessovitz, M.F.A., New York (Tisch School of the Arts)

Shawn Snyder, M.F.A., NYU (Tisch School of the Arts)

Documentary Film Lab Director:

Thomas Lennon, B.A., Yale

Academic Policies and Procedures (MGSA)

ACADEMIC POLICIES AND PROCEDURES

Note: See the **University Policies and Procedures** section in the Rutgers Main catalog for university-wide academic policies and procedures.

Academic Support Services

Academic Credit

Registration and Course Information

Grade Appeal Process

Scholastic Standing

General Information (PHARM)

GENERAL INFORMATION

History and Aims of the School

The Pharmacy Profession

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New Jersey Legal Requirements for the Pharmacy Profession

Office of Continuing Education

Accreditation

Technical Standards for the Pharm.D. Program

History and Aims of the School (PHARM)

HISTORY AND AIMS OF THE SCHOOL

The Ernest Mario School of Pharmacy was founded in 1892 as the New Jersey College of Pharmacy by a group of citizens dedicated to the interest of pharmacy. It was incorporated into Rutgers University in 1927. The college was housed at various locations in downtown Newark, and, after 1925, in its own building in north Newark. During these years, most students lived at home and commuted to classes. In 1971, the college was relocated to the Busch Campus in Piscataway, adjacent to the Robert Wood Johnson Medical School and also near the Library of Science and Medicine and other buildings related to the basic sciences at Rutgers University. In December 2001, the school

was renamed from the College of Pharmacy to the Ernest Mario School of Pharmacy in recognition of the many significant contributions and achievements of alumnus Ernest Mario and to reflect the fact that the school only offers a doctoral professional degree. Ernest Mario is a 1961 graduate of the school and is recognized as one of the most distinguished executives in the pharmaceutical industry.

Today, the school accommodates both resident students (housed at one of the residential campuses in the New Brunswick area) and commuters. Under either arrangement, pharmacy students have access to all cultural and other extracurricular activities within the university.

The six-year, professional degree curriculum for the doctor of pharmacy (Pharm.D.) is structured to educate and prepare men and women for practicing the profession of pharmacy in the community, medical institutions, organized health care facilities, or the pharmaceutical industry by developing high levels of theoretical comprehension and professional skill required for competence in each of these areas. In addition, the Pharm.D. program is designed to create independent thinkers and problem solvers who know how to communicate and counsel health care professionals and patients and who are knowledgeable in all aspects of drug therapy.

The curriculum offers a combination of courses in the biological, physical, and social sciences and the humanities, and an expansive variety of new clinical field experiences, which is the hallmark of the program. Finally, because the pharmacist functions in the context of contemporary society, the curriculum is shaped to develop in the student a sensitivity to the socioeconomic, ethical, and legal aspects of professional life, and an appreciation of the artistic and cultural currents of modern civilization.

These objectives are realized through a balanced program of study in chemical biology, clinical pharmacy, pharmacy practice and administration, pharmaceutical chemistry, pharmaceutics, pharmacology, the natural and social sciences and the humanities, and a structured clinical experience program.

The Pharmacy Profession (PHARM)

THE PHARMACY PROFESSION

Pharmacy is a health care profession concerned with the management of drug therapy in patients, the compounding and dispensing of medications, and the generation and transmission of knowledge about the proper selection and use of drugs and their effects on humans and animals.

Pharmacists in their role as managers of drug therapy work with physicians, patients, and health care providers to ensure effective treatments, particularly for such chronic diseases as asthma, hypertension, and diabetes, by collaborating on medication choices, educating and assisting patients with drug usage, tracking patient progress, and monitoring drug-therapy outcomes.

While everyone is familiar with the community pharmacist, the general public is less aware that career openings also exist in industrial and hospital pharmacies, government agencies, and education, as well as in nursing homes, health maintenance organizations, clinics, home health care agencies, governmental agencies, and nuclear pharmacies.

The community pharmacist serves patients directly as a vital part of total health care. Patients may obtain prescription service, medicines, surgical supplies, immunizations, and information and advice in pharmacies located in almost every town and city.

The modern hospital employs pharmacists who are responsible for establishing an efficient system for managing and providing drug therapy to patients throughout the institution. Hospital pharmacists are increasingly a critical member of the health care team and are involved in the clinical management of drug therapy, consultation, providing drug information to physicians and nurses, designing and preparing special dosage regimens for patients, and counseling patients directly about the proper utilization of their medication.

Many pharmacists are employed by the pharmaceutical industry, serving as scientists and supervisors in research, sales, marketing, and drug information. Others teach and conduct research in colleges of pharmacy, and increasing numbers work for state and federal law enforcement agencies, the military, the U.S. Public Health Service, and the Veterans Administration.

Advantages at Rutgers (PHARM)

ADVANTAGES AT RUTGERS

For students who wish to prepare for one of the many exciting pharmaceutical careers, Rutgers University offers many advantages. The Ernest Mario School of Pharmacy is located on a modern, attractive suburban campus, surrounded by the university's golf course, the Robert Wood Johnson Medical School, the School of Public Health and the university's major science departments. Student housing, a campus student center, and the Library of Science and Medicine are within walking distance of the school. While the campus is a traditional college campus and away from the hustle and bustle of any downtown business district, the nearby central New Jersey metropolitan region offers a wide array of practice-oriented educational opportunities in community pharmacies, hospitals, and the pharmaceutical industry. The school's professional experiential programs take full advantage of these opportunities, including industrial pharmacy sites that provide a unique experience with the nation's leading drug manufacturers.

All activities, both academic and extracurricular, of the larger university are available to pharmacy students, including extensive academic offerings in the basic sciences, humanities, and social sciences.

Dual-degree programs provide specialized opportunities for some of our highest achieving students. Our Pharm.D./Ph.D. program gives select students an excellent opportunity to start graduate work in research programs that combine pharmacy with basic, translational, or clinical research in pharmaceutics, pharmacology, and related fields. Our Pharm.D./M.B.A. provides students with an opportunity to jump-start their careers in pharmacy and business--in hospitals, industry, and other health care venues. Our Pharm.D./M.P.H. enables our students to build on their pharmacy training with a sound understanding of public health fields, such as organization of health services, pharmacoepidemiology, health care policy, biostatistics, and environmental health.

As a state university, Rutgers offers tuition rates that are particularly affordable to New Jersey residents, while maintaining reasonable tuition rates for out-of-state students. Scholarships and other forms of financial aid also are available. For further information, see the Tuition and Fees and Financial Aid websites.

The pharmacy faculty also offers graduate programs for students wishing to earn a master of science or doctor of philosophy degree in chemical biology, pharmaceutical and medicinal chemistry, pharmaceutics and industrial pharmacy, pharmacology, or toxicology. These programs are described on the School of Graduate Studies website.

Facilities (PHARM)

FACILITIES

Facilities (PHARM)

William Levine Hall

William Levine Hall

The principal pharmacy building, William Levine Hall, provides more than 110,000 square feet of space on six different levels for undergraduate instruction and graduate study and research. Undergraduate laboratories and classrooms are provided for instruction in chemical biology, pharmaceutical chemistry, pharmacy practice and administration, pharmaceutics, and pharmacology. Specialized facilities accommodate work in animal experimentation, radioisotopes, electronic instrumentation, and pharmaceutical manufacturing. The 2016 addition to the building provides state-of-the-art hospital simulation suites and a mock intravenous admixture lab. Additionally, a new community pharmacy laboratory, several large and small classrooms, and student study space have been added. The Ernest Mario School of Pharmacy faculty is located in this building as well as in several other buildings throughout the campus, including the newly expanded Susan Lehman Cullman Laboratory for Cancer Research, which is attached to William Levine Hall.

Facilities (PHARM)

Libraries

Libraries

Pharmacy students make use of extensive pharmacy, science, and health-related collections in the Library of Science and Medicine adjacent to the school. Other sources are available in the Alexander Library on the College Avenue campus and the other libraries, general and specialized, of the university library system. All university library materials are accessible to pharmacy students directly or through interlibrary loan and online reference service.

New Jersey Legal Requirements for the Pharmacy Profession (PHARM)

NEW JERSEY LEGAL REQUIREMENTS FOR THE PHARMACY PROFESSION

The requirements for licensure as a registered pharmacist in the state of New Jersey are set by the state Board of Pharmacy. Since the specific requirements change from time to time, it is advisable to contact the state board for the most current information when specific questions about the requirements for licensure arise. Correspondence to the board may be addressed to the Executive Director, Board of Pharmacy, 124 Halsey Street, P.O. Box 45013, Newark, NJ 07101 (973-504-6450 or here).

To qualify for licensure in the state of New Jersey, the applicant must be a graduate of an accredited college of pharmacy, must have completed a sufficient amount of time in an approved experience program, and must have passed both the state Board of Pharmacy Licensure Examination and the Multistate Jurisprudence Pharmacy Examination. The experience program may consist of internship, externship, or a combination of both. Externship refers to a college-credited and supervised experience program that has been approved by the Board of Pharmacy as meeting the experience requirement. Internship refers to postgraduate experience in an approved pharmacy with a board-approved preceptor. A total of 1,440 hours of internship/externship is necessary for a candidate to qualify to take the licensure examination. The examination itself is a comprehensive computer-adaptive examination that integrates the pharmaceutical sciences with pharmacy practice.

The curriculum at the Ernest Mario School of Pharmacy currently provides an externship and related experience components that meet the experience requirements for licensure in New Jersey. Students contemplating registration as a pharmacist in states other than New Jersey should become familiar with the licensure and reciprocation requirements in those states. Information about registration in other states may be obtained from the appropriate state board of pharmacy or through the National Association of Boards of Pharmacy, 1600 Feehanville Dr., Mount Prospect, IL 60056 (847-391-4406 or here).

Office of Continuing Education (PHARM)

OFFICE OF CONTINUING EDUCATION

The mission of the Office of Continuing Education, under the guidance of the dean's office, is to serve the educational needs of practitioners through the provision of educational programs. These programs are designed to let the participant achieve, retain, and strengthen professional knowledge and competencies. The website is here.

Accreditation (PHARM)

ACCREDITATION

Accreditation (PHARM)

Accreditation Council for Pharmacy Education

Accreditation Council for Pharmacy Education

The Pharm.D. degree program of the Ernest Mario School of Pharmacy is accredited by the Accreditation Council for Pharmacy Education, 190 S. LaSalle Street, Suite 3000, Chicago, IL 60603-3446 (312-664-3575; Fax: 866-228-2631). The Accreditation Council for Pharmacy Education is made up of 10 members representing the American Association of Colleges of Pharmacy, the American Pharmaceutical Association, the National Association of Boards of Pharmacy, and the American Council on Education. It is recognized as the national accrediting agency for colleges of pharmacy in this country. The council also accredits the Ernest Mario School of Pharmacy as an approved continuing education provider.

Accreditation (PHARM)

American Association of Colleges of Pharmacy

American Association of Colleges of Pharmacy

The Ernest Mario School of Pharmacy is a member of the American Association of Colleges of Pharmacy, which was organized in 1899 for the promotion of the interests of pharmaceutical education. Since its founding, the association has steadily increased in size and enlarged its services. Today, it is recognized as a vital factor in the welfare of the profession of pharmacy. It has set and maintained high standards of pharmaceutical education. Members of the faculty participate in its activities, and the school maintains its prescribed standards.

Technical Standards for the Pharm.D. Program (PHARM)

TECHNICAL STANDARDS FOR THE PHARM.D. PROGRAM

The Technical Standards were updated in August 2019. They were approved by the University General Counsel in August 2019 and the EMSOP Faculty on August 29, 2019. The standards can be found here.

Degree Requirements (PHARM)

DEGREE REQUIREMENTS

Requirements

Graduation

Requirements (PHARM)

REQUIREMENTS

The degree of doctor of pharmacy is awarded to a pharmacy student by the university upon the recommendation of the faculty of the Ernest Mario School of Pharmacy. Recommendation is contingent upon the student's fulfillment of the following requirements:

1. completion of the six-year curriculum for the doctoral degree

2. cumulative grade-point average must be greater than 2.5, and the cumulative professional grade-point average must be greater than 2.5

3. professional grade-point average in the terminal year must be greater than 2.5

4. completion of four years of full-time study for the doctoral degree at an accredited college of pharmacy, the last year of which must have been spent at the Ernest Mario School of Pharmacy

5. candidate must be adjudged by the faculty to be of good ethical character and properly equipped for the profession of pharmacy

6. candidate must submit the graduating student survey prepared in conjunction with the American Association of Colleges of Pharmacy (AACP) and the Accreditation Council for Pharmacy Education (ACPE)

Proficiency in English

Proficiency in English

Students are expected to demonstrate the ability to speak and write effectively in the English language. Those failing to write literate English on any written assignment may warrant a failing grade for that reason alone. Instructors report to the English department any failure to meet this standard. Students who continue to write unsatisfactorily even though they have passed 01:355:101 Expository Writing I may be required to repeat the course in addition to their regular program.

Graduation (PHARM)

GRADUATION

Degrees are conferred by the university at the recommendation of the school faculty only at the annual commencement at the end of the spring semester. Students completing degree requirements in August, October or January may make a written request to the Office of the Registrar for a certificate attesting to their completion

of degree requirements after September 1, October 1, or January 1, provided they have completed a diploma application by the appropriate deadline. All students are required to file a diploma information form with the registrar (available here), normally at the beginning of the fourth professional year.

Graduation (PHARM)

Graduation with Honors

Graduation with Honors

Students whose Rutgers cumulative grade-point averages are between 3.160 and 3.359 graduate with the distinction *cum laude*. Those whose averages are between 3.360 and 3.659 graduate *magna cum laude*. Students whose averages are between 3.660 and 4.000 graduate *summa cum laude*. Averages are not rounded to the next higher number in the calculation of honors. Only courses completed at Rutgers are counted in these averages.

Programs of Study (PHARM)

PROGRAMS OF STUDY

Six-Year Pharmacy Curriculum

Prepharmacy Curriculum

Dual-Degree Options

Honors and Awards

Scholarships

Educational Opportunity Fund

Six-Year Pharmacy Curriculum (PHARM)

SIX-YEAR PHARMACY CURRICULUM

First Preprofessional Year

First Semester

01:119:115 General Biology I (4)

01:160:161 and 101 General Chemistry I (4)

01:160:171 Introduction to Experimentation (1)

01:355:101 Expository Writing I (3)

01:640:135 Calculus I (4)

Second Semester

01:119:116 General Biology II (4)

01:119:117 General Biology Lab (2)

01:160:162 General Chemistry II (4)

01:_:_ Second College-level Writing course (3)*

30:725:104 Pharmacy Convocations (1)**

humanities/social sciences electives (3)

Second Preprofessional Year

First Semester

01:160:307 Organic Chemistry I (4)

01:220:102 Introduction to Microeconomics (3)

01:750:161 Elements of Physics (4)

humanities/social sciences elective (3)

psychology/sociology elective (3)

Second Semester

30:718:200 Integrated Organ Physiology (3)

01:160:308 Organic Chemistry II (4)

01:160:311 Organic Chemistry Laboratory (2)

01:960:401 Basic Statistics for Research (3)

2 humanities/social sciences electives (6)

First Professional Year

First Semester

30:158:309 Biochemical Foundations of Pharmaceutical Biotechnology (3)

30:718:304 Pathophysiology (3)

30:721:301 Introduction to Pharmaceutics and Laboratory (4)

30:715:207 Pharmaceutical Chemistry (2)

30:725:320 Foundations of Pharmacy Care (4)

30:_:_ Professional elective I (2)***

30:725:304 LEAP-AHEAD Documentation Portfolio I (0.5)

Second Semester

30:158:310 Biochemical Foundations of Pharmaceutical Biotechnology II (3)

30:721:430 Introduction to Biopharmaceutics and Pharmacokinetics (4)

30:718:320 Pharmacology and Pharmacogenetics (3)

30:721:320 Drug Delivery and Laboratory (4)

30:725:321 Integrated Pharmacy Assessment Skills Series (iPASS) I (1)

30:725:305 LEAP-AHEAD Documentation Portfolio II (0.5)

30:_:_ Professional elective I (2)

Summer Semester

30:725:330 Introductory Practice Community Experience (2)

Second Professional Year

First Semester

30:158:420 Pharmaceutical Microbiology (3)

30:715:409 Medicinal Chemistry I (3)

30:720:440 Pulmonary and Hematology Pharmacotherapy (3)

30:720:442 Cardiology Pharmacotherapy (4)

30:725:470 Medical Literature Evaluation and Application (3)

30:725:432 iPASS II (2)

30:_:_ Professional elective II (2)

30:725:404 LEAP-AHEAD Documentation Portfolio III (0.5)

Second Semester

30:715:410 Medicinal Chemistry II (3)

30:720:445 Renal Pharmacotherapy (2)

30:720:446 Infectious Disease Pharmacotherapy (4)

30:725:489 Sterile Compounding (2)

30:725:308 Pharmacy Practice Management (3)

30:_:_ Professional elective III (2)

30:725:433 iPASS III (2)

30:725:405 LEAP Seminar IV (0)

Summer Semester

30:725:480 Introductory Pharmacy Practice Experience Hospital/Institutional (2)

Third Professional Year

First Semester

31:720:540 Endocrine and Reproductive Pharmacotherapy (2)

31:720:541 Gastrointestinal, Hepatic, and Nutrition Pharmacotherapy (2)

31:720:542 Oncology Pharmacotherapy (3)

31:725:550 Self Care and Home Care (3)

31:725:540 Principles of Pharmaceutical Economics (3)

30:_:_ Professional elective IV (2)

31:725:534 iPASS IV (2)

31725:504 LEAP-AHEAD Documentation Portfolio V (0.5)

Second Semester

31:725:545 Pharmacy Law and Bioethics (4)

31:720:545 Psychiatric and Behavioral Disorders Pharmacotherapy (2)

31:720:546 Neurology Pharmacotherapy (3)

31:720:547 Immunology, Ocular, and Dermatology Pharmacotherapy (1)

30:725:415 Poison Management and Drug Abuse (3)

30:_:_ Professional elective V (2)

31:725:535 iPASS V (2)

31725:505 LEAP-AHEAD Documentation Portfolio VI (0.5)

Note: All curriculum requirements of the first five years must be successfully completed before students may register for any sixth-year rotation (Advanced Pharmacy Experience). Students must complete at least eight experiential rotations during the last year of the program (summer, fall, spring).

Fourth Professional Year

Summer Session

31:725:791 Advanced Practice Experience I (5)

31:725:792 Advanced Practice Experience II (5)

31:725:793 Advanced Practice Experience III (5)

First Semester

31:725:794 Advanced Practice Experience IV (5)

31:725:795 Advanced Practice Experience V (5)

31:725:796 Advanced Practice Experience VI (5)

Second Semester

31:725:797 Advanced Practice Experience VII (5)

31:725:798 Advanced Practice Experience VIII (5)

31:725:799 Advanced Practice Experience IX (5)

31:725:615 Student Portfolio (2)

31:725:617 Pharmacy Reflection Seminar (2)

*01:355:201, 01:355:202, 01:355:203, 01:355:301, 01:355:302, 01:355:312, 01:355:315, 01:355:342, 01:355:375, or 01:355:303. Communication courses will NOT be accepted.
**30:725:104 is required of first-year students only. Transfer students entering the first professional (third) year of the program do not take this course.
***Students must complete five professional electives during the first through third professional years; one of which must be a clinical elective in the third professional year.

Prepharmacy Curriculum (PHARM)

PREPHARMACY CURRICULUM

This program outlines the courses required by students who currently are not enrolled at the Ernest Mario School of Pharmacy but who are interested in the profession of pharmacy and wish to apply to the school as transfer students. Upon satisfactory completion of both years of the program, students are eligible to apply for transfer to the Ernest Mario School of Pharmacy. However, students should understand that transferring is a competitive process and many students admitted will have more than two years of college completed. Admission is not guaranteed. All requirements of the preprofessional program must be completed prior to starting the first professional year. Parenthetical numbers below refer to the number of credits.

First Year

First Semester

General Biology I with laboratory (4,2)

General Chemistry I with laboratory (4,1)

English Composition I (3)*

Calculus I (4)

Second Semester

General Biology II with laboratory (4,2)

General Chemistry II (4)

English Composition II (3)*

humanities/social sciences electives (3)

Second Year

First Semester

Human Anatomy and Physiology I (3)**

Organic Chemistry I with laboratory (4,1)

Microeconomics (3)

Physics I with laboratory (3,1)***

humanities/social sciences electives (6)

Second Semester

Human Anatomy and Physiology II (3)**

Organic Chemistry II with laboratory (4,1)

Physics II (3)***

Basic Statistics for Research (3)****

humanities/social sciences electives (6)

*These are college-level English and writing courses that include training in the successful writing of a research paper.
**Rutgers students may substitute Systems Physiology (01:146:356), which generally has spaces available in the

Summer Session offering.
***Elements of Physics (01:750:161) may be substituted for Rutgers students if spaces are available.
****A two-semester sequence of general statistics may be substituted.

Dual-Degree Options (PHARM)

DUAL-DEGREE OPTIONS

Pharm.D./M.B.A.

The Pharm.D./master of business administration (M.B.A.) is designed for students who wish to add business expertise to their professional pharmacy education. Pharm.D. students may earn advanced standing in the Rutgers Business School: Graduate Programs-Newark and New Brunswick (RBS) master of business administration (M.B.A.) program for some of their required and elective Pharm.D. courses. Pharm.D. students, who meet academic eligibility requirements, may apply to the Rutgers Business School: Graduate Programs-Newark and New Brunswick in their fourth professional year. If accepted, students matriculate into RBS immediately after completion of the Pharm.D., or they may defer enrollment for one year. With advanced standing, full-time students will complete the M.B.A. in approximately 15 months; part-time students need approximately three years to complete the program.

Pharm.D./M.P.H.

The Pharm.D./master of public health (M.P.H.) program is designed to provide students with in-depth complementary training as pharmacists and public health experts. The Pharm.D./M.P.H. is offered jointly with the School of Public Health. Graduates will build on their pharmacy training with a sound understanding of public health fields, such as organization of health services, pharmacoepidemiology, health care policy, biostatistics, and environmental health. Students meeting the eligibility requirements may apply for admission during the second professional year or later after completing two public health core courses. Students enroll in the School of Public Health after they complete the Pharm.D. program. With advanced standing, full-time students may finish the M.P.H. in one year; part-time students need approximately three years to compete the program.

Pharm.D./Ph.D.

The Pharm.D./doctor of philosophy (Ph.D.) degree option is designed to meet the needs and interests of exceptionally bright and highly motivated students wishing to pursue the doctor of philosophy (Ph.D.) degree. Students are eligible to apply for entry into the graduate program in pharmaceutical science, the joint graduate program in toxicology, or the program in medicinal chemistry by the end of the second professional year of the Pharm.D. program. Applicants must meet the entry criteria, including academic performance standards and Graduate Record Exam (GRE) scores as set by the graduate program and an interview with a member of the dual-degree faculty committee. Admitted students will continue in the Pharm.D. program and complete graduate courses and/or research during the summer and also in place of professional electives. Students will complete the Pharm.D. and graduate at the end of the fourth professional year. They will remain in graduate school for approximately three years while engaging predominantly in research with a mentor and advisory committee. Over this time the student will complete required coursework and conduct research in accordance with the curriculum of the graduate program and will fulfill the requirements of both degrees in six plus three years. The program is highly individualized to the student's research interests.

Pharm.D./M.D.

The Pharm.D./doctor of medicine (M.D.) dual-degree option, developed jointly by Rutgers' Ernest Mario School of Pharmacy and Robert Wood Johnson Medical School (RWJMS), is the first dual degree of its kind in the United States. Only currently enrolled Pharm.D. students at the Ernest Mario School of Pharmacy are eligible to apply for admission. This highly selective program is designed to create an elite cadre of interdisciplinary practitioners, highly skilled in the disciplines of both pharmacy and medicine, and poised to provide leadership in collaborative clinical practice, academic research, public policy, and the pharmaceutical industry.

Applicants must be in the second or third year of the professional program at the School of Pharmacy and have an excellent academic record, typically with a GPA of 3.5 or better.Clinical and/or research experience, service, and leadership are also essential. Prospective students should pursue opportunities to engage in clinical settings, participate in interprofessional programs, and work with student organizations to provide community service in health-related fields. Applicants are first screened by a School of Pharmacy committee; successful applicants are then referred to the Robert Wood Medical School for additional screening and for a final decision on admission.

Dual-degree students are encouraged to participate in interprofessional programs with students in other fields of health care. In their final year at the School of Pharmacy, they are assigned to specialized clinical clerkships emphasizing collaborative practice with medical students and physicians. Once students begin the RWJMS curriculum, specialized enrichment options will provide opportunities to take advantage of their extensive knowledge of pharmacology, pharmacotherapy, and pharmacy practice. A capstone experience brings together their interests and experiences in pharmacy and medicine. The dual-degree program requires two years of preprofessional study, four years in the Pharm.D. program, and four years in medical school.

Honors and Awards (PHARM)

HONORS AND AWARDS

Honors and Awards (PHARM)

Honors Program

Honors Program

The Pharm.D. Honors Research Program is designed to provide exceptional students in the Ernest Mario School of Pharmacy with in-depth research training and experience in a specialized area of interest. The program is flexible to maximize opportunities and meet student needs; students may enter at any time from the spring semester of the second preprofessional year through the fall semester of the second professional year, though they are encouraged to enter the program as early as feasible. The admission requirements include a cumulative grade-point average of 3.3 or better, a letter of recommendation from an Ernest Mario School of Pharmacy faculty member who agrees to serve as the student's Honors Research mentor, and an application form with essay and résumé. Students interested in the program should contact faculty members to inquire about availability to perform honors research. Students who successfully complete the Honors Research Program will be identified at graduation with special commendation, which will also be noted on their transcripts. The full program description is available on the program's website.

Honors and Awards (PHARM)

Rho Chi Society

Rho Chi Society

Students in the Ernest Mario School of Pharmacy are eligible for election to Rho Chi Honor Society, the national pharmacy honor society. After completion of no less than one-half of the required professional didactic coursework, students ranked in the top 20th percentile of their class and who have attained a minimum professional grade-point average of 3.0 on a 4.0 scale are eligible for election. Election is based on high standards of scholarship with the view that scholarly attainment indicates the capacity of the individual for outstanding achievement in pharmacy.

Honors and Awards (PHARM)

Sigma Xi

Sigma Xi

Students who have shown excellence in scholarship and promise of engaging in scientific research at a recognized institution during the ensuing year are eligible for election as associate members of Sigma Xi, the national scientific honor society. The website can be found here.

Honors and Awards (PHARM)

Other Honors and Awards

Other Honors and Awards

Students in the Ernest Mario School of Pharmacy may compete for departmental, fraternal, industrial, or association monetary awards. Election to Phi Lambda Sigma, the national pharmacy leadership society, is a highly coveted honor for pharmacy students active in student life.

Scholarships (PHARM)

SCHOLARSHIPS

The following scholarships, in varying amounts, are awarded annually to pharmacy students on the basis of financial need and academic merit. Inquiries regarding these scholarships should be addressed to the Ernest Mario School of Pharmacy dean's office at 848-445-6250.

Acme Markets Scholarship. Provides annual tuition assistance to New Jersey students in their last three years who are employed in a community pharmacy setting. Awards based on financial need and academic merit.

New Jersey Pharmacists Association Scholarship. For students in the professional years; based on academic achievement, financial need, and extracurricular activities.

Barone Endowed Pharm.D./M.D. Scholarship. For full-time students enrolled in the Pharm.D./M.D. dual-degree program.

Harold Blumenkrantz Scholarship. For full-time students from Monmouth County who are in their professional years. Awards based on academic merit and financial need. Preference given to students who demonstrate an interest in pursuing community pharmacy as a career.

Dr. Sanford M. Bolton and Phyllis Bolton Endowed Scholarship. Awarded to full-time graduate students based on academic merit and financial need.

Lucille and Michael Bongiovanni Endowed Scholarship. Based on academic merit and financial need for students in their professional years of the curriculum.

NJ Women's League/Bowers Memorial Scholarship. For a third-year student enrolled at the Ernest Mario School of Pharmacy. Scholarship administered jointly with the Women's League of Rutgers University.

John and Josephine Calasibetta Endowed Scholarship. For students in their professional years; based on academic merit and financial need.

Class of 1934 Pharmacy Scholarship. For students in their professional years; based on academic merit and need.

Ronald I. Cohen Endowed Scholarship. For students in their professional years. Preference given to students who have an interest in pursuing community pharmacy as a career.

John L. Colaizzi Scholarship. For students in their final two years; based on academic merit and/or financial need.

David L. Cowen History of Pharmacy Scholarship.

Samuel Cutler Endowed Scholarship. For full-time undergraduate and graduate students based on merit and financial need.

James R. Croucher/Eli Lilly Endowed Scholarship. For New Jersey residents exhibiting leadership and community involvement; based on financial need.

CVS/Caremark Charitable Trust. For students in their professional years; based on academic achievement, financial need, extracurricular activities, and interest in community pharmacy practice.

Martin G. and Marlene Daffner Endowed Scholarship. For students in their professional years; based on academic merit and financial needs.

Davidson, Davidson & Kappell, LLC Annual Scholarship. Based on academic merit and/or financial need.

John J. DeBus Memorial Scholarship. Based on academic merit and financial need.

Delta Sigma Theta Fraternity Scholarship. Based on academic merit and financial need for students in their professional years.

Anthony J. DeRosa Scholarship. Based on academic merit and financial need.

Louis T. and Monica M. DiFazio Scholarship. Based on academic merit and financial need for students in their professional years. Preference given to students who have an interest in pursuing a career in the pharmaceutical industry related to research or the field of pharmaceutics.

Bruce and David Epstein Endowed Pharm.D. Scholarship. For full-time students in the professional years based on academic merit and financial need.

Oswald Fechner Endowed Scholarship. Based on academic merit and financial need.

Louis E. Feinerman Scholarship. Based on academic merit and financial need.

Alvin Felmeister Scholarship. Based on academic merit and financial need.

Foxcroft Pharmacy Endowed Scholarship. For a student in the professional years; based on academic merit, financial need, extracurricular activities, and interest in community pharmacy practice.

Lawrence S. Fromkin Scholarship. For full-time students in their professional years or part-time, post-B.S. students, pursuing their Pharm.D. Emphasis given to those applicants who are active in pharmacy-related activities/ associations at the Ernest Mario School of Pharmacy and/or other professional organizations that are not affiliated with the school.

Leonard Gold, M.D., and Mrs. Eleanor Gold Endowed Scholarship. Awarded to full-time students based on academic merit and financial need.

Steven and Linda Gooen Professional Development Travel Scholarship. Awards to support travel for conference participation.

Hudson County Pharmaceutical Society Endowed Scholarship. Based on academic merit and financial need.

Gertrude D. Kuebler Scholarship. Based on academic merit and financial need.

Deborah Lewin Kull Annual Scholarship. Based on academic merit and/or financial need.

Stephen and Ruth Lane Endowed Scholarship. For full-time students in Ocean County in their professional years. Awards based on academic merit, financial need, and interest in pursuing community pharmacy practice.

Daniel and Nancy Levine Endowed Scholarship. Awarded to qualified full-time students based on academic merit.

William and Helen Levine Endowed Scholarship. For students in their professional years.

Walter J. Lewitt Scholarship. Based on financial need and academic merit. For students in their professional years.

Seymour A. Lubman Memorial Scholarship. Based on academic merit and/or financial need.

Ernest Mario Endowed Scholarship. For students in their professional years; based on academic merit and financial need.

Emil P. Martini Sr. Memorial Scholarship. For a student demonstrating outstanding scholastic achievement, character, and financial need.

Jack Mazer Memorial (Class of 1930) Scholarship. For students in their professional years; based on academic merit and financial need.

Margaret Ryan Murray Scholarship. For New Jersey residents in the final two years; based on academic merit and financial need.

National Association of Chain Drug Stores Foundation. Based on academic merit and/or financial need.

Thomas T. Nevin Memorial Scholarship. For students in their professional years; based on academic achievement, financial need, extracurricular activities, and interest in community pharmacy practice.

Novartis Endowed Scholarship. Based on academic merit and financial need.

Harold and Betty Perl Endowed Scholarship. For students in their professional years; based on academic merit and financial need.

Pharmacy Alumni Association Scholarships. For pharmacy students in their professional years; based on academic achievement, financial need, or extracurricular activities.

Pharmacy Reunion Campaign Scholarship. Awarded annually based on academic merit and financial need.

Reema and Navneet Puri Endowed Graduate Scholarship. Awarded to qualified Pharm.D. student intending to continue into the Ernest Mario School of Pharmacy graduate programs.

Sumant and Leena Ramachandra Endowed Scholarship. Preference given to underrepresented minority groups.

Amalia R. and R. Raymond Ricciardi Endowed Scholarship. For a full-time student; based on academic merit.

Jacob Robbins Memorial Scholarship. Based on academic merit and financial need.

John V. Saenger Endowed Scholarship. Based on academic merit and financial need.

Schering-Plough Scholarship. For students in their professional years; based on academic merit and financial need.

Eric D. Seifert Memorial Scholarship. For students in their professional years; based on academic merit and financial need.

Edward Solow Endowed Scholarship. Awarded to qualified full-time students.

Paul Stonehill Memorial Endowed Scholarship. Based on academic merit, financial need, and interest in pursuing community pharmacy practice.

Supervalue Pharmacies. For New Jersey residents in their last three years of pharmacy school who are currently employed in a community pharmacy practice. Awards based on financial need and academic merit.

Glenn A. and Leslie E. Van Buskirk Annual Scholarship. Based on academic merit and/or financial need.

Walgreens Diversity Scholarship. For students in their professional years; based on academic merit, financial need, and involvement with student organizations promoting diversity on campus.

Walgreens Pharmacy Management Scholarship. Based on academic merit and/or financial need.

Wal-Mart Scholarship Fund. For students in their professional years; based on academic achievement, financial need, extracurricular activities, and interest in community pharmacy practice.

Educational Opportunity Fund (PHARM)

EDUCATIONAL OPPORTUNITY FUND

Students eligible for an Educational Opportunity Fund (EOF) grant not only receive financial support, but also are assigned an adviser who will help with any problems that may arise as well as provide assistance in organizing their academic programs. In addition to advising, EOF offers tutorial assistance for basic to more advanced academic courses. The EOF program also offers a wide range of workshops to help students sharpen their skills and progress successfully through the curriculum.

Each year, EOF offers a precollege summer-on-campus program to help the student make a smooth transition from high school to college.

For more information about EOF, please contact the Ernest Mario School of Pharmacy, Office for Student Development (848-445-6263).

Course Listing (PHARM)

COURSE LISTING

Explanation of Three-Part Course Numbers

Chemical Biology 158

Medicinal Chemistry 715

Pharmacology and Toxicology 718

Pharmacy 720

Pharmaceutics 721

Pharmacy Practice and Administration 725

Explanation of Three-Part Course Numbers (PHARM)

EXPLANATION OF THREE-PART COURSE NUMBERS

The number preceding each course title is divided into three parts. The first two digits are the administrative code (standing for a faculty or a school), the next three digits are the subject code, and the final three digits are the course code.

Administrative Codes

The Ernest Mario School of Pharmacy administrative code is 30 through the first four years of the Pharm.D. program. A code of 31 is used in the last two years of the doctoral program. For a complete list of administrative codes used in this catalog, see the beginning of the Programs of Study and Courses for Liberal Arts and Sciences Students section.

Subject Codes

A subject code comprises the third through fifth digits in all course numbers and indicates the subject matter of the course. Courses with the following subject codes are listed in this chapter. (This list does not constitute a list of majors.)

158 Chemical Biology

715 Medicinal Chemistry

718 Pharmacology and Toxicology

720 Pharmacy

721 Pharmaceutics

725 Pharmacy Practice and Administration

Course Codes

The course code comprises the sixth, seventh, and eighth digits in all course numbers. Course codes from 100 to 299 indicate introductory and intermediate undergraduate courses. Codes from 300 to 499 indicate advanced undergraduate courses. Courses coded from 500 to 899 are graduate courses.

Two course codes separated by a comma indicate that each semester may be taken independently of the other (example: 30:720:391,392). Two course codes separated by a hyphen indicate that satisfactory completion of the first semester is a prerequisite to the second semester (example: 30:725:202-203); the first semester may be taken for credit without taking the second, except where a statement is added to indicate that both semester courses must be completed in order to receive credit.

Credits awarded for the successful completion of each course are indicated in parentheses following the course title. The notation BA indicates that the number of credits is determined by arrangement with the department offering the course.

Unless otherwise indicated, a course normally meets weekly for a number of lecture hours equal to the number of credits to be earned. Special hours or modes of class, other than lecture, are usually indicated in italics below the course title.

Chemical Biology 158 (PHARM)

CHEMICAL BIOLOGY 158

30:158:309-310 ***Biochemical Foundations of Pharmaceutical Biotechnology I and II (3, 3)***
Covers basic principles in cell and molecular biology and biochemistry. Addresses the application of biochemistry to biotechnology. Focuses on the concepts in biochemistry and molecular biology in drug discovery and the practice of pharmacy.
Lec. 3 hrs. Prerequisites: 01:119:115,116,117 (formerly 01:119:101-102); 01:160:307-308.

30:158:402 ***Diet, Nutrition, and Disease Prevention in Pharmacy Practice (2)***
Selected topics on diet and nutrition as they relate to health and disease. The biochemical mechanisms and critical analyses of the existing information will be emphasized. Students are encouraged to make class presentations or write semester papers.
Lec. 2 hrs.

30:158:409 ***Pharmacogenomics (2)***
Survey of the polymorphisms (population and individual differences) in the pharmacokinetics and pharmacodynamics of therapeutic drugs. Genetics and molecular basis of these polymorphisms and examples of associated abnormal responses to therapeutic agents and sensitivity to environmental toxicants.

30:158:420 ***Pharmaceutical Microbiology (3)***
Study of the basic principles of human disease causing bacteria, viruses, fungi, protozoa, and helminth parasites. This courses focuses on organisms capable of causing disease as well as the study of the immune system and mechanisms used to defend against pathological microorganisms. Also included are the mechanisms of pharmacological agents such as antibiotics that are used to treat infectious microorganisms.
Prerequisites: 01:119:115,116,117 (formerly 01:119:101-102); 01:160:307-308; 01:694:301.

30:158:495,496,497,498 ***Research in Chemical Biology (BA)***
Undergraduate research in chemical biology.
Prerequisite: Permission of instructor. No more than two semesters of research courses may be used to satisfy degree requirements.

Medicinal Chemistry 715 (PHARM)

MEDICINAL CHEMISTRY 715

30:715:307 ***Pharmaceutical Chemistry (2)***
Introduces structure, properties, and analysis of pharmaceutical agents and metabolites as well as the fundamental techniques used for near patient testing in clinical laboratories.

30:715:360 ***Pharmaceutical Biochemistry (2)***
Introduction to drug interaction in basic biochemical processes. Includes enzyme inhibitors, antimetabolites, and detoxification enzymes.
Prerequisite: 11:115:301.

30:715:409-410 ***Medicinal Chemistry I, II (3,3)***
Study of organic medicinal and pharmaceutical compounds, with special emphasis on the correlation of structural and physiochemical properties with biological activity.
30:718:320

30:715:450 ***Drugs: Structure and Function (3)***
Provides a survey of the major pharmaceutical agents in clinical use. Emphasis is placed on the influence of chemical structure in the elicitation of pharmacological effects.
Prerequisite: Undergraduate organic chemistry.

30:715:451 ***Foundations In Drug Discovery (3)***
Basic course for students preparing to do research in medicinal chemistry. Topics covered include information management, computer methods, basic laboratory techniques, bioassay techniques, metabolism, prodrugs, and quantitative structure-activity relationships.
Prerequisite: Undergraduate organic chemistry.

30:715:452 ***Principles of Drug Design (3)***
Topics covered include identifying new drug leads, drug absorption and distribution, pharmacomodulation, enzymes and receptors as targets, peptidomimetics, computer-aided drug design, and combinatorial chemistry.
Prerequisite: Undergraduate organic chemistry.

30:715:453 ***Herbal Medicines and Nutraceuticals (2)***
Introduction to basic aspects of natural products chemistry as well as mechanisms associated with absorption, distribution, metabolism, and excretion of endogenous compounds and xenobiotics. Topics covered include disease states wherein herbal medicines and nutraceuticals have been suggested as having beneficial effects.

30:715:454 ***Heterocycles in Medicinal Chemistry***
This course provides a discussion of the properties, reactions, and synthesis of the major classes of heterocyclic compounds, including sugars, which comprise most drugs in
clinical use.
01:160:307-308

30:715:495,496,497,498 ***Research in Medicinal Chemistry (BA)***
Undergraduate research in medicinal chemistry.
Prerequisite: Permission of instructor. No more than two semesters of research courses may be used to satisfy degree requirements.

Pharmacology and Toxicology 718 (PHARM)

PHARMACOLOGY AND TOXICOLOGY 718

30:718:200 Integrated Organ Physiology (3)
Provides a basic understanding of anatomy, physiology, and applied biochemistry. Introduces to the structure (anatomy) and function (physiology) of the major body systems emphasizing cellular biology, neural, cardiovascular, respiratory, renal, hepatic, immune, endocrine, and metabolic systems, cumulating to systems integration. Provides a thorough background of physiology to support future biomedical and pharmaceutical sciences coursework.

30:718:304 ***Pathophysiology (3)***
General principles of disease and their application to the study of clinical disorders that affect the body as a whole, its specific systems, and individual organs.
Lec. 3 hrs. Practicum provided as needed. Prerequisite: 01:119:116. Corequisite: 01:694:301.

30:718:320 ***Pharmacology and Pharmacogenetics (3)***
Chemical structure, physiochemical properties, drug absorption, and metabolism of medicinal agents.
Prerequisite: 01:694:301.

30:718:495,496,497,498 ***Research in Pharmacology (BA)***
Undergraduate research in pharmacology.
Prerequisite: Permission of instructor. No more than two research courses may be used to satisfy degree requirements.

Pharmacy 720 (PHARM)

PHARMACY 720

30:720:301 ***Introduction to Research (2)***
Provides students an understanding of the nature of scientific investigation and how it differs from learning the known facts in a field of study. Students to learn how to gather information, assimilate, and through the use of deductive and inductive reasoning, generate novel theory and hypothesis.
Prerequisite: Permission of instructor.

30:720:401 ***Principles of Research in Pharmacy (2)***
This course is designed to give students an understanding of the principles involved in experimental design as it pertains to bench and clinical research. Includes lectures, independent learning, team learning, class discussions, and written assignments.

30:720:440 ***Pulmonary and Hematology Pharmacotherapy (3)***
Overview of the pathophysiology, pharmacology, and therapeutics of common disorders of the pulmonary and hematologic systems. Emphasis on application of pharmaceutical-care principles to pulmonary and hematologic disorders.

30:720:442 ***Cardiology Pharmacotherapy (4)***
Overview of the pathophysiology, pharmacology, and therapeutics of common disorders of the cardiovascular systems. Emphasis on application of pharmaceutical-care principles to cardiovascular disorders.

30:720:445 ***Renal Pharmacotherapy (2)***
Provides knowledge of the normal physiologic functions of the kidneys and anatomy of renal circulation, as well as the pathophysiology of renal disorders. Identify the etiology, clinical presentation, and treatment of fluid/electrolyte imbalances and interpret acid-base disorders. Calculate appropriate patient specific fluid requirements, renal function, and dosing regimen. Determine and classify the type of acute kidney injury a patient is experiencing.

30:720:446 ***Infectious Diseases Pharmacotherapy (4)***
Overview of the pathophysiology, pharmacology, and therapeutics of common infectious diseases. Includes overview of microbiological organism and appropriate drug therapy. Emphasis on application of pharmaceutical-care principles to infectious diseases.

31:720:540 ***Endocrine and Reproductive Pharmacotherapy (2)***
Overview of the pathophysiology, pharmacology, and therapeutics of common disorders of the endocrine and reproductive systems. Emphasis on application of pharmaceutical-care principles to diabetes, reproductive health, and disorders of hypothalamic-pituitary-adrenal axis and thyroid.

31:720:541 ***Gastrointestinal, Hepatic, and Nutritional Pharmacotherapy (2)***
Overview of the pathophysiology, pharmacology, and therapeutics of common disorders of the cardiovascular systems. Emphasis on application of pharmaceutical-care principles to gastrointestinal, hepatic, and nutrition disorders.

31:720:542 ***Oncology Pharmacotherapy (3)***
Overview of the pathophysiology, pharmacology, and therapeutics of common oncologic disorders. Emphasis on application of pharmaceutical-care principles to oncologic disorders.

31:720:545 ***Psychiatric and Behavioral Disorders Pharmacotherapy (2)***
Overview of the pathophysiology, pharmacology, and therapeutics of common psychiatric and behavioral disorders. Emphasis on application of pharmaceutical-care principles to psychiatric and behavioral disorders.

31:720:546 ***Neurology Pharmacotherapy (3)***
Overview of the pathophysiology, pharmacology, and therapeutics of common disorders of the neourologic systems. Emphasis on application of pharmaceutical-care principles to neurologic disorders.

31:720:547 ***Immunology, Ocular, and Dermatology Pharmacotherapy (2)***
Overview of the pathophysiology, pharmacology, and therapeutics of common disorders of the immune, ocular, and dermatologic systems. Emphasis on application of pharmaceutical-care principles to immunological, ocular, and dermatologic disorders.

Pharmaceutics 721 (PHARM)

PHARMACEUTICS 721

30:721:301 ***Introduction to Pharmaceutics and Laboratory (4)***
Selected topics dealing with the physicochemical properties of drugs and pharmaceuticals (physical pharmacy); study of the fundamental principles and processes of pharmacy, metrology, and calculations.
Prerequisites: 01:160:308, 1:640:135, 01:750:161.

30:721:320 ***Drug Delivery and Laboratory (4)***
Pharmaceutical product design and drug delivery. Theory of dosage form formulation, manufacturing, testing, stability, bioavailability, and controlled release.
Prerequisite: 30:721:301.

30:721:430 ***Introduction to Biopharmaceutics and Pharmacokinetics (4)***
Rate processes; time-course extent of absorption, distribution, and elimination of drugs in humans, involving models, bioavailability calculations, and dosage regimen design.
Prerequisite: 30:721:301.

30:721:495,496,497,498 ***Research in Pharmaceutics (BA)***
Undergraduate research in the pharmaceutical sciences.
Prerequisite: Permission of instructor. No more than two semesters of research courses may be used to satisfy degree requirements. Pharmaceutics faculty.

Pharmacy Practice and Administration 725 (PHARM)

PHARMACY PRACTICE AND ADMINISTRATION 725

30:725:104 ***Pharmacy Convocations (1)***
Introduces basic concepts of the practice of pharmacy as a component of the health care system. Discusses the role of pharmacists and the goals and trends of pharmaceutical education and the career pathways available to pharmacists.
Required for all first-year, preprofessional students.

30:725:304,305,404,405; 31:725:504,505, 614, 615 ***LEAP-AHEAD Documentation/Portfolio 1-6 (0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 1, 1)***
The LEAP (Leadership, Entrepreneurship and Innovation, Assessment of Self Professionalism) seminar introduces the practice of personal and professional development using a case-based approach. The goal is to develop a student's knowledge and skills as they relate to professionalism, self-awareness, leadership, innovation, and entrepreneurship. Co-curricular activities will allow students to become engaged citizens with the profession of pharmacy and their community through service, leadership, and community engagement activities with reflection assignments woven throughout the experiences.

30:725:308 ***Pharmacy Practice Management (3)***
Relates principles of management to pharmacy practice environments (such as community and home health care pharmacies, chain pharmacies, managed-care pharmacies, and hospitals and other institutional pharmacies).

30:725:317, 417 and 31:725:518, ***Pharmacy Review, Evaluation and Preparation (PREP) 1-4 (0.5, 0.5, 1, 2)***
A longitudinal program designed to help students prepare for introductory/advanced pharmacy practice experiences (IPPEs, APPEs), licensure exams, and post-graduation clinical practice through reinforcement of pharmaceutical and clinical knowledge. Successfully passing these courses is a prerequisite for progressing onto the IPPE and APPE Rotations.

30:725:320 ***Foundations of Pharmacy Care (4)***
Provides fundamental understanding of functions, responsibilities, and outcomes of pharmacy practice in modern health and disease and a systematic inquiry into the role and nature of pharmacy practice in the health care system. Concept of pharmaceutical care emphasized as the underlying basis of pharmacy practice. Essential skills and pharmaceutical calculation acquired through self-study tutorials. Pharmaceutical nomenclature and medical terminology are emphasized.
Prerequisite: First professional year standing.

30:725:321 ***Integrated Pharmacotherapy Assessment Skills Series I (2)***
iPASS I is the first of a five-semester series designed to provide students with an introduction to principles encountered in the ambulatory care and hospital practice settings. The purpose of this course is to prepare students with the fundamental information needed to assure their success on the Introductory Pharmacy Practice Experience (IPPE) rotations. In addition, the student will be introduced to concepts and basic skills of communication, drug information, and professionalism

30:725:330 ***Introductory Pharmacy Practice Community Experience (2)***
Provides students with their first structured exposure to professional pharmacy practice in the community pharmacy setting and the provision of pharmaceutical care in representative ambulatory settings. Students are assigned to a practice setting for a 160-hour experience.

30:725:341 ***Economic Modeling of Pharmaceuticals and Other Health Interventions (3)***
This course will cover the principles and methods of economic modeling of pharmaceuticals and other health-improving interventions such as devices, diagnostics, and new models of delivering care and health promotion programs.

30:725:350 ***Motivating Change as a Health Ambassador for Diabetes Mellitus (2)***
This course is designed to increase student understanding of diabetes mellitus and to provide students the necessary tools to help patients suffering from diabetes take control of their disease. While health related professions often teach their students diabetes in their curriculum, few offer interdisciplinary education approaches. Furthermore, behavior modification and motivational interviewing is often not included in these courses. In order to improve patient outcomes, it is essential to leverage the expertise of multiple professions.

30:725:423 ***Medical Writing (2)***
Practical applications of technical writing required of pharmacists in the health care system; tools needed to meet demands and improve written communication skills.
Prerequisite: Second or third professional year standing.

30:725:424 ***History of Pharmacy (2)***
Historical development, trends, and impact of pharmacy as a health care profession and a biomedical science from ancient to modern times.

30:725:427 ***Community Practice Management (2)***
Overview of opportunities and involvement in community pharmacy practice.
Prerequisite: First professional year standing.

30:725:428 ***Hospital Practice Management (2)***
Introduction to hospital pharmacy practice; presentation and discussion of services, functions, personnel, administration, and relation to other hospital departments. Field trips and projects.
Prerequisite: First professional year standing.

30:725:429 ***Introduction to Pharmaceutical Industry (2)***
Steps and factors involved in discovery and development of new pharmaceuticals. Emphasis on organizational functions and interfaces.
Prerequisite: First professional year standing.

30:725:432 ***Integrated Pharmacotherapy Assessment Skills Series II (2)***
The second course of a five-semester series designed to integrate content from the organ module pharmacotherapy series with application-based learning; enables students to gather patient information; perform physical assessments; integrate medical literature and patient information to design pharmacotherapy care plans; communicate information to patients, caregivers, and other health care professionals; and evaluate literature. Emphasis on pulmonary, hematology, and cardiology pharmacotherapy. The standards of professionalism will be promoted throughout the course.

30:725:433 ***Integrated Pharmacotherapy Assessment Skills Series III (2)***
The third course of a five-semester series designed to integrate content from the organ module pharmacotherapy series with application-based learning; enables students to gather patient information; perform physical assessments; integrate medical literature and patient information to design pharmacotherapy care plans; communicate information to patients, caregivers, and other health care professionals; and evaluate literature. Emphasis on renal and infectious disease pharmacotherapy. The standards of professionalism will be promoted throughout the course.

30:725:470 ***Medical Literature Evaluation and Application (3)***
Provides fundamental background for answering drug information requests and critically evaluating primary literature.
Prerequisites: Statistics and second professional year standing.

30:725:480 ***Introductory Pharmacy Practice Experience Hospital/Institutional (2)***
Provides students with their first structured exposure to professional practice and the provision of pharmaceutical care in representative acute-care settings. Students are assigned to a practice setting for a 160-hour experience.
Prerequisite: Completion of second professional year didactic coursework.

30:725:482 ***Leadership for Pharmacy Professionals (2)***
This course is designed to introduce students to broad concepts of leadership and professionalism in pharmacy practice. The format includes interactive lectures, as well as a number of group projects, presentations, and practical exercises. Topics include leadership theory, emotional intelligence, the Myers-Briggs test, presentation skills, professional writing, etiquette, ethics, conflict resolution, and networking.
Prerequisites: First professional year standing and permission of instructor.

30:725:483 ***Adventures in Pharmacy Practice (2)***
Complement to the required Pharmacy Practice Management. Topics include contemporary subjects that have a direct impact on pharmacy practice. Subjects include automation, politics, ethics, customer satisfaction, "pharmacy practice in the news," and the future of pharmacy practice.
Prerequisite: First professional year standing or higher.

30:725:485 ***Herbal and Alternative Medicine (2)***
Reviews the herbal/alternative medicine used to alleviate the common disease states. Topics include overview of the history of alternative medicine, in-depth analysis of the most popular herbs, and patient counseling for herbal use.
Prerequisite: Third professional year standing.

30:725:488 ***Introduction to Pharmacoepidemiology (2)***
This course will cover basic concepts of pharmacoepidemiology including pharmacovigilance and its role in drug regulation, study methods, basic statistical tools, and data resources.

30:725:489 ***Sterile Compounding (2)***
Provides students with an introduction to sterile compounding, including proper techniques, pharmaceutical calculations, current sterile compounding guidelines, chemotherapy, and other hazardous drugs, and total parenteral nutrition.

30:725:495,496,497,498 ***Research in Pharmacy Practice and Administration (BA)***
Undergraduate research in pharmacy practice and/or administration.
Prerequisite: Permission of instructor. No more than two semesters of research courses may be used to satisfy degree requirements.

31:725:515 ***Poison Management and Drug Abuse (3)***
Provides an understanding of the effects in clinical management of drug overdose, toxic exposure, and substance abuse. Didactic lectures and student-based case discussions.
Prerequisite: Third professional year standing.

31:725:517 ***Outcomes Research Operations***
Builds skills in outcomes research operations pertaining to IRB requirements, project management, literature evaluation, reference management, and professionalism. Students will be prepared to transition these academic skill sets to independent professional practice. The course is designed to serve as a foundation to the MS-HOPE capstone project

31:725:520 ***Cannabis and Cannabinoids: Clinical and Health Implications in Pharmacy Practice (2)***
This course is designed to introduce clinical aspects of cannabis use and factors to consider in patient advisement on cannabinoid therapy. Topic areas include an introduction to cannabis botany, the endocannabinoid system, potential disease states where cannabinoids may serve a therapeutic purpose, and potential adverse effects of cannabinoids. The goal is to develop a student's critical thinking and medical literature evaluation skills in the context of cannabinoid therapy.

31:725:526 ***Patient Advocacy and Health Care Policy (2)***
Developing strategies that lead to sound health care policy is more important than ever. The student will gain a deeper understanding of contemporary health policy topics such as pharmaceutical pricing, drivers of health care cost, and the role of both state and federal government in shaping the future of health care and patient access. Additionally, the course will help pharmacy students understand role of patient advocacy organizations and professional societies in influencing health policy.

31:725:527 ***Ambulatory Care: Applying Key Concepts (2)***
This course will equip students with knowledge of primary literature and guidelines that can be used to apply evidence-based recommendations to patients in the ambulatory care setting. Students will review publications, present literature to the class, and apply their knowledge to an evolving patient case that will mimic clinical practice.

31:725:530 ***Clinical Research Design (2)***
Delineates the principles of clinical research design, characteristics, and types of clinical trials, selection and usage of statistical methods appropriate to various designs, and methods and issues related to outcomes assessment alongside clinical trials.

31:725:534 ***Integrated Pharmacotherapy Assessment Skills Series IV (2)***
The fourth course of a five-semester series designed to integrate content from the organ module pharmacotherapy series with application-based learning; enables students to gather patient information; perform physical assessments; integrate medical literature and patient information to design pharmacotherapy care plans; communicate information to patients, caregivers, and other health care professionals; and evaluate literature. Emphasis on endocrine, reproductive, gastrointestinal, hepatic, nutritional, and oncologic pharmacotherapy. The standards of professionalism will be promoted throughout the course.

31:725:535 ***Integrated Pharmacotherapy Assessment Skills Series V (2)***
The fifth course of a five-semester series designed to integrate content from the organ module pharmacotherapy series with application-based learning; enables students to gather patient information; perform physical assessments; integrate medical literature and patient information to design pharmacotherapy care plans; communicate information to patients, caregivers, and other health care professionals; and evaluate literature. Emphasis on psychiatric, behavioral disorders, neurology, immunology, ocular, and dermatology pharmacotherapy. The standards of professionalism will be promoted throughout the course.

31:725:540 ***Principles of Pharmaceutical Economics (3)***
Provides an understanding of the economic aspects of pharmacy practice and the pharmaceutical industry within the context of the health care system. Explores the principles and applications of pharmacoeconomics and pharmacy practice and provides the techniques to measure outcomes and disease-state management.
Prerequisite: 01:220:102.

31:725:545 ***Pharmacy Law and Bioethics (4)***
Provides understanding of the theoretical and applied aspects of pharmaceutical jurisprudence and ethics, as required for professional practice and licensure as a pharmacist.
Prerequisites: 30:725:308 and 320 and third professional year standing.

31:725:550 ***Self-Care and Home Care (3)***
Provides opportunity to learn the concepts and acquire knowledge required for the pharmacist's involvement in self-care and home care.
Prerequisites: 31:725:570 and 585.

31:725:5661 ***Pediatric Pharmacy Practice (2)***
Introduction to the concepts of pharmacy practice as it relates to the expanding segment of pediatrics.
Prerequisite: Third professional year standing

31:725:562 ***Women's Health Issues (2)***
Investigate, explore, and discuss issues important to women's health. An in-depth presentation of the female reproductive system, along with related diseases and disorders, is covered in addition to broad coverage of other disorders prevalent in women.
Prerequisite: Third professional year standing.

31:725:563 ***Gerontological Pharmacy Practice (2)***
The course is taught through interactive case-based lectures, debates, group projects, presentations, and practical exercises. Students will improve their skills in patient interviewing techniques, geriatric assessment, SOAP note writing, and Medication Therapy Management (MTM) documentation. The goal is to develop the student's problem-solving skills and empathy in the care and management of geriatric patients who often present with multiple disease states, polypharmacy, and challenging issues.
Prerequisite: Third professional year standing.

31:725:576 ***Emergency Medicine Pharmacotherapy (2)***
Familiarize pharmacy students with key disease states encountered by the emergency medicine pharmacist. Didactic lectures are presented by experienced emergency medicine pharmacists with an emphasis on evidence-based medicine and practical bedside applications. Students are expected to facilitate peer-to-peer and collaborative learning respectively through topic discussion, case development, and simulation lab participation.

31:725:577 ***Concepts in Palliative and End-of-Life Care (3)***
Introduces the emerging field of palliative care and pharmacy practice issues related to the care of patients with noncurable, advanced illness or those at the end-of-life. Topics covered include communication skills, clinical decision making, control of symptoms, management of complications, psychosocial and spiritual care, and care of the dying patient. The goal is to develop the student's critical thinking skills in the provision of palliative pharmacy care as well as compassion for patients and caregivers living with a serious or terminal illness.
Prerequisite: Third professional year standing.

31:725:578 ***Strategies in HIV Therapeutics (2)***
Provides an in-depth overview of HIV/AIDS management. Covers various topics, including the intricacies of providing patient-specific antiretroviral therapy, management of antiretroviral and AIDS-related complications, global HIV/AIDS policy and advocacy, and sociological/psychological implications of HIV. Students will give presentations based on patient cases and current topics in HIV.
Prerequisite: Third professional year standing.

31:725:579 ***Advanced Pharmacotherapy Applications (2)***
This course is intended to enhance and develop problem-solving skills relative to the management of complex patient cases similar to those encountered in the inpatient setting. For third professional year students in the doctor of pharmacy program.
Prerequisite: Third professional year standing.

31:725:581 ***Concepts in Psychiatric Pharmacotherapy (2)***
The course will explore more in-depth the disease states from therapeutics, as well as discuss other topics such as autism, eating disorders, personality disorders, and factitious disorders. The course will be interactive, as students will have the opportunity to conduct a simulated patient interview, write SOAP notes, and present topics.
Corequisite: 31:725:595.

31:725:582 ***Critical Care Pharmacotherapy (2)***
Students will develop critical thinking, problem-solving, and decision-making skills that will help them effectively evaluate the types of medication-related issues for patients seen in the intensive care unit.
Prerequisite: Third professional year standing.

31:725:583 ***Pharmaceutical Marketing (2)***
Educates on the skills that pharmaceutical marketers will need to master to be successful. Provides an in-depth understanding of the development of pharmaceutical advertising, promotional pieces, and messages. Also provides information on potential marketing career options in the pharmaceutical industry.
Prerequisite: Second professional year standing or higher.

31:725:584 ***Managed Care Pharmacy Practice (2)***
Focuses on issues surrounding practice of pharmacy in a managed care environment, including cost, payment, and recognition of stakeholders. Discusses the impact of managed care on other pharmaceutical environments.
Prerequisite: 30:725:308.

31:725:617 ***Pharmacy Reflection Seminar (2)***
Pharmacotherapeutic topics, drug/disease state knowledge, and ethics/professionalism will be reviewed in a highly interactive manner requiring student participation in discussions, cases, and breakout sessions. At the conclusion of the course, clinical skills will be evaluated including blood pressure assessment, glucometer utilization, and other assessments.

31:725:791 through 799 ***Advanced Practice Experience Rotations (5)***
Pharmaceutical-care experience rotations conducted in the final professional year of the program. Sequence consists of seven, five-week rotations to include community-based pharmaceutical care experience, hospital-based pharmaceutical care experience, and general medicine practice experience. One elective practice experience can be selected from available sites and preceptors.
Prerequisites: Fourth professional year standing.

Administration and Faculty (PHARM)

ADMINISTRATION AND FACULTY

Administration

Faculty

Administration (PHARM)

ADMINISTRATION

Joseph A. Barone, Dean

John L. Colaizzi, Dean Emeritus

Nancy Cintron, Senior Associate Dean for Diversity, Equity, Inclusion (DEI) and Student Affairs

Carol Goldin, Senior Associate Dean for Planning and Assessment

Donald K. Woodward, Senior Associate Dean for Academic Services

Donna Feudo, Associate Dean for Experiential Education

Renping Zhou, Associate Dean for Research

Minakshi Lahiri, Assistant Dean for Academic Assessments

Laura Sclafani, Assistant Dean Academic Services

Faculty (PHARM)

FACULTY

Department of Chemical Biology

Department of Chemical Biology

Chair: Wei-Xing Zong

Distinguished Professors:

Suzie Chen, (Emeritus) B.S., Trinity College; M.S., Ph.D., Albert Einstein College of Medicine

Wei-Xing Zong, B.S., M.S., Nankai (China); Ph.D. Medicine and Dentistry (New Jersey)

Chung S. Yang (Emeritus), B.S., National Taiwan; M.S., Ph.D., Cornell

Professors:

Philip Furmanski, B.A., Ph.D., Temple

Nanjoo Suh, B.S., Ewha Women's (Korea); M.S., Seoul National; Ph.D., Illinois (Chicago)

Renping Zhou, B.S., Nanjing Teacher's College (China); Ph.D., California (Berkeley)

Associate Professors:

Luca Cartegni, M.S., Ph.D., Pavia (Italy)

Fang Liu, B.S., Beijing; Ph.D., Harvard

Audrey Minden, B.A., Colorado; Ph.D., Illinois (Chicago)

Assistant Professors:

Christina Glytsou, B.S., M.S., National and Kapodistrian; Ph.D., University of Padua

Matthew J. McBride, B.S., Drexel; Ph.D., Harvard

Research Professors:

Lanjing Zhang, M.D., Tongji Medical (Wuhan, China)

Adjunct Professors:

Xiaoxin Chen, M.D., Beijing Medical; Ph.D., Rutgers

Anthony Y. Lu, Ph.D., North Carolina

Helmut Zarbl, D.C.S., Marianopolis (Canada); B.Sc., Ph.D., McGill (Canada)

Kun Zhang, B.S., M.S., Guangdong University of Technology (China); Ph.D., Lanzhou (China)

Xi Zheng, B.S., Sun Yat-sen-Medical Sciences (China); Ph.D., Huddinge University Hospital, Karolinska Institute (Sweden)

X. F. Steven Zheng, Ph.D., Harvard

Adjunct Assistant Professors:

Pavel Kramata, M.S., Institute of Chemical Technology (Czech Republic); Ph.D., IOCB, Academy of Sciences (Czech Republic)

Gongjie Liu, M.D.,Nanjing Medical University; M.S., Medical College of Ohio

Ronald Rothman, B.A. Temple; Ph.D., Pennsylvania

Joseph Wahler, B.S., Pennsylvania State; Ph.D. Rutgers

Brian Wall, Ph.D., Rutgers

Faculty (PHARM)

Department of Medicinal Chemistry

Department of Medicinal Chemistry

Chair: Longqin Hu

Professors:

Longqin Hu, B.S., M.S., Second Military Medical (China); Ph.D., Kansas

Edmond J. LaVoie (Emeritus), B.S., Fordham; Ph.D., SUNY (Buffalo)

Jun Wang, B.S., Wuhan, M.S., National (Singapore), Ph.D., Pennsylvania

Assistant Professor:

Matthew Moschitto, B.S., Bates; M.S., Ph.D., Cornell

Adjunct Professors:

Ray Bakhtiar, B.S., Arkansas; M.S., Arkansas (Fayetteville); Ph.D., North Dakota State

Samuel Chackalamannil, B.S., Karala (India); M.S., Temple; Ph.D., Yale

Joel Freundlich, B.S., M.E., Cornell; Ph.D., Massachusetts Institute of Technology

Vladyslav Kholodovych, M.S., Kiev State (Ukraine); Ph.D., Ukrainian National Academy of Sciences (Kiev)

iii. Nicholas A. Meanwell, B.S., Ph.D., Sheffield (London)

Ravi P. Nargund, B.S., Allegheny College, Ph.D., Indiana (Bloomington)

Jian Shen, M.E., Shanghai Jiaotong; Ph.D., Houston

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Jeffrey Hale, B.S., Stevens Institute of Technology, Ph.D., Rutgers

Michael Totleben, B.S., Gannon; Ph.D., Pittsburgh

Faculty (PHARM)

Department of Pharmaceutics

Department of Pharmaceutics

Chair: Tamara Minko

Distinguished Professors:

Ah-Ng Tony Kong, B.S., Alberta; Ph.D., SUNY (Buffalo)

Tamara Minko, M.S., Mordovsky State (Russia); Ph.D., Institute of Physiology/Ukrainian Academy of Sciences

Patrick J. Sinko, B.S., Rutgers; Ph.D., Michigan

Guofeng You, B.S., Beijing Medical; Ph.D., Clark

Professors:

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Leonid Kagan, M.S., Ph.D., Hebrew (Israel)

Associate Professor:

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Olga Gabuzenko, M.S., Ph.D., State University Kharkov (Ukraine)

Dayuan Gao, Ph.D., Shenyang Pharmaceutical

Faculty (PHARM)

Department of Pharmacology and Toxicology

Department of Pharmacology and Toxicology

Chair: Debra L. Laskin

Distinguished Professors:

Debra L. Laskin, B.A., New York University; M.A., CUNY (Hunter College); Ph.D., Medical College of Virginia

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Gary J. Grover, PhD, Rutgers

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Faculty (PHARM)

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Department of Pharmacy Practice and Administration

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Nancy Castanheira, Pharm.D., Rutgers

Joseph DiCesare, M.P.H., Rutgers

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Nancy Lisowski, Pharm.D., Maryland

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Adjunct Clinical Professor:

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Mona Mahal, M.D., Christian Medical (India)

Robin Winter-Sperry, B.A., Miami; M.D., Northeastern (Tampico, Mexico)

Academic Policies and Procedures (PHARM)

ACADEMIC POLICIES AND PROCEDURES

Note: See the **University Policies and Procedures** section in the Rutgers Main catalog for university-wide academic policies and procedures.

Criminal Background Checks and Urine Drug Screens

Academic Credit

Registration and Course Information

Scholastic Standing

Disciplinary Hearing Procedures

General Information (RBS-NB)

GENERAL INFORMATION

History and Aims of the School

The Program

Scholarships

Admissions

History and Aims of the School (RBS-NB)

HISTORY AND AIMS OF THE SCHOOL

The Rutgers Business School: Undergraduate-New Brunswick (RBS-UNB) offers major programs that lead to the bachelor of science degree in accounting, business analytics and information technology, finance, leadership and management, marketing, and supply chain management. Undergraduate degrees in the broad functional areas of business have been offered New Brunswick since 1934. In 1981, these departments were reorganized into the School of Administrative Sciences under the Faculty of Professional Studies.

In June 1984, the university's Board of Governors approved a reorganization of the School of Administrative Sciences into the School of Business. The new School of Business received final approval from the New Jersey Department of Higher Education in February 1986, and began operation as a distinct unit on September 1, 1986. In April 1991, the School of Business-New Brunswick received its accreditation from the Association to Advance Collegiate Schools of Business International (AACSB International) in business administration.

In 1996, the School of Business, the School of Management in Newark, and the Graduate School of Management, the business units on Rutgers' northern campuses, were merged into a single school that was subsequently named Rutgers Business School-Newark and New Brunswick. The undergraduate business program in New Brunswick remains a separate program--with unique entrance and graduation requirements--within the Rutgers Business School.

The Rutgers Business School: Undergraduate-New Brunswick has the following mission: to provide a high-quality program of study for students wishing to pursue professional careers in industry and public accounting firms, to expand the university's research efforts in the areas of business and managerial issues, to encourage faculty in business studies to serve the business and government communities, and to participate in professional associations.

The Program (RBS-NB)

THE PROGRAM

The undergraduate majors offered by the Rutgers Business School: Undergraduate-New Brunswick (RBS-UNB) include accounting, business analytics and information technology, finance, leadership and management, marketing, and supply chain management. Each major leads to the degree of bachelor of science and combines a liberal arts foundation in mathematics, the natural sciences, the social and behavioral sciences, and the humanities, with a professional specialization in one of the broad functional areas of business.

The purpose of the curriculum is to provide a broad education that prepares the student for imaginative and responsible citizenship and leadership roles in business and society. The curriculum is responsive to social, economic, and technological developments and reflects the application of evolving knowledge in economics and the behavioral and quantitative sciences. All RBS-UNB programs of study include an emphasis on written and oral expression.

Through coursework at RBS-UNB, every student is exposed to the international dimensions of business, to the economic and legal environments as they pertain to profit and nonprofit organizations, and the effects of ethical considerations and social and political influences on such organizations. In studies outside the Rutgers Business School: Undergraduate-New Brunswick, each student gains an understanding of the political and legal environments of business and society through coursework in areas such as political science, public administration, and ethics.

Scholarships (RBS-NB)

SCHOLARSHIPS

Rutgers Business School: Undergraduate-New Brunswick (RBS-UNB) scholarships are administered by the Special Programs Department and, sometimes, the individual departments. RBS scholarships are competitive awards based upon outstanding GPAs, active organization participation, faculty recommendations, and leadership potential. Scholarship specifications are also a governing factor. Students must apply to be considered for an award. The application process begins in mid-August and thru mid-September. RBS students are notified by email when the scholarship portal opens.

Alumni Association Scholarship - Awarded annually to a full-time undergraduate New Jersey resident who demonstrates superior academic achievement.

Atrion Corporation Endowed Scholarship - The Atrion Corporation created this endowed scholarship to provide financial assistance to undergraduate, non-traditional students enrolled at Rutgers Business School on the New Brunswick campus.

The Bank of New York Mellon Scholarship - This scholarship fund seeks to support Rutgers Business School's recruitment of outstanding students and, in turn, further strengthen the quality of the RBS-UNB student body.

C. Thomas Mallos Scholarship - Awarded annually to a full-time undergraduate senior accounting major who demonstrates academic excellence and service. Established by C. Thomas Mallos.

The Center for Women in Business (CWIB) - CWIB will award selected students up to $5,000 in scholarship money to fund expenses while pursuing a degree at RBS. This scholarship will be awarded to students who demonstrate a commitment to developing their own leadership potential and/or advancing other women in business. This scholarship is awarded to F/T undergraduate students based on financial need. Recipients should participate in the Rutgers Business School's Women BUILD Program or be a student leader in an RBS club or organization.

Chopruvka Family and Goldman Sachs Gives Endowed Quant Scholarship - Recipients are to be selected among full-time undergraduate sophomore students enrolled in RBS. Students must be members of the Road to Wall Street Program at RBS and pursuing at least one quantitative major, including but not limited to Computer Science, Mathematics, and/or BAIT.

Cohn Reznick Scholarship - Awarded to a junior accounting major who has achieved academic excellence, engages in extracurricular activities and plans to pursue a career in the accounting profession.

Edgar Dunlap Scholarship - Awarded to a full-time junior who demonstrates superior academic achievement.

EY Diversity and Inclusion Accelerator Program - This fund provides scholarship support for students enrolled in the B-STAR program with awards designed for Road to CPA students or students majoring in accounting.

Gary Dornbush - Awards are made to full-time undergraduate students majoring in accounting in excellent academic standing.

Gary Cohen Endowed Scholarship - Awarded to a full-time Rutgers Business School student who demonstrates drive and high academic merit.

Gebruder Weiss Supply Chain Leadership Scholarship - This scholarship is awarded to full-time undergraduate students. Two students will be selected each year - one from the New Brunswick campus and the other from the Newark campus. Recipients will be offered an internship at the company as well.

Jayceryll Malabuyoc de Chavez Memorial Scholarship - Awards are made to full-time New Brunswick undergraduate students enrolled in the Rutgers Business School, based on academic merit, who have demonstrated leadership at the University and/or in the community.

Kenneth and Jessica Miller Scholarship - Awards are made to full-time undergraduate RBS students based on academic and financial needs. Awards may be renewed for up to three years.

Littman Family Scholarship - Awards are made to provide tuition assistance to undergraduate business students on the New Brunswick campus. Established by Leonard and Herbert Littman.

Michael and Elizabeth Dimond BAIT Scholarship - Awards are made to full-time undergraduate students with a minimum 3.2 GPA who have demonstrated leadership potential. Preference to finance majors but not required.

MSD Scholars Initiative Program at Rutgers Business School - The MSD Scholars Initiative, a strategic partnership with Rutgers Business School, will create a pathway program for professional opportunities on Wall Street for students focused on diversity, equity, and inclusion issues from prior to their first year through graduation.

Nan and Paul Okarma - Road to CPA - New Brunswick is an all-inclusive program created to provide guidance and support to students on their path to CPA licensure and a meaningful accounting career. Recipients must be full-time RBS New Brunswick undergraduate accounting majors with a 3.0 GPA or higher. One female recipient is preferred.

Omotayo Okusanya Beta Alpha Psi - This scholarship is awarded to a full-time New Brunswick undergraduate accounting major in their junior year (Class of 24) who is a member of Beta Alpha Psi with a minimum GPA of 3.5.

Omotayo Okusanya Road to Wall Street - This award calls for a sophomore, junior, or senior with a 3.5 GPA or higher who has completed a summer internship with a Wall Street investment bank or in the area of venture capital, private equity, or asset management at a reputable financial services institution and has earned a grade of A in the Road to Wall Street class.

RBS 75th Anniversary Endowed Scholarship - Awarded annually to undergraduate and/or graduate students based on academic merit. This endowed scholarship fund is established by alumni and friends of Rutgers Business School in recognition of the school's 75th anniversary.

Richard Luhmann Scholarship - Awarded annually to a senior accounting major who has demonstrated academic excellence and service. Established by family, friends, and colleagues in memory of Richard Luhmann, Rutgers College Class of 1948.

Richard Federici Scholarship - Scholarships are awarded to New Jersey residents with good academic standing.

Robert and Leighanne Egan Family Endowed Scholarship - Awards are made to full-time undergraduate RBS students based on academic merit and financial need.

Dr. Rosa Oppenheim Leadership Award - This award is made to graduating seniors who support future business leaders who exhibit a commitment to leadership. A short essay on leadership is required.

Roslyn Kuchin Scholarship - Awards are made annually to full-time students who are in good standing.

School of Business Scholarship - Awarded to full-time students with high academic performance. Established in 1993.

Vito A. Cardace Scholarship - Awards are made to full-time students who demonstrate outstanding academic achievement. Created by Vito A. Cardace (RBS'60).

Admissions (RBS-NB)

ADMISSIONS

Admissions (RBS-NB)

First Year

First Year

First-year students should apply online through the Office of University Undergraduate Admissions. Information for admitted first-year students can be found here.

Admissions (RBS-NB)

External Transfer

External Transfer

Transfer students from outside of Rutgers should apply online through the Office of University Undergraduate Admissions. Information for potential and admitted transfer students can be found here.

Admissions (RBS-NB)

School-to-School Transfer

School-to-School Transfer

Students who wish to transfer to Rutgers Business School: Undergraduate-New Brunswick from other Rutgers University schools should use the online application. More information about the requirements can be found here.

Admissions (RBS-NB)

Reenrollment

Reenrollment

Students in good academic standing who interrupt their registration at Rutgers Business School: Undergraduate-New Brunswick must apply for reenrollment. Any conditions established at the time of leaving must be met before an application for readmission is made. Students who are eligible to return will be reenrolled at Rutgers Business School: Undergraduate-New Brunswick. Students will be held to all of the Rutgers Business School: Undergraduate-New Brunswick degree requirements. (Re)declaration of major and/or departmental certification is at the discretion of the relevant academic department(s).

Important Note: Only previous Rutgers Business School: Undergraduate-New Brunswick students may apply for reenrollment for the spring semester. Students who were previously enrolled in another school of Rutgers University may apply for reenrollment to the Rutgers Business School: Undergraduate-New Brunswick for the fall semester. Students who have been academically dismissed will not be permitted to reenroll under any circumstances.

Students interested in applying for reenrollment to the Rutgers Business School: Undergraduate-New Brunswick should submit their application for reenrollment by January 1 for the spring semester or August 31 for the fall semester. The reenrollment application is available at the following website: Here.

Degree Requirements (RBS-NB)

DEGREE REQUIREMENTS

Credits and Residency

Graduation

Programs of Study: Majors and Minors

RBS Concentrations

Credits and Residency (RBS-NB)

CREDITS AND RESIDENCY

All students must earn at least 120 degree credits, with a minimum cumulative grade-point average of 2.000. Most students should be able to complete their baccalaureate requirements in four years of full-time study. Students must complete the required program of study in their business major, in addition to the liberal arts core curriculum requirements. See Programs of Study section for complete requirements.

Rutgers Business School: Undergraduate-New Brunswick (RBS-UNB) students must complete 45 business credits at Rutgers University-New Brunswick. Students matriculated in RBS-UNB must receive written prior approval to take courses outside of Rutgers-New Brunswick.

Graduation (RBS-NB)

GRADUATION

Degrees are conferred by Rutgers University on the recommendation of the faculty of the Rutgers Business School-Newark and New Brunswick in May, January, and August. Students file for their diploma through the online diploma application. Diplomas will be withheld from all students whose financial accounts are delinquent. The bachelor's degree is conferred with the distinction *summa cum laude* for graduates with a Rutgers cumulative grade-point average of 3.850 or higher, *magna cum laude* for those with an average of 3.700 or higher, and *cum laude* for those with an average of 3.500 or higher. Averages are not rounded to the next higher number in the calculation of honors. Academic departments may recommend students for departmental honors based on a combination of cumulative grade-point average and academic excellence within the major. More information about RBS graduation can be found here.

Programs of Study: Majors and Minors (RBS-NB)

PROGRAMS OF STUDY: MAJORS AND MINORS

The business studies program is only part of the student's academic program. Students will complement their professional education with coursework in the humanities, mathematics, natural sciences, and social and behavioral sciences. In order to design an integrated academic program, full-time students should plan their program over four years. During the first three semesters, the student should formulate a schedule that is comprised of the five foundational courses and liberal arts core curriculum requirements. During the remaining five semesters, the schedule focuses on completing the remaining credits required of the business major. Students should also plan to take additional general elective credits to ensure that their total degree credits equals 120, the number of credits needed for the bachelor of science degree. Business majors should consult with a Rutgers Business School: Undergraduate-New Brunswick advisor when they are planning their academic program.

The following are the five foundational courses that students should complete during their first three (four at most) semesters:

Foundational Courses (16 credits)
01:198:170 Computer Applications for Business (3)
01:220:102 Introduction to Microeconomics (3)
01:220:103 Introduction to Macroeconomics (3)
01:640:135 Calculus I (4)
01:960:285 Introductory Statistics for Business (3)

Liberal Arts Core Curriculum Requirements (minimum 27 credits)
In addition to the five eligibility courses and courses that are required for the major, all Rutgers Business School: Undergraduate-New Brunswick students must complete the following liberal arts core curriculum requirements:
1) Contemporary Challenges (two courses)
2) Areas of Inquiry (six courses)

3) Cognitive Skills and Processes (five courses).
All courses must be at least 3 credits and must be taken for degree credit. Pass/no credit courses may not be used to fulfill these requirements. Students should see Degree Navigator for specific courses and conditions.

Major Requirements (60-63 credits)
The major requirements for Rutgers Business School: Undergraduate-New Brunswick programs of study can be divided into two parts: business core course requirements that all students must complete regardless of their choice of major program (accounting, business analytics and information technology, finance, leadership and management, marketing, or supply chain management), and a combination of required and elective courses that students take according to their choice of major. Students must complete the requirements of the major that are in effect at the time of their admission into the major. All core courses and required courses specific to the major must be completed with a grade of C or better.

010 Accounting Major

136 Business Analytics Concentration

390 Finance Major

605 Leadership and Management Major

630 Marketing Major

799 Supply Chain Management Major

135 Business Administration Minor

382 Entrepreneurship Minor

010 Accounting Major (RBS-NB)

010 Accounting Major

Major requirements for students who entered RBS ***in the fall 2025 semester:***

Business Core

33:010:272 Introduction to Financial Accounting (3)
33:010:275 Introduction to Managerial Accounting (3) (prerequisite: 33:010:272)
33:011:301 Foundations for Your Career Journey (1)
33:011:302 Building Your Brand (1) (prerequisite: 33:011:301)
33:011:303 Conquering Your Transition (1) prerequisite: 33:011:302)
33:136:385 Statistical Methods in Business (3)
33:136:386 Operations Management (3)
33:140:320 Business Law I (3)
33:390:300 Financial Management (3)
33:620:301 Introduction to Management (3)
33:620:302 Management Skills (3)

33:620:492 Business Policy and Strategy (3) (prerequisites: 33:390:300, 33:620:301, 33:630:301, and senior year)
33:630:301 Introduction to Marketing (3)
33:799:301 Introduction to Supply Chain Management (3)

Required Accounting Courses

33:010:325. Intermediate Accounting I (3) (prerequisite: 33:010:272)
33:010:458 Accounting Information Systems (3) (prerequisite: 33:010:272)
33:010:326 Intermediate Accounting II (3) (prerequisite: 33:010:325)
33:010:451 Cost Accounting (3) (prerequisite: 33:010:275)
33:010:415 Concepts of Auditing (3) (prerequisite: 33:010:325)
33:010:421 Income Tax Accounting (3) (prerequisite: 33:010:325)
33:010:401 Advanced Accounting (3) (prerequisite: 33:010:326)
33:010:416 Audit Analytics (3) (prerequisite: 33:010:415)
33:010:422 Topics in Income Taxation (3) (prerequisite: 33:010:421)

If you major in Accounting as your first, second, or third major, you are required to take 33:010:458 Accounting Information System and 33:140:320 Business Law I. You will not earn credit for taking 33:136:370 Management Information System. You can earn credit towards graduation if you take 33:522:334 Business Ethics but it will not fulfill a major requirement.

A grade of B or better is required to take any additional Finance department courses beyond 33:390:300 Financial Management.

Students with more than one Business School major may only double count one RBS course between those majors.

136 Business Analytics and Information Technology (BAIT) Major (RBS-NB)

136 Business Analytics and Information Technology (BAIT) Major

Major requirements for students who entered RBS ***in the fall 2025 semester:***

Business Core

33:010:272 Introduction to Financial Accounting (3)
33:010:275 Introduction to Managerial Accounting (3) (prerequisite: 33:010:272)
33:011:301 Foundations for Your Career Journey (1)
33:011:302 Building Your Brand (1) (prerequisite: 33:011:301)
33:011:303 Conquering Your Transition (1) prerequisite: 33:011:302)
33:136:370 Management Information Systems OR 33:010:458 Accounting Information Systems (3) (33:010:458 required if double majoring in Accounting; Prerequisite for 33:010:458: 33:010:272)
33:136:385 Statistical Methods in Business (3)
33:136:386 Operations Management (3)
33:140:320 Business Law I (3) OR 33:522:334 Business Ethics (3) (33:140:320 required if double majoring in Accounting)

33:390:300 Financial Management (3)
33:620:301 Introduction to Management (3)
33:620:302 Management Skills (3)
33:620:492 Business Policy and Strategy (3) (prerequisites: 33:390:300, 33:620:301, 33:630:301, and senior year)
33:630:301 Introduction to Marketing (3)
33:799:301 Introduction to Supply Chain Management (3)

Required BAIT Courses

33:136:388 Foundations of Business Programming (3)
33:136:485 Time Series Modeling for Business (3) (prerequisite: 33:136:385)
33:136:470 Business Data Management (3) (prerequisites: 33:136:370 or 33:010:458; and 33:136:388)
33:136:400 Business Decision Analytics under Uncertainty (3) (prerequisite: 33:136:386)

Three BAIT electives (9), 3 credits of which must be from the Department of Management Science and Information Systems (136).

A grade of B or better is required to take any additional Finance department courses beyond 33:390:300 Financial Management.

If you major in Accounting as your first, second, or third major, you are required to take 33:010:458 Accounting Information System and 33:140:320 Business Law I. You will not earn credit for taking 33:136:370 Management Information System. You can earn credit towards graduation if you take 33:522:334 Business Ethics but it will not fulfill a major requirement.

Students with more than one Business School major may only double count one RBS course between those majors.

390 Finance Major (RBS-NB)

390 Finance Major

Major requirements for students who entered RBS ***in the fall 2025 semester:***

Business Core

33:010:272 Introduction to Financial Accounting (3)
33:010:275 Introduction to Managerial Accounting (3) (prerequisite: 33:010:272)
33:011:301 Foundations for Your Career Journey (1)
33:011:302 Building Your Brand (1) (prerequisite: 33:011:301)
33:011:303 Conquering Your Transition (1) prerequisite: 33:011:302)
33:136:370 Management Information Systems OR 33:010:458 Accounting Information Systems (3) (33:010:458 required if double majoring in Accounting, Prerequisite for 33:010:458: 33:010:272)
33:136:385 Statistical Methods in Business (3)
33:136:386 Operations Management (3)
33:140:320 Business Law I (3) OR 33:522:334 Business Ethics (3) (33:140:320 required if double majoring in Accounting)
33:390:300 Financial Management (3)

33:620:301 Introduction to Management (3)
33:620:302 Management Skills (3)
33:620:492 Business Policy and Strategy (3) (prerequisites: 33:390:300, 33:620:301, 33:630:301, and senior year)
33:630:301 Introduction to Marketing (3)
33:799:301 Introduction to Supply Chain Management (3)

Required Finance Courses

33:390:380 Investment Analysis (3) (prerequisite: 33:390:300)
33:390:420 Derivatives (3) (prerequisite: 33:390:380)
33:390:400 Corporate Finance (3) (prerequisite: 33:390:300)

Four Finance Electives (12)

A grade of B or better is required to take any additional Finance department courses beyond 33:390:300 Financial Management.

If you major in Accounting as your first, second, or third major, you are required to take 33:010:458 Accounting Information System and 33:140:320 Business Law I. You will not earn credit for taking 33:136:370 Management Information System. You can earn credit towards graduation if you take 33:522:334 Business Ethics but it will not fulfill a major requirement.

Students with more than one Business School major may only double count one RBS course between those majors.

605 Leadership and Management Major (RBS-NB)

605 Leadership and Management Major

Major requirements for students who entered RBS ***in the fall 2025 semester:***

Business Core

33:010:272 Introduction to Financial Accounting (3)
33:010:275 Introduction to Managerial Accounting (3) (prerequisite: 33:010:272)
33:011:301 Foundations for Your Career Journey (1)
33:011:302 Building Your Brand (1) (prerequisite: 33:011:301)
33:011:303 Conquering Your Transition (1) prerequisite: 33:011:302)
33:136:370 Management Information Systems OR 33:010:458 Accounting Information Systems (3) (33:010:458 required if double majoring in Accounting, Prerequisite for 33:010:458: 33:010:272)
33:136:385 Statistical Methods in Business (3)
33:136:386 Operations Management (3)
33:140:320 Business Law I (3) OR 33:522:334 Business Ethics (3) (33:140:320 required if double majoring in Accounting)
33:390:300 Financial Management (3)
33:620:301 Introduction to Management (3)
33:620:302 Management Skills (3)

33:620:492 Business Policy and Strategy (3) (prerequisites: 33:390:300, 33:620:301, 33:630:301, and senior year)
33:630:301 Introduction to Marketing (3)
33:799:301 Introduction to Supply Chain Management (3)

Required Management Courses

33:620:369 International Business (3) (prerequisite: 33:620:301)
33:620:410 Executive Leadership (3) (prerequisite: 33:620:302)

Electives: At least 6 credits (two courses) of the following:

33:620:362 Effective Leadership Communications (3) (prerequisite: 33:620:302)
33:620:330 Women Leading in Business (3) (prerequisites: 33:620:301 or 33:620:302) 33:620:320 Cross Cultural Management (3) (prerequisite: 33:620:301)
33:620:350 Negotiations (3) (prerequisite: 33:620:301)
33:620:370 Managing Diversity in Organizations (3) (prerequisite: 33:620:301)
33:620:430 Team Building and Group Processes (3) (prerequisite: 33:620:301)

Other elective courses (up to 6 credits)

A grade of B or better is required to take any additional Finance department courses beyond 33:390:300 Financial Management.

If you major in Accounting as your first, second, or third major, you are required to take 33:010:458 Accounting Information System and 33:140:320 Business Law I. You will not earn credit for taking 33:136:370 Management Information System. You can earn credit towards graduation if you take 33:522:334 Business Ethics but it will not fulfill a major requirement.

Students with more than one Business School major may only double count one RBS course between those majors.

630 Marketing Major (RBS-NB)

630 Marketing Major

Major requirements for students who entered RBS ***in the fall 2025 semester:***

Business Core

33:010:272 Introduction to Financial Accounting (3)
33:010:275 Introduction to Managerial Accounting (3) (prerequisite: 33:010:272)
33:011:301 Foundations for Your Career Journey (1)
33:011:302 Building Your Brand (1) (prerequisite: 33:011:301)
33:011:303 Conquering Your Transition (1) prerequisite: 33:011:302)
33:136:370 Management Information Systems OR 33:010:458 Accounting Information Systems (3) (33:010:458 required if double majoring in Accounting, Prerequisite for 33:010:458: 33:010:272)
33:136:385 Statistical Methods in Business (3)
33:136:386 Operations Management (3)

33:140:320 Business Law I (3) OR 33:522:334 Business Ethics (3) (33:140:320 required if double majoring in Accounting)
33:390:300 Financial Management (3)
33:620:301 Introduction to Management (3)
33:620:302 Management Skills (3)
33:620:492 Business Policy and Strategy (3) (prerequisites: 33:390:300, 33:620:301, 33:630:301, and senior year)
33:630:301 Introduction to Marketing (3)
33:799:301 Introduction to Supply Chain Management (3)

Required Marketing Courses

33:630:385 Marketing Research (3) (prerequisites: 33:136:385 and 33:630:301)
33:630:374 Consumer Behavior (3) (prerequisite: 33:630:301)
33:630:452 Marketing Strategy and Decision-Making (3) (prerequisite: 33:630:385 and seniors only)

Four Marketing Electives (12)

A grade of B or better is required to take any additional Finance department courses beyond 33:390:300 Financial Management.

If you major in Accounting as your first, second, or third major, you are required to take 33:010:458 Accounting Information System and 33:140:320 Business Law I. You will not earn credit for taking 33:136:370 Management Information System. You can earn credit towards graduation if you take 33:522:334 Business Ethics but it will not fulfill a major requirement.

Students with more than one Business School major may only double count one RBS course between those majors.

799 Supply Chain Management Major (RBS-NB)

799 Supply Chain Management Major

Major requirements for students who entered RBS ***in the fall 2025 semester:***

Business Core

33:010:272 Introduction to Financial Accounting (3)
33:010:275 Introduction to Managerial Accounting (3) (prerequisite: 33:010:272)
33:011:301 Foundations for Your Career Journey (1)
33:011:302 Building Your Brand (1) (prerequisite: 33:011:301)
33:011:303 Conquering Your Transition (1) prerequisite: 33:011:302)
33:136:370 Management Information Systems OR 33:010:458 Accounting Information Systems (3) (33:010:458 required if double majoring in Accounting, Prerequisite for 33:010:458: 33:010:272)
33:136:385 Statistical Methods in Business (3)
33:136:386 Operations Management (3)
33:140:320 Business Law I (3) OR 33:522:334 Business Ethics (3) (33:140:320 required if double majoring in Accounting)
33:390:300 Financial Management (3)

33:620:301 Introduction to Management (3)
33:620:302 Management Skills (3)
33:620:492 Business Policy and Strategy (3) (prerequisites: 33:390:300, 33:620:301, 33:630:301, and senior year)
33:630:301 Introduction to Marketing (3)
33:799:301 Introduction to Supply Chain Management (3)

Required SCM Courses

33:799:305 Global Procurement and Sourcing Strategies (3) (prerequisite: 33:799:301)
33:799:330 Business Logistics and Transportation (3) (prerequisite: 33:799:301)
33:799:310 Demand Planning and Fulfillment (3) (prerequisite: 33:799:301)
33:799:380 Introduction to Project Management (3) (prerequisite: 33:799:301)
33:799:493 Internship in Supply Chain Management (3)** (prerequisite: 33:799:301) OR 33:799:421 Co-op in Supply Chain Management (3)** (prerequisite: 33:799:301) OR 33:799:420 SCM Industry Client Projects (3)** (prerequisites: 33:799:380 and 33:799:305 OR 33:799:330, and seniors only)

Three Supply Chain Electives (9)**

** Students may only take **one** experiential learning course towards their SCM required courses from among these three categories: Industry Client Projects, Internship in Supply Chain Management, and Co-op in Supply Chain Management. Co-op in Supply Chain Management and Internship in Supply Chain Management for SCM required credits are by application only through the Supply Chain department. If you choose to take Co-op in Supply Chain as your **one** SCM required course you will also be registered for both 799:421 (SCM Co-op) and 011:482 (Special Topics in Admin Studies) with 011:482 counting for general elective credit only. SCM students are limited to one experiential learning experience. After your **one** course allowed for SCM required credit, you must apply through to the Office of Career Management and you will be registered for general elective credit only.

A grade of B or better is required to take any additional Finance department courses beyond 33:390:300 Financial Management.

If you major in Accounting as your first, second, or third major, you are required to take 33:010:458 Accounting Information System and 33:140:320 Business Law I. You will not earn credit for taking 33:136:370 Management Information System. You can earn credit towards graduation if you take 33:522:334 Business Ethics but it will not fulfill a major requirement.

Students with more than one Business School major may only double count one RBS course between those majors.

135 Business Administration Minor (RBS-NB)

135 Business Administration Minor

This minor is only for non-RBS students: Rutgers students from other schools, departments, and majors can expand their education and enhance their careers by earning a minor in business administration at Rutgers Business School: Undergraduate-New Brunswick. The minor benefits any major by giving students skills and knowledge to compete globally while broadening their appreciation for how the world works.

Path to Minor

Rutgers Business School's undergraduate program in New Brunswick offers a minor in business administration to provide students with a strong foundation in the broad functional areas of business. The 18-credit minor consists of six 3-credit introductory courses covering each of Rutgers Business School's disciplinary areas. This combination provides a substantial and comprehensive overview of the major aspects of business administration.

The business administration minor requires the successful completion with a grade of C or better of the following courses:

33:010:272 Financial Accounting (3)
33:390:203 Introduction to Finance(3) (prerequisite: Financial Accounting [33:010:272]) 33:620:301 Introduction to Management (3)
33:630:301 Introduction to Marketing (3)
33:799:301 Introduction to Supply Chain Management (3)
And a choice of one of the following:
33:136:287 Introduction to Business Analytics (3) OR
33:136:385 Statistical Methods (3) (prerequisite: Calculus) OR
33:136:386 Operations Management (3) (prerequisite: Calculus)

Please note that if you intend to transfer into Rutgers Business School, none of the 200-level courses required for the minor will transfer in except for Financial Accounting 33:010:272. With the exception of Introduction to Finance and Introduction to Business Analytics, all of the above courses are taken alongside RBS majors.

Be informed that students may not double minor in business administration and entrepreneurship. Eligibility to be admitted into the minor requires the student to meet all of the following criteria:

- Good academic standing with a GPA of 2.0 or better.
- Successful completion with a grade of C or better of Precalculus College Mathematics (01:640:115) (or placement out of Precalculus).
- Successful completion with a grade of C or better of Statistics I (01:960:211). [Introductory Statistics for Business (01:960:285), Basic Statistics for Research (01:960:401), Basic Statistics for Exercise Science (01:377:275), Basic Statistics for Sport Studies (01:377:276), Basic Statistical Methods (10:762:205), Quantitative Methods for Psychology (01:830:200), or Analysis of Social Science Data (01:920:312) may be substituted for Statistics 1.]

382 Entrepreneurship Minor (RBS-NB)

382 Entrepreneurship Minor

This minor is only for non-RBS students: Non-RBS students pursuing the entrepreneurship minor will take all six courses (18 credits).

The suggested course track for this minor will be to first take the preliminary core requirements designed to provide students with general business skills (9 credits), then take the entrepreneurship core courses (6 credits), and finally select an elective (3 credits). The entrepreneurship minor course sequence is structured such that students acquire basic business knowledge and skills before taking more advanced courses. Within the minor, students receive a

combination of theoretical and practical exposure to entrepreneurship. Case study is the principal teaching method, supplemented by lectures, project work, and guest speakers. Be informed that students may not double minor in business administration and entrepreneurship.

Preliminary Core Requirements (9 credits)

33:382:103 Accounting for Entrepreneurs and Small Businesses (3)
33:382:203 Finance for Entrepreneurs and Small Businesses (3)
33:382:202 Marketing for Entrepreneurs and Small Businesses (3)

Entrepreneurship Core Requirements (6 credits)

33:382:302 Introduction to Entrepreneurship (3)
33:382:303 Managing Growing Ventures (3)

Electives (3 credits)

RBS Concentrations (RBS-NB)

RBS CONCENTRATIONS

Students who are enrolled in a Rutgers Business School Undergraduate Program in New Brunswick major can complete a concentration in Business Analytics, Entrepreneurship, Finance, Global Business, Leadership Skills, Management Information Systems, Real Estate, or Professional Selling. Only Finance majors can declare the concentration in Fixed Income and Credit Analysis.

You may declare a concentration if you have successfully completed 45 college credits. You may only declare one concentration.

If you have a Business Analytics and Information Technology major you may not declare a Business Analytics or Management Information Systems concentration. If you have a Finance major you may not declare a Finance concentration. If you have a Leadership and Management major you may not declare an Entrepreneurship, Global Business, or Leadership Skills concentration. If you have a Marketing major you are permitted to do the Professional Selling Concentration, and it will become part of your major. If you have a Finance major, the Fixed Income and Credit Analysis concentration will become part of your major.

136 Business Analytics Concentration

382 Entrepreneurship Concentration

390 Finance Concentration

390F Fixed Income and Credit Analysis Concentration

620 Global Business Concentration

623 Management Information Systems Concentration

625 Leadership Skills Concentration

634 Professional Selling Concentration

851 Real Estate Concentration

136 Business Analytics Concentration (RBS-NB)

136 Business Analytics Concentration

The intention of this concentration is to allow students not majoring in business analytics and information technology (BAIT) to add a field of secondary expertise to their transcripts, complementing their major area of study, without having to take the full complement of seven extra courses required to double-major in BAIT. Such students are advised to select one of the two concentrations (business analytics [BA] or management information systems [MIS]); selecting both concentrations requires six additional courses, in which case it is recommended that the student take one further course and thus qualify for a major or double major in BAIT.

Concentration Requirements (9 credits total)

Business Decision Analytics under Uncertainty 33:136:400 (3) (prerequisite: 33:136:386)
Time Series Modeling for Business 33:136:485 (3) (prerequisite: 33:136:385)

Elective Courses (3 credits)
Students can choose one of the following courses as an elective:

Data Mining for Business Intelligence 33:136:494 (3)
Investment Modeling with 'R' 33:136:450 (3) (prerequisite: 33:136:370)
Large-Scale Business Data Analysis 33:136:487 (3) (prerequisite: 33:136:370)
Optimization Modeling 33:136:486 (3) (prerequisite: 33:136:386)
Risk Modeling 33:136:405 (3) (prerequisite: 33:136:386)

You cannot 'double count' or overlap any courses between RBS-NB majors and RBS-NB concentrations. All concentration courses must be fulfilled by courses not required by an RBS-NB major. Degree Navigator will not remove the double counted courses and it is the student's responsibility to monitor this manually.

382 Entrepreneurship Concentration (RBS-NB)

382 Entrepreneurship Concentration

Many companies are explicitly setting expectations for, and placing value on, employees with entrepreneurial skills. Within the concentration, students receive a combination of theoretical and practical exposure to entrepreneurship. Case study is the principal teaching method, supplemented by lectures, project work, and guest speakers.

RBS students pursuing the entrepreneurship concentration will take two entrepreneurship core requirements (6 credits) and one entrepreneurship elective (3 credits).

Concentration Requirements (9 credits total)

Required Courses (6 credits)
Students are required to take the following two courses:

Introduction to Entrepreneurship 33:382:302 (3)
Managing Growing Ventures 33:382:303 (3) (prerequisite: 33:382:302)

Elective Courses (3 credits)
Students can choose one of the following courses as an elective:

Creativity, Innovation, and Entrepreneurship 33:382:340 (3)
Entrepreneurship Practicum 33:382:496 (3)
International Entrepreneurship 33:620:475 (3)
Managing Technological Innovation 33:382:355 (3)
Multicultural Market 33:382:352 (3)
Music Industry 33:382:486 (3)
New Product Planning 33:630:369 (3)
Social Entrepreneurship 33:382:310 (3)
Technology Ventures 33:382:360 (3) (prerequisite: 33:382:302)
Urban Entrepreneurship and Economic Development 33:382:342 (3)

You cannot 'double count' or overlap any courses between RBS-NB majors and RBS-NB concentrations. All concentration courses must be fulfilled by courses not required by an RBS-NB major. Degree Navigator will not remove the double counted courses and it is the student's responsibility to monitor this manually.

390 Finance Concentration (RBS-NB)

390 Finance Concentration

Finance focuses on all aspects of money management such as investment, collection, disbursement, borrowing, and fundraising. These individuals prepare financial reports needed to conduct operations and to satisfy tax and regulatory requirements.

To declare a finance concentration, students must complete 33:390:300 Financial Management with a grade of B or better.

Concentration Requirements (9 credits total)

Investment Analysis 33:390:380 (3)
Corporate Finance 33:390:400 (3)
Derivatives 33:390:420 (3) (prerequisite: 33:390:380)

You cannot 'double count' or overlap any courses between RBS-NB majors and RBS-NB concentrations. All concentration courses must be fulfilled by courses not required by an RBS-NB major. Degree Navigator will not remove the double counted courses and it is the student's responsibility to monitor this manually.

390F Fixed Income and Credit Analysis Concentration (RBS-NB)

390F Fixed Income and Credit Analysis Concentration

In today's financial landscape, a clear understanding of credit risk and financial analysis is crucial for businesses to make sound lending and investment decisions. Students should emerge with a greater understanding of capital markets. The Credit Analysis concentration is designed to equip students with the analytical skills, risk assessment frameworks, and financial evaluation techniques required to succeed in the credit and lending industry.

Students must be a declared finance major to declare this concentration as it will become built into the major program. Students must earn a B or higher in 33:390:300 Financial Management to declare a finance major or concentration.

Concentration requirements (21 credits total)

Required courses (18 credits):

Students are required to take the following six courses

Investment Analysis 33:390:380 (3)
Corporate Finance 33:390:400 (3)
Derivatives 33:390:420 (3) (prerequisite: 33:390:380)
Investment Banking Analysis (3) (prerequisite: 33:390:400)
Fixed Income (3) (prerequisite: 33:390:380)
Credit Analysis (3) (prerequisite: 33:390:380)

Elective Courses (3 credits): Students must choose one additional finance elective to complete this concentration.

620 Global Business Concentration (RBS-NB)

620 Global Business Concentration

In the interconnected global economy, a clear understanding of the complex global business environment is important to compete domestically as well as in international markets. The global business concentration is designed to equip students with the knowledge, skills, and global perspectives required to thrive in the global workplace.

RBS students pursuing the global business concentration take two global business core courses (6 credits) and one elective (3 credits).

Concentration Requirements (9 credits total)

Required Courses (6 credits)
Students are required to take the following two courses:

Global Management and Strategy 33:620:402 (3)
International Business 33:620:369 (3)

Elective Courses (3 credits)
Students can choose one of the following courses as an elective:

Cross-Cultural Management 33:620:320 (3)
Doing Business in Emerging Markets 33:620:479 (3)
Executive Leadership 33:620:410 (3)
Global Capital Markets 33:390:320 (3)
Global Money Markets & Institutions 33:390:375 (3)
International Entrepreneurship 33:620:475 (3)
International Marketing 33:630:371 (3)
Diversity, Equity, and Inclusion in Management and Organizations 33:620:370 (3)
Negotiations 33:620:350 (3)
Procurement and Global Sourcing Strategies 33:799:305 (3)

You may not declare a Global Business concentration if you have a Leadership and Management major.

You cannot 'double count' or overlap any courses between RBS-NB majors and RBS-NB concentrations. All concentration courses must be fulfilled by courses not required by an RBS-NB major. Degree Navigator will not remove the double counted courses and it is the student's responsibility to monitor this manually.

623 Management Information Systems Concentration (RBS-NB)

623 Management Information Systems Concentration

The intention of this concentration is to allow students not majoring in business analytics and information technology (BAIT) to add a field of secondary expertise to their transcripts, complementing their major area of study, without having to take the full complement of seven extra courses required to double-major in BAIT. Such students are advised to select one of the two concentrations (business analytics [BA] or management information systems [MIS]); selecting both concentrations requires six additional courses, in which case it is recommended that the student take one further course and thus qualify for a major or double-major in BAIT.

Concentration Requirements (9 credits total)

Required Courses (6 credits)
Students are required to take the following two courses:

Business Data Management 33:136:470 (3) (prerequisite: 33:136:370)
Foundations of Business Programming 33:136:388 (3)

Elective Courses (3 credits)
Students can choose one of the following courses as an elective:

Data Mining for Business Intelligence 33:136:494 (3)
Enterprise Architecture 33:136:465 (3) (prerequisite: 33:136:370)
Information System Security 33:136:471 (3) (prerequisite: 33:136:370)
Investment Modeling with 'R' 33:136:450 (3) (prerequisite: 33:136:370)

You may not declare a concentration in management information systems if you have a major in business analytics and information technology.

You cannot 'double count' or overlap any courses between RBS-NB majors and RBS-NB concentrations. All concentration courses must be fulfilled by courses not required by an RBS-NB major. Degree Navigator will not remove the double counted courses and it is the student's responsibility to monitor this manually.

625 Leadership Skills Concentration (RBS-NB)

625 Leadership Skills Concentration

The leadership skills concentration within the Department of Management and Global Business aims to help students to master some of the critical "soft skills" necessary to progress through a successful career. With its focus on courses such as Executive Leadership, Effective Leadership Communications, and Negotiations, students should emerge with a greater understanding of themselves and have built a toolkit for effectively interacting with others. The department will also offer course options for this concentration that focus on teamwork, diversity, and issues involved with cross-cultural management.

RBS students pursuing the leadership skills concentration will take 3 courses (9 credits). The courses include one requirement (3 credits), one elective that must be chosen from a list of two (3 credits or 6 credits if both are taken), and if needed, one extra elective from a list of courses offered by the department (0-3 credits).

Concentration Requirements (9 credits total)

Required Courses (3 credits)
Students are required to take the following course:

Executive Leadership 33:620:410 (3)

Elective Courses (6 credits)
Select at least one of the following two (may select both):

Effective Leadership Communications 33:620:362 (3)
Negotiations 33:620:350 (3)

If needed, select one of the following:

Cross-Cultural Management 33:620:320 (3)
Diversity, Equity, and Inclusion in Management Organizations 33:620:370 (3)
Team Building and Group Processes 33:620:430 (3) (prerequisite: 33:620:301)
Women Leading in Business 33:620:330 (3) (prerequisite: 33:620:301 and junior/senior status)

You may not declare a leadership skills concentration if you have a major in leadership and management.

You cannot 'double count' or overlap any courses between RBS-NB majors and RBS-NB concentrations. All concentration courses must be fulfilled by courses not required by an RBS-NB major. Degree Navigator will not remove the double counted courses and it is the student's responsibility to monitor this manually.

631 Sales Concentration (RBS-NB)

631 Sales Concentration

Discontinued after spring 2023

The sales concentration provides an opportunity for RBS students (all majors except marketing) to obtain the essential knowledge and skills required to begin professional careers in sales. Sales representatives provide value for their business customers by satisfying needs and solving customer problems. In order to accomplish this, sales representatives develop strong relationships with their customers that are built on trust, cooperation, commitment, and information. These representatives may sell consumer goods and services, industrial products, business goods and services, and health care products and services.

Concentration Requirements (9 credits total)

Required Courses (6 credits)
Students are required to take the following two courses:

Sales Management 33:630:401 (3)
Business to Business Marketing 33:630:370 (3)

Elective Courses (3 credits)
Students can choose one of the following courses as an elective:

Consumer Behavior 33:630:374 (3)
Retail Marketing 33:630:368 (3)
Negotiations 33:620:350 (3)
International Marketing 33:630:371 (3)
New Product Planning 33:630:369 (3)

You cannot 'double count' or overlap any courses between RBS-NB majors and RBS-NB concentrations. All concentration courses must be fulfilled by courses not required by an RBS-NB major. Degree Navigator will not remove the double counted courses and it is the student's responsibility to monitor this manually.

634 Professional Selling Concentration (RBS-NB)

634 Professional Selling

The concentration in professional selling provides an opportunity for all RBS students to obtain the essential knowledge required to pursue a professional career in sales. The role of selling is a critical function in all industries

and is responsible for driving revenue, share and profit for an organization. Salespeople also serve as an important link between an organization and its customers. Professional selling requires a specific set of skills for an individual to execute the sales process successfully.

Concentration Requirements (9 credits total)

Required Courses (6 credits)
Students are required to take the following two courses:

Sales Management 33:630:401 (3)
Introduction to Professional Selling 33:630:485 (3)

Elective Courses (3 credits)

Students can choose one of the following courses as an elective:
Business to Business Marketing 33:630:370 (3)
Retail Marketing 33:630:368 (3)
Negotiations 33:620:350 (3)
New Product Planning 33:630:369(3)

If you have a major in marketing, you may declare the concentration in professional selling. These courses will count as your major electives and are an exception to the rule below.

You cannot 'double count' or overlap any courses between RBS-NB majors and RBS-NB concentrations. All concentration courses must be fulfilled by courses not required by an RBS-NB major. Degree Navigator will not remove the double counted courses and it is the student's responsibility to monitor this manually.

851 Real Estate Concentration (RBS-NB)

851 Real Estate Concentration

Current undergraduate business school students pursuing a concentration in real estate will take four courses (12 credits). Students in this program will be taught by top-notch real estate experts and be exposed to relevant coursework and industry-leading guest speakers. But more importantly, by enrolling in either of these programs, students will have unparalleled access to the more than 70 industry leaders who advise the Rutgers Center for Real Estate. Further, the center will provide scholarships, mentoring, internships, and career opportunities for students enrolled in the program.

Concentration Requirements

The concentration consists of four courses (12 credits) in addition to satisfaction of the core undergraduate business requirements. There are two paths to completion of the concentration--one path for finance majors andanother for students in RBS majors in areas other than finance.

Requirements for Nonfinance Majors

Required courses (12 credits)

Real Estate Law 33:851:350 (3)
Essentials of Real Estate Finance 33:851:380 (3) (prerequisite: 33:390:300)
Commercial Debt Markets 33:851:470 (3)
Development 33:851:432 (3)

Requirements for Finance Majors

Required courses (12 credits)

Real Estate Law 33:851:350 (3)
Real Estate Finance and Mortgage-Backed Securities* 33:390:435 (3) (prerequisite: 33:390:300)
Commercial Debt Markets 33:851:470 (3)
Development 33:851:432 (3)

*Course credit counts simultaneously as both a requirement for the concentration and as an elective for finance majors. It is an exception to the rule below.

You cannot 'double count' or overlap any courses between RBS-NB majors and RBS-NB concentrations. All concentration courses must be fulfilled by courses not required by an RBS-NB major. Degree Navigator will not remove the double counted courses and it is the student's responsibility to monitor this manually.

Course Listing (RBS-NB)

COURSE LISTING

Explanation of Three-Part Course Numbers

Accounting 010

Administrative Studies 011

Business Analytics and Information Technology 136

Business Law 140

Entrepreneurship 382

Finance 390

Business Ethics 522

Management and Global Business 620

Marketing 630

Supply Chain Management 799

Real Estate 851

Explanation of Three-Part Course Numbers (RBS-NB)

EXPLANATION OF THREE-PART COURSE NUMBERS

The number preceding each course title is divided into three parts. The first two digits are the administrative code (standing for a faculty or a school), the next three digits are the subject code, and the final three digits are the course code.

Administrative Codes

The code for the Rutgers Business School: Undergraduate-New Brunswick is 33. For a complete list of administrative codes used in this catalog, see the beginning of the Programs of Study and Courses for Liberal Arts and Sciences Students section.

Subject Codes

A subject code comprises the third through fifth digits in all course numbers and indicates the subject matter of the course. Courses with the following subject codes are listed in this chapter. (This does not constitute a list of majors.)

010 Accounting

011 Administrative Studies

136 Business Analytics and Information Technology

140 Business Law

382 Entrepreneurship

390 Finance

522 Business Ethics

620 Management and Global Business

630 Marketing

799 Supply Chain Management

851 Real Estate

Course Codes

The course code comprises the sixth, seventh, and eighth digits in all course numbers. Course codes from 100 to 299 indicate introductory and intermediate undergraduate courses. Codes from 300 to 499 indicate advanced undergraduate courses. (Courses coded from 500 to 799 are graduate courses.)

Two course codes separated by a comma indicate that each semester may be taken independently of the other (example: 33:620:498,499). Two course codes separated by a hyphen indicate that satisfactory completion of the first semester is a prerequisite to the second semester (example: 33:010:325-326); the first semester may be taken for credit without taking the second, except where a statement is added to indicate that both semester courses must be completed in order to receive credit.

Credits awarded for the successful completion of each course are indicated in parentheses following the course title. The notation BA indicates that the number of credits is determined by arrangement with the department offering the course.

Accounting 010 Courses (RBS-NB)

ACCOUNTING 010

For required courses for the accounting major, see the Programs of Study chapter. Additional information about the undergraduate program can be found here.

33:010:272 ***Introduction to Financial Accounting (3)***
Introduction to basic accounting concepts, business and reporting, and accounting; emphasis on measuring and recording transactions and interpreting financial statements.
Not open to first-year students.

33:010:275 ***Introduction to Managerial Accounting (3)***
Introduction to basic concepts of management accounting with emphasis on decision making and controlling operations through the use of budgets and forecasting models, cost and activity analyses, and various financial and nonfinancial performance measures.
Prerequisite: 33:010:272 or 29:010:203 or 52:010:101. Not open to first-year students.

33:010:310 ***Accounting for Engineers (3)***
Introduction to financial accounting and significant cost accounting concepts.
Prerequisites: Open only to students majoring in engineering. Not open to first-year students.

33:010:325 ***Intermediate Accounting I (3)***
Development of accounting principles under the corporate form of business organization. Topics include basic financial statements, cash and receivables, inventories, property, plant, equipment, and intangible assets.
Prerequisites: 33:010:272 or29:010:203 or 52:010:101. Open to accounting and finance majors.

33:010:326 ***Intermediate Accounting II (3)***
Continuation of 33:010:325 with topical coverage of long-term liabilities, stockholders' equity, investments, revenue recognition, accounting for income taxes, pensions, leases, accounting changes, and statement of changes in financial position.
Prerequisites: 33:010:325 or 29:010:305. All except first-year students.

33:010:401 ***Advanced Accounting (3)***
Consolidated financial statements, including the elimination of intercompany transactions. Accounting for foreign currency transactions and translation of foreign currency financial statements. Fund accounting for state and local governments. Reporting by segments of conglomerates.
Prerequisites: 33:010:326 or 29:010:306.

33:010:415 ***Concepts of Auditing (3)***
Introduction to the principles and concepts of the audit as an attestation service offered by the accounting profession. Primary emphasis is placed on generally accepted auditing standards, the role of the CPA/auditor in evidence collection, analytical review procedures and reporting, the CPA/auditor's ethical and legal responsibilities, and the role of the Securities and Exchange Commission and other constituencies. Audit testing including statistical sampling, internal control issues, and audit programs are discussed.
Prerequisites: 33:010:325 or 29:010:305. All except first-year students.

33:010:416 ***Audit Analytics (3)***
This course is designed to familiarize accounting majors with various analytical skills and provide them with a practical demonstration in an auditing context. It is designed to familiarize students with the concept of audit analytics, the basic audit analytical tools, the trending topics in this field, and the application of different analytical methods in the internal and external audit process. It links audit analytics to corporate continuous monitoring and business process support and provides hands-on experience in using state-of-the-art audit analytical tools.
Prerequisites: 33:010:415 or 29:010:430. Junior and senior accounting majors only.

33:010:421 ***Income Tax Accounting (3)***
Analysis of the income tax laws as they apply to the income of individuals with an emphasis on problems arising from these laws.
Prerequisites: 33:010:325 or 29:010:305.

33:010:422 ***Topics in Income Taxation (3)***
Designed for those who will specialize in taxation. Examination of taxation problems of corporations and partnerships, corporate distributions, liquidations, reorganizations, and other corporate tax matters.
Prerequisite: 33:010:421 or 29:010:413.

33:010:451 ***Cost Accounting (3)***
Basic cost concepts and the operation of the two basic cost systems (job order and process cost), including problems involving multiple product costing and standard cost with emphasis on variance analysis.
Prerequisites: 33:010:275 or 29:010:204 or 52:010:202. Not open to first-year students. Accounting majors only.

33:010:458 ***Accounting Information Systems (3)***
Management information systems concepts used to develop an accounting information system for corporations, with emphasis on general concepts, management of accounting data flow, and software controls.
Prerequisites: (01:198:170 or 14:440:127) & 33:010:272 OR 29:010:203 & (01:197:170 or 01:198:110)

33:010:472 ***Analysis of Financial Statements (3)***
Factors that affect the critical examination and interpretation of financial statements from the viewpoint of groups, using such data with emphasis on accounting problems, analytical methods, and item content of formal statements.
Prerequisites: 33:010:325 or 33:390:400 or 29:010:305 or 20:390:330. Open to accounting and finance majors only.

33:010:472 ***CPA Level Financial Accounting and Reporting (3)***
The objective of the course is to familiarize students with strategies to help successfully complete the Financial Accounting and Reporting section of the Uniform Certified Public Accountant (CPA) exam. This course will cover new financial accounting and reporting material and techniques in relevant areas not addressed in core accounting curriculum classes. In addition, the course will build on students existing knowledge of financial accounting and reporting to provide a comprehensive review of the areas generally tested on the exam integrating the material in a manner which students have not previously seen.
Prerequisites: 33:010:401

33:010:490 ***Independent Project in Accounting (3)***
Individual research and/or reading program under guidance of member of the department.
Prerequisites: Permission of department. Open to accounting majors only.

33:010:495,496 ***Honors Project in Accounting (3,3)***
Individual research and preparation of a written thesis under direction of an accounting faculty member.
Prerequisites: Open to accounting seniors in honors program only. Both semesters must be completed to receive credit.

Administrative Studies 011 Courses (RBS-NB)

ADMINISTRATIVE STUDIES 011

33:011:100 ***Introduction to Business (3)***
Introduction to business functions, methods of business operation, types of business ownership, and the role of business organizations in society.
First-Years and Sophomores.

33:011:231 ***Women's Business Leadership Initiative Seminar I (1)***
This course, reserved for students newly admitted to the Women BUILD program, provides an understanding of the various dimensions of Gender Identity and explores the unique challenges and opportunities presented to women in business. The course aims to provoke students to question their assumptions and become more self-aware, confident members and future leaders within an organizational context. Students learn to make meaningful connections between seminar content and the development of a personal leadership style.
Open to Rutgers Business School students - Permission from Undergraduate Office.

33:011:270 ***BYOC: Continuous Business Monitoring (1)***
This course describes a paradigm shift from the traditional auditing and monitoring approach. Rather than resorting to analyzing a sample of the population, this course presents methodologies and techniques that can be applied to the entire population of records in an audit-by-exception manner. The students learn about various related topics, such as process mining, artificial intelligence, exception identification and prioritization, and automation, among others.

33:011:271 ***BYOC: Emerging Technologies in Business (1)***
This course covers a wide range of emerging technologies in the accounting and auditing areas. Students are introduced to data visualization and interactive dashboards, artificial intelligence, process mining, blockchain, smart contracts, crypto currencies, cybersecurity, and text mining. Moreover, students learn about practical applications and use cases of such technologies in a business environment.

33:011:272 ***BYOC: Business Process Automation (1)***
This course discusses the increasingly popular Robotic Process Automation (RPA) technology. Students learn about progressiveness advanced and complex scenarios of automation. In addition, they learn about the relationship between automation and the concept of continuous auditing and continuous monitoring, as well as hands-on use cases in accounting.

33:011:273 ***BYOC: Cloud Computing Blockchain & Crypto (1)***
This course introduces students to blockchain technology and cloud computing and how they are applied in an accounting and auditing context. Students learn about various issues related to cryptocurrencies and their valuation and markets, such as their unique properties and the technologies used to build them. Furthermore, students learn about information risk management and cyber security as well as their impact on business and good practice standards of cybersecurity.

33:011:274 ***BYOC: AI in Accounting & Audit (1)***
In this course, students learn about Artificial Intelligence (AI) and some of its potential applications in accounting and auditing. By studying technology from a business perspective, students get a more holistic view of its uses. In addition to the basics of AI, students study techniques such as classifiers, cluster analysis, exception and anomaly detection, automation, and learn more advanced applications of AI in accounting and auditing.

33:011:275 ***BYOC: Design it Yourself in Accounting & Audit***
This course allows students to design the course themselves by allowing them to select modules of interest. More specifically, students can choose any five modules from a set of eligible modules across all BYOC courses.

33:011:301 ***Foundations for Your Career Journey***
Foundations for Your Career Journey is the first in the Business Forum 3 course series. This course is designed to introduce the resources and opportunities available at the business school and Rutgers University that support student success, creates foundational materials needed to begin career journeys, and drives development of business professionalism in students.

33:011:302 ***Building Your Brand***
Building Your Brand is the second in the Business Forum 3 course series. This course is designed to build your professional brand by learning to effectively communicate in professional contexts and translating your personal skillset and competencies into internship and career opportunities.
Prerequisite: 33:011:301

33:011:303 ***Conquering Your Transition***
Conquering Your Transition is the third and final in the Business Forum 3 course series. This course is designed to navigate your transition from college to the workplace and translate your accumulated business knowledge and experiences into success in the business world. It involves mastering skills necessary to foster a supportive professional network, navigate the challenges of personal finance, and navigate difficult yet common workplace challenges.
Prerequisite: 33:011:302

33:011:380 ***Co-op Education (6)***
Provides the opportunity to apply concepts learned in class to the work environment.
Prerequisite: Special Permission.

33:011:390 ***Personal Financial Planning (3)***
The emphasis of this course is on the applications of personal financial planning concepts in an integrated planning environment, exposing students to the financial planning profession and assist students with their own personal financial decisions. Students will learn the following aspects of financial planning: money management skills, tax planning, credit management, risk management and insurance, personal investment management, retirement planning, and estate planning.
Prerequisite: 33:390:300 or 33:390:310. Open to Rutgers Business School students.

33:011:480 ***Special Topics in Business (BA)***
Consideration of interdisciplinary topics of contemporary importance in business.
Prerequisites: Junior and senior status and permission of instructor. Rutgers Business School majors only.

33:011:485 ***Field Internship in Business (3)***

Supervised involvement in a private, public, or nonprofit organization providing the student with an opportunity to apply business knowledge.

Prerequisite: Special Permission.

Business Analytics and Information Technology 136 Courses (RBS-NB)

BUSINESS ANALYTICS AND INFORMATION TECHNOLOGY 136

For required courses for the business analytics and information technology (136) major, see the Programs of Study chapter. Additional information about the undergraduate program can be found here.

33:136:287 ***Introduction to Business Analytics (3)***
Introduction to Business Analytics for business administration minors.
Business Administration minors only.

33:136:370 ***Management Information Systems (3)***
Fundamentals of computer technology, including hardware, software, telecommunications, and basics of the internet. The role of computer-based information and executive decision support systems in the modern firm. Design, normalization, creation, and querying of relational databases. Management of information and data. Elementary system development principles.
Prerequisites: 01:198:170 or 01:198:111 or 01:198:110 or 14:440:127. Open to Rutgers Business School majors.

33:136:385 ***Statistical Methods in Business (3)***
Review of principles of hypothesis testing, chi-square tests, one-way and two-way ANOVA, simple and multiple regression analysis, correlation analysis, nonparametric methods, indices, time series, forecasting, and applications to business.
Prerequisites: (01:640:135 & 01:960:285) or (01:640:130 & 01:960:211) or (01:640:135 & 01:960:285). Open to Rutgers Business School majors and minors.

33:136:386 ***Operations Management (3)***
Key quantitative techniques essential for analyzing and improving business operations. Spreadsheet modeling of business decision problems, both with and without data uncertainty. Linear and integer programming optimization models. Elementary applied probability modeling and Monte Carlo simulation.
Prerequisites: 01:640:130 or 01:640:135 or 01:640:151 or 21:640:135 or 50:640:121. Open to Rutgers Business School majors and minors.

33:136:388 ***Foundations of Business Programming (3)***
Principles of programming and software development are covered in depth, with an emphasis on an object-oriented programming (OOP) style, using an OOP language such as C++ or Java. Studies the principles of object-oriented design using the UML modeling language; fundamental data structures and algorithm development for solving business problems.
Prerequisites: Open to 136 majors and 623 CERT. All except first-year students.

33:136:400 ***Business Decision Analytics under Uncertainty (3)***
Introduction to methods for planning problems that include both time evolution and uncertainty. Covers the ideas of dynamic programming, classical decision trees, and application of Bayesian methods to derive tree probabilities. Includes fundamental computer programming techniques for numerical calculations, loops, and arrays. Introduction to sampling-based simulation techniques. Writing and implementing Monte Carlo simulations and the study of specialized packages for discrete-event simulation.
Prerequisites: 33:136:386 or 29:623:311. Open to 136 majors and 136 CERT. All except first-year students.

33:136:405 ***Risk Modeling (3)***
Introduction of the main concepts and models of decision making under uncertainty when risk aversion plays a major role. Topics serve as a foundation for models involving measures of risk and include expected utility modes with their economic background and business applications; mean-risk models with applications to finance; the concepts of value at risk and average value at risk with applications. Examines fundamental dynamic models, with applications to insurance, finance, and inventory management.
Prerequisites: 33:136:386 or 29:623:311. Open to 136 majors. Junior or senior status.

33:136:440 ***Special Topics: Relational Database and Web Applications (3)***
Provides the basics about the integration of relational databases and the World Wide Web. Utilizes a server-side tool to build and query databases using HTML and SQL, including the design of "shopping cart" applications and interactive web games. Emphasis includes how to build, manipulate, and create output from a database to a webpage.
Prerequisite: 33:136:370 or 33:010:458 or 29:010:485. Open to Rutgers Business School juniors and seniors.

33:136:450 ***Investment Modeling with "R" (3)***
Extends upon the strategies from Investment Modeling with VBA and expands to implementing probability models in R with respect to investment models. Explores event-driven strategies in the hedge fund world and pricing inefficiencies in complicated products such as options and ABS securities.
Prerequisites: 33:136:370 or 33:136:458 or 29:010:485. Open to 136 majors, 136 CERT and 623 CERT. Open to Rutgers Business School juniors and seniors.

33:136:455 ***Introduction to ERP (3)***
An introduction to Enterprise Resource Planning (ERP) systems. Addresses how enterprise information systems are integrated and facilitated to improve business operations. Emphasis on hands-on experience of SAP R/3. Includes

the study of functional business domains and associated business processes, business problems inherent in unintegrated information systems, ERP systems as a solution to various business problems and challenges, and provides an overview of marketing, operations management, and accounting.
Prerequisites: 33:136:370 and 33:010:458 or 29:010:485. Open to 136 majors. Junior or senior status.

33:136:465 ***Enterprise Architecture (3)***
An introduction to models, techniques, and tools for developing Enterprise Architecture (EA), the study of principles, methods, and models that are used in the design and realization of an enterprise's organization structure, business processes, information systems, and infrastructure. Covers methods and frameworks from The Open Group Architecture Framework (TOGAF), Zachman, and other frameworks. Provides an overview and history of EA, TOGAF core concepts, and follows with a tour of the IT landscape in business organizations. Presents EA through the TOGAF standard and its associated modeling language, ArchiMate.
Prerequisites: (33:136:370 or 33:010:458 or 29:010:485) & 33:136:388. Open to 136 majors or 623 CERT. Open to Rutgers Business School juniors and seniors.

33:136:470 ***Business Data Management (3)***
Introduces principles and techniques for managing corporate data resources. Techniques for managing the design and development of large database systems, including data models, concurrent processing, data distribution, database administration, and data warehousing; demonstrates their use in business applications. Discusses principles of database systems, database design, database schemas, and database manipulation using SQL. Surveys advanced database management topics such as transaction control, distributed databases, data warehouses, database ecommerce applications, and object-oriented databases. In addition to conceptual material, provides significant hands-on experience using current database technologies.
Prerequisites: (33:136:370 or 33:010:458 or 29:010:485) & 33:136:388. Open to 136 majors or 623 CERT. Junior or senior status.

33:136:471 ***Information System Security (3)***
Provides an overview of information security and assurance in ebusiness and other cyber environments. Studies key issues associated with protecting information assets, determining levels of protection and response to security incidents, and designing a consistent, reasonable information security system with appropriate intrusion detection and reporting features. Covers the fundamentals of threats, vulnerabilities, firewalls, secure access, intrusion detection, cryptography, disaster recovery techniques, and secure programming.
Prerequisites: 33:136:370 or 33:623:370 or 33:010:458 or 29:010:485. Open to 136 majors or 623 CERT. Junior or senior status.

33:136:485 ***Time-Series Modeling for Business (3)***
Introduction to time-series models with emphasis on practical applications in business. Examines how dynamic financial and economic data can be modeled and analyzed using proper statistical techniques. Topics include methods for trend and seasonal analysis and adjustment, modeling, and forecasting with autoregressive moving average (ARMA) processes; and model identification and diagnostics for time series, volatility, and state space models. This course provides hands-on experience by pairing lectures on methodology with lab sessions using high-performance statistical software to perform real-world data analyses.
Prerequisites: (01:198:111 and 01:960:285) or 33:623:385 OR (01:198:111 and 01:960:285) or 33:136:385. Open to 136 majors or 136 CERT. All except first-year students.

33:136:486 ***Optimization Modeling (3)***
Introduces optimization modeling beyond the confines of a two-dimensional spreadsheet. Study of appropriate mathematical notation for formulating realistic, complex optimization models; how to translate this notation into a modern modeling language; and how to represent given problem data symbolically and separate it from the fundamental model structure. Use of set-theoretic and network ideas in formulating models and representing data; use of nonlinear models or integer variables. Examines how to formulate models in a linear or convex manner; introduction of Lagrange multipliers and their economic interpretation.
Prerequisites: 33:136:386 or 29:623:311. Open to 136 majors and 136 CERT. Junior or senior status.

33:136:487 ***Large-Scale Business Data Analysis (3)***
Introduction to fundamental statistical techniques for analyzing large-scale business data; provides systematic training in statistical models for massive datasets and programming, data management, and exploratory data analysis in real-world settings. Students develop context-sensitive models and perform model checking and diagnosis. Topics include parametric inference, logistic regression, nonlinear regression, causal inference, graphical models, dimension reduction, and model selection. Provides a comprehensive set of data analysis techniques through lessons, demonstrations, and programming labs.
Prerequisites: 33:136:370 or 33:010:458 or 29:010:485. Open to 136 majors. Junior or senior status.

33:136:494 ***Data Mining for Business Intelligence (3)***
Explores the fundamental concepts of data mining and provides extensive hands-on experience in applying the concepts to real-world business applications. Topics include classification, clustering, association analysis, and anomaly/novelty detection. The final two weeks of the course involve student project presentations applying data mining techniques to applications such as fraud detection, web usage analysis, customer churn analysis, customer segmentation, blog mining, text mining, and other business data analysis.
Prerequisites: 33:136:385 & 33:136:388. Open to 136 majors, 136 CERT, and 623 CERT. Junior or senior status.

33:136:495, 496 ***Honors Project in MSIS (3,3)***
Individual research and preparation of a written thesis under direction of a Management Science & Information Systems department faculty member.
Open to Business Analytics & Information Systems major students in the honors program only.

33:136:498 ***Independent Project in MIS (3)***
Individual research and/or reading program under guidance of a member of the Management Science & Information Systems department.
Permission of department. Open to Business Analytics & Information Systems major students only.

Business Law 140 Courses (RBS-NB)

BUSINESS LAW 140

33:140:320 ***Business Law I (3)***
Discussion of the legal environments of business; contracts--their formation, operation, and discharge; sales--property, both real and personal.
Prerequisites:01:220:102 & 01:220:103 & 33:010:272 OR 21:220:101 & 21:220:102 & 29:010:203. All except first-year students.

33:140:321 ***Business Law II (3)***
Negotiable instruments, agency, partnerships, corporations, secured transactions, and bankruptcy.
Prerequisite: 33:140:320. Open to accounting majors; junior or senior status.

Entrepreneurship 382 Courses (RBS-NB)

ENTREPRENEURSHIP 382

33:382:103 ***Accounting for Entrepreneurs and Small Business (3)***
Introduction to basic concepts of managerial and financial accounting in the context of new ventures and small business. Two main emphases frame this course. First, managerial accounting: decision making and controlling operations through the use of budgets and forecasting models, cost and activity analyses, and various financial and nonfinancial performance measures. Second, financial accounting: emphasis on resource management, measuring and recording transactions, and interpreting financial statements.
Not open to Rutgers Business School students.

33:382:105 ***Design Thinking Approach to Innovation and Entrepreneurship (3)***
Creating new businesses, capturing new markets, and enhancing organizational effectiveness occur through improving productivity or innovation, or both. New discoveries, new technologies, competition, and globalization compel both entrepreneurs and existing firms to foster innovation and agility. Design thinking is a human-centered, prototype-driven process for innovation that can be applied to product, service, and business design. This course examines the theory and practice of promoting and managing innovation in start-ups and existing firms. It explores successful use of design thinking frameworks for the design of strategies, funding techniques, business models, risks, and reducing barriers for introducing breakthrough products and services. Topics include business model innovation, design-driven innovation, leadership, strategy, information technology, knowledge management, process improvement, performance measurement, and change management. The course emphasizes hands-on projects and studio-style project works.

33:382:202 ***Marketing for Entrepreneurs and Small Business (3)***
Extensive overview of marketing: the process of creating goods and services in response to consumer wants and needs. Study of the marketing function in business firms and nonprofit organizations. Consumer behavior, marketing research, industrial marketing, pricing, channels of distribution, and promotion.
Not open to Rutgers Business School students.

33:382:203 ***Finance for Entrepreneurs and Small Business (3)***
Introduction to basic financial concepts, business, and reporting in the context of new ventures creation and small business operations.
Not open to Rutgers Business School students.

33:382:302 ***Introduction to Entrepreneurship (3)***
An experiential learning class that provides a framework for understanding the entrepreneurial process. Explores challenges, problems, and issues faced by entrepreneurs who start new businesses. Students identify and evaluate business opportunities, develop business concepts, assess and obtain the required resources, manage the growth of

new ventures, and write a business plan. Emphasis on case studies, with supplemental lectures, business cases, and guest speakers.
Not open to first-year students.

33:382:303 ***Managing Growing Ventures (3)***
An experiential learning class: explores the basics of running a small business including a discussion of leadership, strategy, marketing, finance, operations, human resources, supplier management, facilities, banking, and legal and regulatory considerations. Topics are integrated and presented in the context of a small business environment with the objectives for students to learn how to plan and manage various activities essential for running a small business and how to recognize and avoid the common mistakes made by small business managers. Business case examples and text are used to supplement lectures, student projects, and guest speakers.
Prerequisites: 33:382:302. Open to juniors and seniors.

33:382:310 ***Social Entrepreneurship (3)***
An experiential learning class: explores entrepreneurship as a mechanism for social change, economic development, and community wealth creation. Examines organizational approaches (for-profit and nonprofit) that emphasize both social mission and effectiveness. Students learn how to recognize social impact opportunities, how to reconfigure products and services for underserved markets, and how to develop social enterprise models that are sustainable and scalable. Provides concepts to evaluate social enterprises and the capabilities to become social entrepreneurs.
Prerequisite: Junior or senior status.

33:382:340 ***Creativity, Innovation, and Entrepreneurship (3)***
An experiential learning class that focuses on teaching students to leverage intellectual capital by enhancing the innate creativity to improve the ability to generate creative ideas. Develops creativity through practical exercises. Includes a team project developed from an idea for a product or business presented to a panel of faculty and entrepreneurs.
Not open to first-year students.

33:382:342 ***Urban Entrepreneurship and Economic Development (3)***
An experiential learning class that explores the many dimensions of urban entrepreneurship in the context of socioeconomic development. Utilizes action research methods and the development and completion of consulting projects to explore the business and policy issues in urban areas that affect or foster new ventures. Students will be directed to develop urban-framed entrepreneurial initiatives suited to foster social and economic development in New Jersey.
Prerequisite: Junior or senior status.

33:382:352 ***Multicultural Markets (3)***
An experiential learning class that provides students with a learning experience combining business cases, theory, and history. Explores the link between the size and growth of multicultural populations with successful marketplace performance of businesses in urban communities. Focuses on the challenges businesses face in meeting the needs of consumers from diverse backgrounds, such as Asia, the Middle East, and other countries and in inner-city communities.
Prerequisite: Junior or senior status.

33:382:355 ***Managing Technological Innovation: In-House Entrepreneurship (3)***
Focuses on creating streams of new products or services in established firms by leveraging science and technology. Topics include: managing multiple innovation teams, managing research and development and other resources to support streams of new products, developing a long-term strategic commitment to technological innovation, and organizing for innovation.
Prerequisite: Junior or senior status.

33:382:360 ***Technology Ventures (3)***
Explores the fundamental issues that revolve around technology-intensive ventures. Analysis and evaluation of a business plan for technology business ventures including demand forecasting, financial modeling, licensing of technology and intellectual property, and other issues for current business conditions. Through a collection of case studies, lectures, workshops, and projects that cover high-growth ventures in information technology, electronics, life sciences, biotechnology, and other industries, this course provides the necessary tools to identify business opportunities, start a technology enterprise, gather talent and capital resources, and manage rapid growth.
Prerequisites: 33:382:302. Junior or senior status.

33:382:486 ***Music Industry (3)***
A survey of the music business with emphasis on distribution of recorded music, music publishing, performance rights societies, record companies, agents, personal managers, and contracts.
Prerequisite: Junior or senior status.

33:382:496 ***Entrepreneurship Practicum (3)***
Designed to allow students to gain experience working with and solving problems for a real external company. Students are placed in small teams of three-to-five students and assigned to a local company, which applies for and is vetted by the Small Business Development Corporation in conjunction with Rutgers Business School. The students, coached by their instructor, meet with the firm and agree on a problem for them to work on during the semester. Students learn to assume the role of a consulting organization, author and execute a statement of work, and focus on one aspect of the firm's business. Each situation is different and the team is coached closely by Rutgers faculty. Rutgers will assist teams if required by giving them access to external experts or other faculty members if required for specific expertise. This course serves as the culmination of their entrepreneurial courses and allows students to be fully immersed in developing entrepreneurial skills and learning from successful entrepreneurs.
Prerequisites: 33:382:302. Junior or senior status.

Finance 390 Courses (RBS-NB)

FINANCE 390

For required courses for the finance major, see the Programs of Study chapter. Additional information about the undergraduate program can be found here.

33:390:203 ***Introduction to Finance (3)***
Introduction to concepts of value, valuation of financial instruments, capital budgeting, risk and return, and security analysis.
33:010:272 or 29:010:203 or 52:010:101. Open to 135 minor.

33:390:205 ***Special Topic: Overview of Finance for Wall Street (3)***
This is the introductory course for the Road to Wall Street program. The course and the program are designated for high-potential students. The course is offered in the fall, and interested students should apply during the spring semester of their freshman year. Applicants will be selected based on their GPA, application essays, and interviews. The purpose of this New Brunswick-based overview course is to provide students with an elementary understanding of basic topics relevant to finance, financial modeling, financial markets, and financial instruments in order to prepare them for sophomore/junior year interviews. This course does not provide finance elective credit.
Sophomores only.

33:390:300 ***Financial Management (3)***
Valuation of assets based on the timing and risk (including portfolio-based risk) of their cash flows. Applications include the valuations of financial assets (bonds and shares of stock) and capital budgeting. The use of arbitrage to value assets such as options.
33:010:272 & 01:220:103 & 01:960:285 or 33:010:272 & 01:220:103 & 01:960:211. Not open to first-year students.

33:390:310 ***Financial Management for Finance Majors (3)***
Valuation of assets based on the timing and risk (including portfolio-based risk) of their cash flows. Applications include the valuations of financial assets (bonds and shares of stock), the cost of capital, and capital budgeting. The use of arbitrage to value assets such as options.

This course will not be offered after the spring 2024 semester.
Prerequisites: 33:010:272 and 01:640:135 and 01:960:285. Junior or senior status.

33:390:320 ***Global Capital Markets (3)***
A study of the structure of securities, the financial markets in which they are traded, and the trading rules used by these markets. The assets include stocks, bonds, derivatives, and securitized assets issued by domestic and international issuers from the public and private sectors. The markets include both domestic and international exchanges.
Prerequisites: 33:390:300 or 33:390:310 or 29:390:329. Open to Finance majors only. Junior or senior status.

33:390:331 ***Special Topics: Ethics in Finance (3)***
Focuses on the ethical issues confronting financial professionals, including considerable coverage of the many corporate and investment firm challenges and violations, the role of the financial regulators, and the very latest developments threatening the financial world (markets, institutions, and participants). Instruction includes an overview and discussion of what is legal and what is illegal, what is ethical and what is unethical, and why it is so important in the business of finance.
Prerequisites: 33:390:300 or 33:390:310 or 29:390:329. Open to Finance majors. Junior or senior status.

33:390:375 ***International Financial Management (3)***
A study of the markets and the regimes for the exchange and interest rates for the world's leading economies and currencies. Examines the related institutions (e.g., central banks), agreements and policies, and the use of markets to share and allocate risk.
Prerequisites: 33:390:300 or 33:390:310 or 29:390:329. Open to Finance majors. Junior or senior status.

33:390:380 ***Investment Analysis (3)***
Overview of financial markets and instruments that are used in investments. A brief discussion of the allocation of capital to risky assets. Efficient markets hypothesis, the behavioral finance critique, and technical analysis. The term

structure of interest rates and the valuation of fixed income securities, including the use of duration and convexity. Valuation of common stock.
Prerequisites: 33:390:300 or 33:390:310 or 29:390:329. Open to Finance majors and 390 CERT. All except first-year students.

33:390:385 ***Investment Banking Analysis (3)***
A valuation-oriented course that provides many of the skills and knowledge required by first-year investment banking analysts. Includes Excel-based valuation models, financial statement and discounted cash flow analyses, and comparable valuation methodologies. Also included are modeling leverage buyouts and mergers and acquisitions.
Prerequisites: 33:390:400 or 29:390:330. Finance majors only. Junior or senior status.

33:390:400 ***Corporate Finance (3)***
Capital budgeting, capital structure, dividend policy, mergers and acquisitions, and some aspects of international finance.
Prerequisites: 33:390:300 or 33:390:310 or 29:390:329. Finance majors and 390 CERT. All except first-year students.

33:390:410 ***Asset Pricing and Portfolio Analysis (3)***
Focuses on modern theories of portfolio choice and portfolio management. In-depth coverage of mean variance portfolio selection, efficient frontier, Markowitz portfolio selection model, and single- and multifactor index models. Examines capital asset pricing models and the efficient market hypothesis, portfolio performance evaluation, active portfolio management, and international diversification.
Prerequisites: 33:390:380 or 29:390:315. Finance majors only. Junior or senior status.

33:390:415 ***Indexing & ETFS (3)***
An advanced, modern finance course with the objective of studying portfolio construction and investment management by way of understanding and using indexes and Exchange Traded Funds (ETFs). The course is designed to be comprehensive in covering the economic space available to investors, the many investment objectives/ strategies represented by indexes and ETFs, and the key determinants for building and trading these portfolios. The contemporary and practical class content is enhanced by exposure to useful industry resources and participants. There is a class project that involves working on teams to practice the application of tools and material learned in class.
33:390:380 and 33:136:385 or 29:390:315 & 136:385. Open to Finance majors. Junior and senior status.

33:390:420 ***Derivatives (3)***
Analysis of different kinds of futures and options. Use of commodity, interest rate stock index, and currency futures for hedgers and speculators. Stock options, investment strategies, arbitrage restriction on value and evaluation models, and the use of options and futures contracts in portfolio management.
Prerequisites: 33:390:380 or 29:390:315. Open to Finance majors and 390 CERT. Junior or senior status.

33:390:430 ***Treasury Management (3)***
Introduction to liquidity and cash management, including the examination of inventory, cash, accounts receivable, and other treasury-related, short-term, financial management issues.
Prerequisites: 33:390:300 or 33:390:310 or 29:390:329. Open to Finance majors only. Junior or senior status.

33:390:435 ***Real Estate Finance and Mortgage-Backed Securities (3)***
Examination of primary markets, secondary markets, and derivative products. Topics include origination process, income-producing mortgage loans, agency purchases, security pricing, and securitization of single-family and commercial loans.
Prerequisites: 33:390:300 or 33:390:310 or 29:390:329. Open to Finance majors only. Junior or senior status.

33:390:440 ***Advanced Corporate Finance (3)***
Complex corporate securities, such as callable and convertible debt or adjustable rate preferred stock, option theory, corporate insurance, and hedging.
Prerequisites: 33:390:400 or 29:390:330. Finance majors only. Junior or senior status.

33:390:445 ***Special Topics: Digital Assets (3)***
This is an introductory course in financial technology and its application to digital assets. It is designed for a non-technical audience interested in understanding how the existing financial system works and how digital assets have the potential for disruptive change. These changes are already impacting payments systems and exchanges, increasing, speed, access and lowering costs. The impact of digital assets goes beyond finance. They are opening the door to new business models in advertising, intellectual property, supply chain, social media, communications and more.
Prerequisites: 33:390:300. Open to finance majors. Junior or senior status.

33:390:450 ***Financial Analysis, Planning, and Forecasting (3)***
Overview of short-term and long-term financial analysis, planning, and forecasting; credit, cash, marketable securities, and inventory management. Applications of regression, linear programming, and computer techniques in alternative financial planning and forecasting analyses.
Prerequisites: 33:390:300 or 33:390:310 or 29:390:329. Open to Finance majors only. Junior or senior status.

33:390:460 ***Corporate Risk Management (3)***
Examination of issues faced by the risk manager. Provides a survey of techniques used to measure, estimate, and mitigate a variety of risk exposures, by insurance, hedging, and diversification. Covered risk exposures include interest rate risk, credit risk, market risk, liquidity risk, foreign exchange risk, off balance sheet risk, and operational risk.
Prerequisites: 33:390:420 or 29:390:386. Finance majors only. Junior or senior status.

33:390:465 ***Pension Fund Investment and Management (3)***
Application of financial theory and methods to pension fund investment and management.
Prerequisites: 33:390:300 or 33:390:310. Finance majors only. Junior or senior status.

33:390:480 ***Research in Finance (BA)***
Individual research and reading program under the guidance of a member of the department.
33:390:300 or 33:390:310. Open to Finance majors. Junior and senior status.

33:390:481 ***Research in Finance (BA)***
Individual research and reading program under the guidance of a member of the department.
Prerequisites: Permission of department. Open only to finance juniors or seniors.

33:390:490 ***Fixed Income (3)***
The study of bond valuation and various measures of bond risk, securitization, and measures of portfolio risk and how spread risk and convexity affect the value of a bond portfolio when interest rates change.
Prerequisites: 33:390:380 or 29:390:315. Finance majors only. Junior or senior status.

33:390:491 ***Special Topics: Credit Analysis (3)***
This course is designed to expand student knowledge of fixed-income markets with an in-depth discussion of credit investing. The focus of the class will build on entry-level understanding of interest rates, credit investing, and securitization to more precise real-world investing analysis and techniques. Topics will include understanding the fundamental drivers of credit markets, corporate bond risk, and the understanding of the segments of a corporate capital structure.
Prerequisites: 33:390:380 or 29:390:315. Open to Finance majors. Junior and senior status.

33:390:492 ***Special Topics in Finance (3)***
Special topics course in an area of finance.

33:390:493 ***Special Topics in Finance (3)***
This course and 390:494 make a limited enrollment, yearlong sequence that satisfies the Capstone Project requirements of the Honors College and the SAS Honors Program. Students who are accepted into the seminar are expected to take both semesters of the seminar. Admission is based on an application process and acceptance by the course professors. Three of the 6 credits qualify as a finance elective. The format for both semesters will be conversational, rather than a traditional lecture. Students will be required to present their analyses of topics and answer challenging questions from their classmates. Students taking 390:493 will study the nature of U.S. and global financial cycles and crises. The cycles selected for study will begin hundreds of years ago and end with the Great Recession of 2008-2009. The course will focus on the influence of factors such as excess borrowing, asset bubbles, herd mentality, contagion, and globalization on financial asset returns. Students will also read and discuss some of the classic books about investing. During this first semester, students will write a scholarly research paper on a topic related to the coursework.
Senior status only. Permission of dean.

33:390:494 ***Special Topics in Finance Honors Seminar (3)***
During the second semester, small teams will concentrate on portfolio management of a model portfolio. The portfolio will consist of a multi-asset and be USD based. All portfolios will be managed on the Bloomberg Terminal and students will be required to keep a trade log and trade notes. Students will analyze discrepancies between the returns that were expected at the time that the portfolio was selected and the realized returns. There will be a combined emphasis on both risk management as well as the total returns of the model portfolios. Class time will simulate a mock investment committee where students will discuss news events and their effects on markets, recent trades, and portfolio performance. The second semester will also have a number of specific lectures that reinforce certain portfolio and risk management techniques. Only three of the credits for 33:390:493 and 33:390:494 qualify as a finance elective credits.
Prerequisites: 33:390:393. Senior status.

33:390:495,496 ***Honors Project in Finance (3,3)***
Individual research and preparation of a written thesis under direction of a finance faculty member.
Prerequisites: Honors only. Permission of dean.

Business Ethics 522 Courses (RBS-NB)

BUSINESS ETHICS 522

33:522:334 ***Business Ethics (3)***
Provides a multidisciplinary, interactive study of business ethics and social responsibility in business organizations. Includes coverage of foundational concepts such as virtue theory, rights, justice, utilitarianism, stakeholder management, and social contract theory.
Prerequisites: 01:220:102 & 01:220:103 & 33:010:272 OR 21:220:101 & 21:220:102 & 29:010:203. Open to Rutgers Business School majors; all except first-year students.

Management and Global Business 620 Courses (RBS-NB)

MANAGEMENT AND GLOBAL BUSINESS 620

For required courses for the management (620) and leadership and management (605) majors, see the Programs of Study chapter. Additional information about the undergraduate program can be found here.

33:620:301 ***Introduction to Management (3)***
Focuses on major managerial functions including developing and implementing strategies, designing the organization so diverse employees work collaboratively, enabling ongoing product/business innovation, building an ethical workplace, and engaging with the global competitive environment.
Rutgers Business School students and business administration minors only.

33:620:302 ***Management Skills (3)***
Focuses on the manager's role in working with and leading others including understanding how people differ; developing proficiencies for working with others through decision making and communication; enhancing emotional intelligence, motivation, and commitment; and building and leading teams.
Rutgers Business School students only.

33:620:320 ***Cross-Cultural Management (3)***
Addresses the challenges and opportunities that people experience in international, multicultural environments. Develops understanding and behavioral skills relevant to the interaction of different cultures in business and organizational settings. Utilizes a variety of methods such as experiential learning, case studies, and hands-on activities to develop cross-cultural sensitivity and competence.
Prerequisites: 33:620:301 or 29:620:301. Rutgers Business School majors. All except first-year students.

33:620:330 ***Women Leading in Business (3)***
Provides a foundation to develop leadership skills and career goals as leaders in business organizations. Introduces the core concepts of leadership and career development with special emphasis on the ways that gender affects leadership capabilities and effectiveness.
Prerequisites: 33:620:301 or 29:620:301. Not open to first-year students.

33:620:340 ***Networking and Influence in Business (3)***
Examines the theory and practice of professional and social networking and of building relationships in a job and career; explores the role of power, influence, and legitimacy in organizations.
Prerequisites: 33:620:301 or 29:620:301. Junior or senior status. 620 and 605 majors only.

33:620:350 ***Negotiations (3)***
Examines the major concepts, theories, and processes of negotiation, influence, and persuasion; analyzes the dynamics of communication and conflict and its resolution; emphasizes the building and practicing of negotiation skills using role-playing exercises covering a variety of personal (such as job and buyer/seller negotiations) and professional (such as supply chain, acquisitions, coalitions, and disputes) settings.
Prerequisites: 33:620:301 or 33:620:300 or 29:620:301. Open to majors 605, 799, CERT 620, CERT 625, CERT 631, and CERT 634. All except first-year students.

33:620:362 ***Effective Leadership Communication (3)***
This course is designed to provide students with practical and theoretical knowledge of leadership communication in an era of complexity, fast pacing and heightened scrutiny. Students will learn the leading-edge leadership communication competencies, techniques and skills that are needed by 21st Century leaders. In today's dynamic environment, leaders need to be able to communicate effectively in all three main modalities: one to one, one to many and the various forms. This course will explore the connections between communication and leadership to help students develop their own leadership communication abilities and understand the role of leadership communication inside and outside of organizations.
33:620:302 or 29:620:302. Open to Rutgers Business School and CERT 625.

33:620:365 ***Management of Human Resources (3)***
Explores traditional issues (e.g., staffing, training, job evaluation, compensation, and benefits administration) and contemporary concerns (e.g., organizational change, employee ownership, and cross-cultural and international considerations) related to the management of human resources; emphasizes government legislation affecting human resource functions and the linkage between human resource management and firm strategy.
Prerequisites: 33:620:301 or 29:620:301. Junior or senior status. 620 and 605 majors only. Credit not given for both 33:620:365 and 37:533:301.

33:620:369 ***International Business (3)***
The distinctive circumstances of management arising from the conduct of business in more than one country. Topics include international monetary systems, trade framework, European economic community and regional groups, home and host country policies in international investments, and international agencies. Relevant for the conduct of international business and the management of international corporations.
Prerequisites: 33:620:301 or 33:620:300 or 29:620:301. Open to majors 605, 620, CERT 620, and CERT 631. Junior or senior status.

33:620:370 ***Managing Diversity in Organizations (3)***
Explores the demographic diversity of the U.S. labor force and the challenge it presents to organization managers; treats diversity from the perspective of cultures and subcultures.
Prerequisites: 33:620:301 or 29:620:301. Junior or senior status. 620 and 605 majors only.

33:620:375 ***Organizational Design and Change (3)***
Describes major perspectives on organizational structures, processes, and culture; examines models of organizational change; introduces methodologies that facilitate creativity and change at the individual, group, and organizational levels.
Prerequisites: 33:620:301 or 29:620:301. Junior or senior status. 620 and 605 majors only.

33:620:402 ***Global Management & Strategy (3)***
Explores the formulation and implementation of global strategy in multinational corporations. Examines concepts and frameworks related to the globalization of industries, firm motivations for foreign expansion, foreign market selection, entry mode strategies, organizational design choices, and innovation management in multinational firms.
33:620:301 or 33:620:300 or 29:620:301. Open to Rutgers Business School.

33:620:410 ***Executive Leadership (3)***
Analyzes leaders, the leadership role, and the leadership process in organizational settings; examines leadership activities and classical and contemporary theories; investigates interactions among leadership styles, employee predispositions, group makeup, and organizational culture.
Prerequisites: 33:620:302 or 29:620:302. Open to major 606, CERT 620 and CERT 625. Junior or senior status.

33:620:425 ***Management Consulting (3)***
Provides the best practice skills that internal and external consultants need to introduce change in organizations. Covers problem assessment, data collection and analysis, and implementation.
Open to Rutgers Business School juniors and seniors.

33:620:430 ***Team Building and Group Process (3)***
Examines the skills needed to successfully manage teams in organizations. Utilizes exercises, role-plays, case analyses, and discussions to establish skills. Skills examined and practiced include team building, conflict management, decision making, and strategic thinking.
Prerequisites: 33:620:301 or 29:620:301. Junior or senior status. 620 and 605 majors only.

33:620:475 ***Special Topics: International Entrepreneurship (3)***
International Entrepreneurship (IE) course explores the creation and management of international/global ventures. This course introduces students to a framework for understanding the entrepreneurial process in global contexts. It aims to (1) encourage students to explore entrepreneurial activities outside of their domestic setting, (2) prepare students to better understand and more accurately identify global opportunities, and (3) equip students with skills needed to manage their ventures in the face of ever-evolving global challenges.
Prerequisites: 33:620:301 or 29:620:301.

33:620:479 ***Global Experience (3)***
A global experience course designed for students to learn about the business, economic, and cultural environments of a given foreign country through hands-on learning. Through reading and writing assignments, visiting local and multinational companies, touring cultural sites, and interacting with locals, students expand their global perspectives, build international networks, and enhance their business, management, and cultural knowledge and skills.
Open to Rutgers Business School. By special permission.

33:620:486 ***Organization and Management of the Music Industry (3)***
This course provides an overview of the music business and its connection to all segments of the culture industries. Students will learn to dissect and analyze the commercial characteristics of the industry and will examine activities at multiple levels of analysis: individuals and groups, company, and industry. Some of the questions we will seek to explore are: How can one define the music industry? Who are the major industry actors? What are the major technological and social trends shaping the industry? In addition, we will explore issues related to the companies and organizations in the industry, as well as the individual business person and/or artist. Throughout our discussions, our analyses will be guided by basic concepts of strategic management.
Open to Management majors and 085 minors.

33:620:492 ***Business Policy and Strategy (3)***
Explores strategic decision making at the business and corporate levels, which determines the competitive advantage of a firm and its short- and long-term performance. Topics include situation analysis, core competence, competitive strategy, mergers/acquisitions, strategic alliances, and corporate restructuring.
Prerequisites: 33:390:300/33:390:310, 33:620:301, 33:630:301. Senior status. Rutgers Business School majors only.

33:620:495,496 ***Honors Project in Management (3,3)***
Individual research and preparation of a written thesis under direction of a management faculty member.
Prerequisites: Open to management or leadership and management seniors in honors program only. Both semesters must be completed to receive credit.

33:620:498,499 ***Independent Management Projects (3,3)***
Individual research and reading program under the guidance of a departmental faculty member.
Prerequisites: 33:620:300 or 33:620:301. Open to major 620. Juniors and seniors.

Marketing 630 Courses (RBS-NB)

MARKETING 630

For required courses for the marketing major, see the Programs of Study chapter. Additional information about the undergraduate program can be found here.

33:630:301 ***Introduction to Marketing (3)***
Extensive overview of marketing: the process of creating goods and services in response to consumer wants and needs. Study of the marketing function in business firms and nonprofit organizations. Consumer behavior, marketing research, industrial marketing, pricing, channels of distribution, and promotion.
Rutgers Business School majors and minors only.

33:630:363 ***Introduction to Advertising (3)***
Advertising viewed as a promotional function in the context of marketing objectives. The history and economic significance of advertising; its social importance and relation to business organization; study of advertising functions.
Prerequisites: 33:630:301:29:630:301. Open to Marketing majors. All except first-year students.

33:630:368 ***Retail Marketing (3)***
Channels of distribution approach to the retailing function. The changing character of retail competition; relations between manufacturers and middlemen; procedures and problems of retail management. Emphasis on the smaller entrepreneur as well as the large retail organization. Case studies, field projects.
Prerequisites: 33:630:301 29:630:301. Open to major 630, major 799, CERT 631, and CERT 634. All except first-year students.

33:630:369 ***New Product Planning (3)***
Study of the functions, concepts, and decisions required in the introduction, maintenance, and deletion of products. Special attention given to the areas of new-product need, new-product development, and product planning and strategy.
Prerequisites: 33:630:301 29:630:301. Open to major 630, major 799, CERT 382, CERT 631, and CERT 634. All except first-year students.

33:630:370 ***Business-to-Business Marketing (3)***
Analysis of industrial marketing planning and activities; the management of distribution channels, costs, and policy development.
Prerequisites: 33:630:301 29:630:301. Open to major 630, major 799, CERT 631, and CERT 634. All except first-year students.

33:630:371 ***International Marketing (3)***
Analysis of economic, social, and political environments influencing international markets; comparative studies of global buying behavior, international marketing strategy, and operations.
Prerequisites: 33:630:301 or 29:630:301. Junior or senior status. Marketing majors only.

33:630:372 ***Services Marketing (3)***
Addresses the challenge of marketing services and managing the service component of product/service combinations. Issues covered include service design, quality definition, satisfaction measurement, performance guarantees, and internal and external marketing planning and execution.
Prerequisites: 33:630:301 or 29:630:301. Junior or senior status. Marketing majors only.

33:630:374 ***Consumer Behavior (3)***
Explores the roots of buyer behavior from a managerial perspective, drawing on the disciplines of psychology, sociology, and anthropology. Development of sound marketing strategy. Topics include perception, learning, communication, cognition, memory, motivation, and attitudes of consumers.
Prerequisites: 33:630:301 or 29:630:301. Open to major 630 and CERT 631. All except first-year students.

33:630:385 ***Marketing Research (3)***
Techniques of marketing research and the role of the marketing research department in a business structure. Emphasizes the use of analytical techniques in the design and conduct of marketing research. Problem formulation; collecting and organizing respondent data; and evaluation and use of research findings.
Prerequisites: 33:623:385 or 33:136:385 AND 33:630:301 or 29:630:301. Open to major 630 and major 799. All except first-year students.

33:630:401 ***Sales Management (3)***
Problems, policies, and functions of sales management as the vital link between selling and marketing. Role of the sales manager in the development of a successful sales force. Topics include territory and market analyses,

compensation, sales planning, and control.
Prerequisites: 33:630:301 or 29:630:301. Open to major 799, major 630, CERT 631 or CERT 634. All except first-year students.

33:630:428 ***Nonprofit Marketing (3)***
The Nonprofit Marketing class is a practical course focusing on marketing strategies for NGOs; it covers the nonprofit market and dynamics from macro to micro, the fundraising process, players and institutions, support processes and other applications. It requires the development of a Nonprofit Marketing Team Project, where student teams as consultants for a real-life social cause.
Prerequisites: 33:630:301 or 29:630:301 or 29:630:301. Marketing majors only. All except first-year students.

33:630:452 ***Marketing Strategy (3)***
Integrating and applying marketing concepts to the actual problems of real business and nonbusiness organizations. Strong emphasis on the case method of study. Written and oral presentations required.
Prerequisites: 33:630:385 or 29:630:385. Senior marketing majors only.

33:630:480 ***Special Topics in Marketing: Social Media and Mobile Marketing (3)***
This course focuses on current social media and mobile marketing trends and strategies. It explores social media and mobile marketing and ecosystems and how organizations incorporate these tools into their business strategies. The course will also provide best practices for students to represent their personal brand on social media.
Prerequisites: 33:630:301 or 29:630:301. Marketing majors only. All except first-year students.

33:630:481 ***Special Topics: Marketing Technology (3)***
Marketers can access hundreds of vendors offering diverse technology applications such as campaign management, marketing resource management, marketing analytics, and content marketing. This course introduces students to the opportunities and challenges of using these marketing technologies. The opportunities range from targeting the right audiences to personalizing messaging to leveraging new digital technologies to effectively managing complex multi-channel marketing campaigns. Students will learn how marketing executives decide which technologies are right for addressing their marketing problems.
Prerequisites: 33:630:301. Open to all except first-year students.

33:630:482 ***Advertising Strategy (3)***
Investigation and solution of actual advertising problems by management; examination of advertising as influenced by the marketing structure and environment.
Prerequisites: 33:630:301, 363. Junior or senior status. Marketing majors only.

33:630:485 ***Introduction to Professional Selling (3)***
The role of selling is a critical function in all industries and is responsible for driving revenue, share and profit for an organization. Salespeople also serve as an important link between an organization and its customers. Everyone is a salesperson, and Professional Selling requires a specific set of skills for an individual to be successful; whether selling a product, a service, an idea, or themselves. This course will introduce you to the components of the sales process, as well as the "soft" and "hard" skills necessary to thrive in the business world, including:

1. Finding customers and developing relationships
2. Using various strategies and tools to meet client needs
3. Solving customer problems
4. Psychology of selling

Prerequisites: 33:630:301 or 29:630:301. Open to Rutgers Business School students. All except first-year students.

33:630:486,487 ***Independent Study in Marketing (BA)***
Individual research project under the guidance of a departmental faculty member.
Prerequisites: 33:630:385 and permission of department. Open only to 630 majors.

33:630:488 ***A.I. in Marketing (3)***
This course provides a broad introduction to Artificial Intelligence (AI), Machine Learning, and new emerging technologies that influence Marketing. The course will cover basic concepts in each of the topics and applications in the specific marketing scenarios The course will also draw upon case studies and applications, so that students will learn how to apply these concepts to solve real business problems. Students will learn how to choose the right method for the most common business problems and will obtain hands on experience in solving these problems.
Prerequisites: 33:136:385 and (33:630:301 or 29:630:301).

33:630:489 ***Special Topics in Marketing: Marketing Analytics (3)***
This course will help students design, implement, and apply various techniques to support such decisions. Specifically, students will learn to use and analyze data to target key customers, measure cross-channel campaign performance, and understand customer purchase funnels.
Prerequisites: 33:630:301 or 29:630:301. Open to major 136 and major 630. All except first-year students.

33:630:490 ***Marketing Internship (3)***
Supervised involvement in a private, public, or nonprofit organization providing the student with an opportunity to apply concepts learned in a class to the work environment.
Prerequisites: 33:630:301 or 29:630:301. Open to marketing majors by permission of the department.

33:630:491 ***Marketing Co-Op (3)***
Provides the opportunity to apply concepts learned in class to the work environment.
Open to Rutgers Business School students. Juniors and seniors.

33:630:495,496 ***Honors Program Marketing (3,3)***
Independent research and preparation of a written thesis under direction of a faculty member.
Prerequisites: Open to marketing seniors in honors program only. Both semesters must be completed to receive credit.

33:630:497 ***Digital Marketing (3)***
Introduces students to the growing world of digital marketing; provides knowledge of the digital media landscape, platforms, tools, and technologies.
Prerequisites: 33:630:301 or 29:630:301. Open to Marketing majors. All except first-year students.

33:630:498 ***Special Topics in Marketing: Brand Management (3)***
This course addresses the nature of brand management in the 21st century, and the challenges and skills needed to run a branded business within the framework of a corporate environment.
Prerequisites: 33:630:301 or 29:630:301. Marketing majors only. All except first-year students.

33:630:499 ***Marketing Consulting for Small Business (3)***
Builds upon academic marketing knowledge by working on real-life marketing consulting projects requested by small businesses enrolled with the Small Business Development Center program. Students in this course must

identify and understand the key issues, formulate models, complete analyses, and apply course knowledge to solve real-world problems.
Prerequisites: 33:630:301 or 29:630:301. Open to Marketing majors. Junior or senior status.

Supply Chain Management 799 Courses (RBS-NB)

SUPPLY CHAIN MANAGEMENT 799

For required courses for the supply chain management major, see the Programs of Study chapter. Additional information about the undergraduate program can be found here.

33:799:301 ***Introduction to Supply Chain Management (3)***
A broad overview of business logistics processes and strategies. Topics include revenue management and pricing, logistics and distribution strategies, warehousing and order fulfillment, supply chain design and integration, supply chain software--MRP/ERP systems, procurement and outsourcing, and project management.
Prerequisites: Rutgers Business School majors and minors only.

33:799:305 ***Procurement and Global Sourcing Strategy (3)***
Focuses on the fundamental tools, techniques, sourcing strategies, and processes used by world-class firms. Case studies are introduced to connect the course materials to the practices.
Prerequisites: 33:799:301 or 29:799:301. Open to major 799 or CERT 620. Not open to first year students.

33:799:310 ***Demand Planning and Fulfillment (3)***
Focuses on planning strategies and tools commonly used in business practices. Topics include demand forecasting, sales and operations planning (S&OP), inventory management, material requirement planning (MRP), and revenue management and pricing strategies.
Prerequisites: 33:799:301 or 29:799:301. Open to Supply Chain Management majors. Not open to first year students.

33:799:330 ***Business Logistics and Transportation (3)***
An introduction to the fundamentals of logistics and transportation. Examines the design of channels of distribution, management of inventory, evaluation of transportation alternatives, information flow, facility location, outsourcing logistics operations through third-party relationships, and the rapidly expanding field of logistics information technology. Explores the principles of transportation with emphasis on transportation modal and intermodal operations (rail, highway, air, water, and pipeline transportation) and transportation management.
Prerequisites: 33:799:301 or 29:799:301. Open to Supply Chain Management majors. Not open to first year students.

33:799:380 ***Introduction to Project Management (3)***
Introduction to the classical foundations of project management. Explores modern real-life project problems and key concepts of initiating, planning, organizing, controlling, and running a project, with particular emphasis on projects in the area of supply chain management. Extensive use of case studies.
Prerequisites: 33:799:301 or 29:799:301. Open to Supply Chain Management majors. Not open to first year students.

33:799:410 ***Service Management (3)***
Introduction to both the operational and marketing perspectives of service management. Explores the nature of services in the real business world. Covers key concepts of designing, managing, and supporting a service enterprise. Case studies and field trips are involved.
Prerequisites: 33:799:301 or 29:799:301. Open to Supply Chain Management majors. Not open to first year students.

33:799:420 ***SCMS Industry Client Projects (3)***
Gives a thorough understanding, firsthand knowledge, and working experience of industry supply chain management projects through team projects with real-life industry client contacts. Course is supplemented with guest lectures by distinguished executives and faculty on recent best practices and new challenges in the supply chain management field**.**
Prerequisites: (33:799:305 or 33:799:330) and 33:799:380. Open to Supply Chain Management majors. Seniors only.

33:799:421 ***Co-op in Supply Chain Management (3)***
Provides the opportunity to apply concepts learned in class to the work environment.
Prerequisites: 33:799:301 or 29:799:301. Open to Supply Chain Management majors - juniors and seniors.

33:799:430 ***Security and Risk Management (3)***
Provides a broad overview of key supply chain security areas and issues in the context of homeland security. Explores the need to protect the supply chain and maintain business continuity in the wake of high-consequence, disruptive events.
Prerequisites: 33:799:305 or 33:799:330. Open to Supply Chain Management majors. All except first-year students.

33:799:440 ***Supply Chain Environmental Management and Green Purchasing (3)***
After building a comprehensive knowledge of green supply chain and purchasing techniques, this course will allow students to participate in several applied research projects. Projects will include designing green supply chain and procurement systems and products, integrated with economic, environmental, social, and ethical considerations and corporate reporting.
Prerequisites: 33:799:301 or 29:799:301. Supply chain management majors only. All except first-year students.

33:799:450 ***Fundamentals of Supply Chain Solutions with SAP (3)***
Provides a foundation for understanding the process integration of businesswide functions supported by ERP systems, examines the benefits of implementing ERP, and investigates the guidelines for ERP system implementation and application. Introduces SAP ECC 6.0 to illustrate the basic concepts, capabilities, and advantages of ERP.
Prerequisites: 33:799:301 or 29:799:301. Supply Chain or BAIT majors only. All except first-year students.

33:799:455 ***Supply Chain Transformation in the Digital Era (3)***
This course focuses on the growing impact of technology, data, and online marketplaces on supply chain management. Students will receive hands-on training in Tableau, a best-in-class data visualization platform, and be exposed to multiple other real-world analytics tools demonstrated by industry experts. The class builds on hands-on learning by incorporating an excursion to Boxed.com's state-of-the-art warehouse in Union, New Jersey, where robots are more common than humans. By utilizing engaging teaching tactics geared toward millennial learning styles, this course encourages big picture thinking on global ecommerce trends while teaching specific technical skills that are highly-valued in today's job market.
Prerequisites: 33:799:301 or 29:799:301. Supply chain management majors only. All except first-year students.

33:799:460 ***Introduction to Six Sigma and Lean Manufacturing (3)***
Provides fundamentals of six sigma, lean manufacturing, and tools and strategies to improve the performance of business processes. Case studies, team exercises, and simulations are utilized. Topics include six sigma improvement methodology and tools, lean-thinking tools and approaches, process mapping, dashboards, and other business improvement techniques. Emphasis is placed on the strategic importance of business improvement, the need for fact-based management, and how to deploy these tools in different parts of the value chain.
Prerequisites: 33:799:301 or 29:799:301. Supply chain management majors only. All except first-year students.

33:799:465 ***Special Topics: Blockchain & it's Application in Supply Chain Management (3)***
Blockchain technology in becoming increasingly more important as this technology, once associated primarily with financial transactions and cyber security, can provide value to an organization's supply chain through asset management, traceability, and information sharing.
Open to Supply Chain Management majors. Junior and senior status.

33:799:470 ***Business Intelligence for Supply Chains and Marketing (3)***
An overview of business intelligence in the field of supply chain management and marketing. Addresses how to leverage business intelligence systems to define KPIs, sharpen the accuracy of forecasting and planning, track business activities, and deliver dashboards, scorecards, strategic reporting, and operational/real-time reporting to enhance decision making for supply chain and marketing. SAP business intelligence solution is introduced to illustrate the concepts.
Prerequisites: 33:799:301 or 29:799:301. Supply chain management majors only. All except first-year students.

33:799:475 ***Supply Chain Analytics Essentials (3)***
This course introduces the emerging area of integrating data analytics with supply chain management via tools such as Excel and Python. The course will demonstrate how analytics can be applied to various domains of a supply chain to generate significant social and economic impact. By the course end, students will practice the skills learned by doing a real-life data-driven project in supply chain management.
Prerequisites: 33:799:301 or 29:700:301. Open to Supply Chain Management majors. All except first-year students.

33:799:490 ***Special Topics in Supply Chain Management: Global Logistics and Supply Chain Management (3)***
This course will introduce students to the logistical and regulatory issues that are part of overall supply chain management of global businesses. The course focuses on supply, sourcing, and distribution in an international environment, on managing global logistics, and on border processes including compliance with customs and trade conventions common around the world.
Prerequisites: 33:799:301 or 29:799:301. Junior or senior status. Supply chain management majors only.

33:799:491 ***Supply Chain Finance (3)***
Supply chain students will learn how corporate accounting, and the role of working capital, interrelate to supply chain actions and projects, as well as understand the scorecard of the CFO and how the supply chain can help achieve optimal financial health through effective strategies, investments, and product flows.
Prerequisites: 33:799:301 or 29:799:301. Supply chain management majors only. All except first-year students.

33:799:492 ***Special Topics: Pharma Strategy (3)***
The objective of this course is to provide students with the knowledge of pharmaceutical industry cost management structures, strategic sourcing processes, negotiation tactics, procurement processes and supply chain management

strategies. With shorter product lifecycles and worldwide rivalries increasing, much success depends on effective global supply management being able to deliver the right product to the right market at the right time under appropriate regulatory governance.

33:799:493 ***Internship in Supply Chain Management (3)***
Supervised involvement in a private, public, or nonprofit organization providing the student with an opportunity to apply concepts learned in a class to the work environment.
Prerequisites: 33:799:301 or 29:799:301. Open to supply chain management majors by permission of the department.

33:799:495,496 ***Honors Program SCMS (3,3)***
Independent research and preparation of a written thesis under direction of a faculty member.
Prerequisites: Open to supply chain management seniors in honors program only. Both semesters must be completed to receive credit.

33:799:498,499 ***Independent Study in SCMS (BA,BA)***
Individual research and/or reading program under the guidance of a member of the department.
Prerequisites: 33:799:301 or 29:799:301 and permission of the department. Open only to supply chain management majors with junior or senior status.

Real Estate 851 Courses (RBS-NB)

REAL ESTATE 851

33:851:350 ***Real Estate Law (3)***
This course enables students to recognize and evaluate legal principles and issues in order to guide their decision-making process with respect to real estate, whether as a business executive, an entrepreneur, or in their personal life. It is intended to introduce students to the transactional aspects of the real estate business, including acquisition, disposition, development, investment, management, leasing, tax implications, and negotiations.
Not open to first-year students.

33:851:380 ***Essentials of Real Estate Finance (3)***
This course provides the background and tools necessary to analyze value, risk, and return in commercial property markets. The initial emphasis of the course is on mortgage finance and applications; providing an overview of mortgage structure and mechanics in both residential and commercial markets. The focus then shifts to the evaluation of investment opportunities in property markets from the perspective of an institutional investor. Students will use lease and market information to develop pro forma cash flow projections for a given property and evaluate the associated risks and returns. Extensions include tax issues; the relationship between value, returns, and leverage; partnership agreements; and/or real options. The course also provides extensive training and certification in ARGUS, a real estate industry-standard software package used for entering and compiling lease information.
Prerequisite: 33:390:300 or 33:390:203 or 29:390:329. Not open to first-year students.

33:851:432 ***Real Estate Development (3)***
This course provides an introduction and overview of real estate development of urban places, including the many challenges of the development process such as analyzing market sectors and development opportunities, comprehending the development context of regulation, public policy and politics, raising investment capital,

assembling land, program formulation, building types, construction management, marketing, and sales. Examples of development projects will be presented, each focusing on particular aspects of the overall process.
Prerequisites: 33:851:350 and 33:390:435 or 33:851:380 or 29:851:350 & 29:390:480.

33:851:470 ***Commercial Debt Markets (3)***
Commercial Debt Markets provides an in-depth overview of both public and private sources of commercial debt financing for investment in real assets. The course includes an overview of the U.S. mortgage finance system, agency and nonagency residential mortgage-backed securities, structured mortgage products such as collateralized mortgage obligations, collateralized debt obligations stripped securities, commercial mortgage-backed securities, and limited partnerships. Coursework involves basic fixed-income mathematics and cash flow modeling in Excel.
Prerequisite: 33:390:435 or 33:851:380 or 29:390:480.

Administration and Faculty (RBS-NB)

ADMINISTRATION AND FACULTY

Administration

Faculty

Administration (RBS-NB)

ADMINISTRATION

Business School Leadership

Lei Lei, Dean of Rutgers Business School

Petra Christmann, Vice Dean for Faculty Affairs and Research

Yaw Mensah, Interim Vice Dean for Innovation and Strategic Partnerships

Shen Yeniyurt, Vice Dean for Academic Programs and Learning Assurance

Melissa Rivera, Senior Associate Dean for Finance and Administration

Deans & Directors of the Undergraduate Programs-New Brunswick

Robert Kurland, Senior Associate Dean

Alexandra Charles, Assistant Dean for Special Populations Advising

Felicia Norott, Assistant Dean & Director for Junior and Senior Advising

Kerstin Schnatter, Assistant Dean & Director for First-Year and Sophomore Advising

Office of Undergraduate Programs-New Brunswick

Melba Blanco, Assistant Dean

Alfred Blake, Student Counselor

Gavin Cummings, Senior Program Coordinator

Rose Distefano, Academic Advisor

Maureen Duchatellier, Administrative Assistant

Stephanie Elliott, Academic Advisor

Leidy Garcia-Cosbert, Assistant Dean

Nadia Khokhar, Assistant Dean

Tara Maluszczak, Administrative Assistant

Nicole Martinez, Assistant Dean

John Muth, Assistant Dean

Edna Rodriguez, Program Coordinator

Alexis White, Assistant Dean

Christine Yannuzzi, Enrollment Manager

Faculty (RBS-NB)

FACULTY

The Rutgers Business School-Newark and New Brunswick is organized into the following six departments:

Accounting and Information Systems

Finance and Economics

Management and Global Business

Management Science and Information Systems

Marketing

Supply Chain Management

These departments offer undergraduate major programs in accounting, business analytics and information technology, finance, leadership and management, marketing, and supply chain management.

Department of Accounting and Information Systems

Department of Accounting and Information Systems

Chair: Jay Soled

Professors:

Suresh Govindaraj, B.Tech., Institute of Technology (B.H.U., India); M.B.A., Delhi; M.A., Pennsylvania; Ph.D., Columbia

Alexander Kogan, M.S., Moscow; Ph.D., USSR Academy of Science

Yaw Mensah, B.S., Ghana; M.B.A., Ph.D., Columbia

Dan Palmon, B.S., M.B.A., Hebrew; Ph.D., New York

Bharat Sarath, Ph.D., Stanford; Ph.D., Calgary (Canada)

Glenn Shafer, A.B., Ph.D., Princeton

Jay Soled, B.A., Haverford College; J.D., Michigan; LL.M., New York

Miklos Vasarhelyi, B.S., Guanabara (Brazil); B.S., Rio de Janeiro; M.S., Massachusetts Institute of Technology; Ph.D., Southern California

Associate Professors:

Michael G. Alles, B.Econ., Australian National; Ph.D., Stanford

Divya Anantharaman, B.Sc., Oxford Brooks; Ph.D., Columbia

Helen Brown-Liburd, B.B.A., CUNY (Baruch); Ph.D., Wisconsin (Madison)

Valentin Dimitrov, B.S.M., Ph.D., Tulane

Alexander J. Sannella, B.B.A., M.B.A., Iona; M.Phil., Ph.D., New York

Michael Schoderbek, B.B.A., Iowa; M.S., Pennsylvania State; Ph.D., Indiana

Hilal Atasoy, Ph.D., Illinois

Feng Gao, B.A., Renmin (China); M.A., Tsinghua; M.S., Ph.D., Iowa; Ph.D., Rochester - Associate and Department Vice Chair

Hussein Issa, Ph.D., Rutgers

Kevin Moffitt, Ph.D., Arizona

Won Gyun No, B.A., M.S., Choonamm (South Korea); M.A.C.C.Y., Wisconsin; Ph.D., Waterloo (Ontario)

Li Zhang, B.A., M.A., Nanjing (China); Ph.D., London Business School and Department Vice Chair

Assistant Professors:

Michael Carniol, B.A., Northwestern; M.B.A., New York (Stern); Ph.D., Pennsylvania (Wharton)

Soohyun Cho, Ph.D., Florida

Disen Huang, Ph.D., New York (Stern)

Kyungha Lee, Ph.D., Northwestern

Ryan McDonough, Ph.D., Michigan

Chanta Thomas, Ph.D., Southern Illinois

Claire Yan, Ph.D., Houston

Assistant Professors of Professional Practice:

Irfan Bora, B.A., M.B.A., Rutgers

Michael Cohen, B.S., Rutgers

Abraham Miller, M.S., Columbia

Sarah O'Rourke, M.S. in Professional Accounting, Seton Hall

Savita Sahay, Ph.D., California

Gita Sharma, LL.M., NYU School of Law; J.D., Albany Law School of Union

C. Daniel Stubbs Jr., B.B.A., M.B.A., Pace

Instructors of Professional Practice:

Marshall E. Saunders, M.B.A., Pace

Evan Wasserman, M.B.A., Rutgers

Instructors:

Ann Medinets, B.A., Boston; B.Arch., NJIT; M.B.A., Ph.D., Rutgers

Faculty (RBS-NB)

Department of Finance and Economics

Department of Finance and Economics

Chair: Darius Palia

Vice Chairs: Ben Sopranzetti and Victor Glass

Distinguished Professor: Cheng-Few Lee, B.A., M.A., National Taiwan; M.S., West Virginia; Ph.D., SUNY (Buffalo)

Professors:

Ivan E. Brick, B.A., Yeshiva; Ph.D., Columbia

Morris A. Davis, B.A., Ph.D., Pennsylvania

Serdar Dinc, B.S., Bilkent (Turkey); Ph.D., Stanford

Mahmud Hassan, M.A., Boston; M.B.A., Indiana; Ph.D., Vanderbilt

Simi Kedia, B.A., Lady Shri Ram (India); Ph.D., New York

Farrokh Langdana, B.Tech., Indian Institute of Technology; M.B.A., M.A., Ph.D., Virginia Polytechnic Institute

Darius Palia, M.M.S., Bombay; Ph.D., New York

Tavy Ronen, B.A., Wesleyan; M.Phil., Ph.D., New York

Ben Sopranzetti, B.S.E.E., Rutgers; M.S.E., Drexel; Ph.D., Illinois (Urbana-Champaign)

Menahem Spiegel, B.A., Jerusalem; M.A., Ph.D., Chicago

Daniel Weaver, B.A., Seton Hall; Ph.D., Rutgers

Yangru Wu, M.A., Delaware; Ph.D., Ohio State

Associate Professors:

Azi Ben-Rephael, B.A., Hebrew (Jerusalem); Ph.D., Tel Aviv

Priyank Gandhi, M.F.E., California (Berkeley); Ph.D., California (Los Angeles)

Jin-Mo Kim, B.A., M.S., Korea; Ph.D., Michigan State

Zhengzi Li, B.S., Nankai (China); Ph.D., Duke

Rose Liao, B.S., Shandong Institute of Economics (China); Ph.D., Ohio State

Zhaodong Zhang, B.A., Fudan (China); M.A., Vanderbilt; Ph.D., Pennsylvania State

Assistant Professors:

Hosein Maleki, B.S., M.A., McGill; Ph.D., Concorida, McGill, HEC, UQAM

Professors of Professional Practice:

Victor Glass, M.B.A., Ph.D., Columbia

John Longo, M.B.A., Ph.D., Rutgers

Associate Professors of Professional Practice:

Arthur Guarino, B.A., M.B.A., Seton Hall; M.S., Syracuse; J.D., Rutgers

Mark Gunther, B.S.E., M.B.A., Michigan

David Frame, B.Sc., Minnesota; Ph.D., Carnegie Mellon

Fred Hoffman, B.A., Rutgers; M.A., Fairleigh Dickinson

Parul Jain, B.A., M.A., Delhi; Ph.D., Washington

Lisa Kaplowitz, B.A., Brown; M.B.A., Northwestern (Kellogg)

Mariya Naumova, M.S., Perm State (Russia); Ph.D., Rutgers

Ron Richter, B.S., Rutgers; M.B.A., New York

Assistant Professors of Professional Practice:

Ronnee Ades, B.A., SUNY; M.B.A., Temple

Kwame Adu-Gyamfi, B.B.A., Adelphi; M.B.A., Cornell; D.B.A., Rutgers

Ahmed Albrolisy, B.S., Mansoura; M.B.A., D.B.A., Rutgers

Lauren De Marco, B.S., St. John's; M.S., Stevens Institute of Technology

Mitchell Fillet, B.A., Boston; M.B.A., New York

Kenneth Freeman, B.S.., Rutgers; M.A.., Boston

Harvey Poniachek, Ph.D., SUNY (Albany)

Burton Scheaffer, B.A., Dickinson; M.B.A., Cornell

Joseph Shatz, B.A., Cornell; MIMFA, Creighton

Faculty (RBS-NB)

Department of Management and Global Business

Department of Management and Global Business

Chair: Ajai Gaur

Professors:

Ted Baker, M.B.A., Chicago; M.A., Ph.D., North Carolina

Michael Barnett, M.B.A., Webster; Ph.D., New York

John Cantwell, M.Sc., University of London; Ph.D., Reading

Chao C. Chen, M.A., Ph.D., SUNY (Buffalo)

Petra Christmann, M.B.A., Kiel Institute for World Economy (Germany); Ph.D., California (Los Angeles)

Joanne B. Ciulla, M.A., Delaware; Ph.D., Temple

Farok Contractor, M.S., Michigan; M.B.A, Ph.D., Pennsylvania

Nancy DiTomaso, M.S., Ph.D., Wisconsin

Ajai Gaur, Ph.D. (Strategy), National (Singapore)

Mitchell Koza, Ed.M., Harvard; Ph.D., Chicago

Terri Kurtzberg, M.A., Chicago; M.S., Ph.D., Northwestern

Daniel Z. Levin, M.S., Ph.D., Northwestern

Jeffrey A. Robinson, M.S., Georgia Institute of Technology; M.Phil., Ph.D., Columbia

Danielle Warren, M.A., Ph.D., Pennsylvania

Associate Professors:

Michelle Gittelman, M.B.A./M.I.A., Columbia; Ph.D., Pennsylvania

Douglas Miller, M.A., Arizona; Ph.D., Ohio State

Aviad Peer, M.S., Technion Israel Institute of Technology; Ph.D., British Columbia

Oliver Sheldon, M.S., Ph.D., Cornell

Phyllis Siegel, B.A., B.S., Pennsylvania; M.Phil., Ph.D., Columbia

Markus Taussig, M.A., John Hopkins; Ph.D., Harvard

Danni Wang, M.S., Guanghua School of Management (China); Ph.D., Arizona State

Assistant Professors:

Anastasia Bailey, M.B.A., Florida A&M; Ph.D., Ohio State

Tony He, M.B.A., Harvard Business; Ph.D., Pennsylvania Wharton

Jerry W. Kim, A.M., Ph.D., Harvard

Junchao (Jason) Li, M.S.B.A., Ph.D., Washington

Tobey Scharding, M.A., Johns Hopkins; Ph.D., Stanford

Alexander Van Zant, M.S., Ph.D., (Berkeley)

Jaume Villanueva, M.B.A., Wisconsin; Ph.D., Minnesota

Associate Professor of Professional Practice:

Mason Ameri, M.A., M.S., Ph.D., Rutgers

Arturo Osorio Fernandez, M.B.A., Ph.D., Massachusetts

Denis Hamilton, M.B.A., Pennsylvania; Ph.D., Rutgers

Charlie Stevens, Ph.D., Ohio State

Jeana Wirtenberg, M.A., Ph.D., California (Los Angeles)

Assistant Professors of Professional Practice:

Douglas Brownstone, B.S., Cornell; M.B.A., Syracuse

Ramdas Chandra, M.B.A., University of Delhi; Ph.D., NYU, New York

Joydeep Chatterjee, M.B.A., George Washington; M.A., Ph.D., Pennsylvania

Smita Chopra, M.B.A., Ctr for Mgmt Dev, India; B.Sc., India

Jerome (Jerry) Flynn, M.B.A., Cleveland; Ph.D., Virginia Polytechnic

Mary Giordano, B.A., Rutgers; M.B.A., Rutgers Business School

Sharon Hellman, B.S., Rutgers; M.S., Stevens Institute of Technology

Ed Hubbard, A.B., Brown; M.B.A., Pennsylvania

Robert C. Hughes, M.A., Ph.D., California (Los Angeles)

Danielle Jenkins, B.S., Penn State, Mb.A., Pepperdine

Anthony Lucas, M.A., Montclair; Ed.D., Rutgers

Gary Minkoff, B.A., Rutgers; M.B.A., Babson

Jonathan Ng, M.B.A., Nanyang Technological; Ph.D. Capella

Zeki Pagda, M.B.A.; Ph.D., San Diego

Mukesh Patel, B.A., Rutgers; J.D., Fordham

Lyneir Richardson, B.S., Bradley; J.D., Chicago

Pallavi Shukla, B.S., Birla Institute of Technology (India); Ph.D., Rutgers

Jeremy Vogelmann, S.B., Massachusetts Institute of Technology; M.B.A., New York

Department of Management Science and Information Systems

Department of Management Science and Information Systems

Chair : Michael Katehakis

Vice Chairs: Endre Boros & Sergei Schreider

Board of Governors Professors:

Andrzej Ruszczynski

Distinguished Professors:

Endre Boros, Ph.D., Eotvos Lorand (Budapest, Hungary)

Jonathan Eckstein, Ph.D., Massachusetts Institute of Technology

Michael Katehakis, M.S., South Florida; M.S., Ph.D., Columbia

Andrzej Ruszczynski, Ph.D., Warsaw (Technology)

Jaideep Vaidya, Ph.D., Purdue

Hui Xiong, Ph.D., Minnesota

PROFESSOR EMERITUS-FTTRP

Douglas Jones, M.S., Ph.D., Florida State

Professors:

Farid Alizadeh, Ph.D., Minnesota

Vijay I. Atluri, Ph.D., George Mason

Ted Szatrowski, M.S., Ph.D., Stanford

Associate Professors:

Mert Gurbuzbalaban Ph.D., New York

Thomas Lidbetter, Ph.D., London School of Economics

Xiaodong Lin, Ph.D., Purdue

Spiros Papadimitriou, Ph.D., Carnegie Mellon

Periklis Papakonstantinou, Ph.D., Toronto

Jian Yang, Ph.D., Texas (Austin)

Assistant Professors:

Shahrzad Haddadan, Ph.D., Dartmouth

Arunesh Sinha, Ph.D., Carnegie Mellon

Jalaj Upadhyay, Ph.D., University of Waterloo, Canada

Associate Professors of Professional Practice:

Berhanu Alemayehu, DrPH, University of Michigan

Kemal Gursoy, Ph.D., Rutgers

Nuria Diaz-Tena, Ph.D., Pennsylvania (Wharton)

Joann Ordille, Ph.D, Wisconsin (Madison)

Janos Pinter, Ph.D., Moscow State (Lomonosow-Russia)

Sergei Schreider, Ph.D., Australian National

Visiting Associate Professors:

Jin Wang, Ph.D., University of Hong Kong

Assistant Professors of Professional Practice:

Romulo Neves Ely, Ph.D., Coppe UFRJ (Rio de Janeiro)

Wajahat Gilani, Ph.D., Rutgers

Chon Lintakoon, D.B.A., Rutgers

Meng Qu, Ph.D., Rutgers

Michail Xyntarakis, MS NTU of Athens Greece, M.S. Texas (Austin)

Gabriel Zenarosa, Ph.D., Pittsburgh

Instructor of Professional Practice:

Vladimir Gurvich, Ph.D., Moscow Institute of Physics and Technology

Sheema Mirchandani, M.C.A., Pune (India)

Affiliated Faculty:

James Calvin, Ph.D., Stanford

Suresh Govindaraj, Ph.D., Columbia

Dimitris Metaxas, Ph.D., Toronto

Marvin Nakayama, Ph.D., Stanford

Vladimir Pavlovic, Ph.D., Illinois (Urbana-Champaign)

Faculty (RBS-NB)

Department of Marketing

Department of Marketing

Chair: Chan Choi

Vice Chair: Kristina Durante and Ozge Turut

Director of Marketing Education: Erich Toncre

Professors:

Chan Choi, B.A., Seoul National; M.B.A., Michigan State; Ph.D., Pennsylvania

Harsharanjeet (Sharan) Jagpal, B.A., North Bengal (India); B.Sc., London School of Economics; Ph.D., Columbia

Alokparna (Sonia) Basu Monga, B.Pharm., Birla Institute of Technology and Science (India); M.B.A., Lancaster; Ph.D., Minnesota

Ashwani Monga, B.Tech., National Dairy Research Institute (India); M.B.A., Indian Institute of Management; Ph.D., Minnesota

Jerome Williams, B.A., Pennsylvania; M.S., Union; Ph.D., Colorado

Sengun (Shen) Yeniyurt, B.S., Istanbul Technical; M.B.A., Bogazici (Turkey); Ph.D., Michigan State

Associate Professors:

Kristina Durante, B.S., Boston; M.A., Chicago; Ph.D., Texas (Austin)

Can (John) Uslay, B.S., Middle East Technical (Turkey); M.B.A., Ph.D., Georgia Institute of Technology

Assistant Professors:

Kihyun (Hannah) Kim, B.A., M.B.A., Ewha Womans (South Korea); M.S., Ph.D., Georgia State

Oscar Moreno, B.S., M.S., Ph.D., Utah

Richard Schaefer, B.A., Trinity; M.S., Ph.D., Texas (Austin)

Gabriela (Gabbie) Tonietto, B.S., Ph.D., Washington (St. Louis)

Ozge Turut, B.S., Bogazici (Turkey); M.B.A., Carnegie Mellon; D.B.A., Harvard

Assistant Professors of Professional Practice:

Madhavi Chakrabarty, B.S., M.S., Indian Institute of Technology; Ph.D., New Jersey Institute of Technology

Yla Eason, B.A., Fitchburg State; M.B.A., Harvard; Hon. Ph.D., Bloomfield

Marc Kalan, B.A., Pennsylvania; M.B.A., Columbia

Arnold Pollack, B.A., New York; M.B.A., Pennsylvania

Stacy Smollin Schwartz, B.A., Pennsylvania State; M.B.A., Harvard

Erich Toncre, B.A., Indiana; M.S., M.B.A., New Jersey Institute of Technology

Faculty (RBS-NB)

Department of Supply Chain Management

Department of Supply Chain Management

Chair: Lian Qi

Vice Chairs: Arash Azadegan and Rosa Oppenheim

Professors:

Arash Azadegan, Ph.D., Arizona State

Alok Baveja, Ph.D., SUNY (Buffalo)

Wayne Eastman, J.D., Harvard

Kevin Kolben, J.D., Michigan

Lei Lei, Ph.D., Wisconsin (Madison)

Benjamin Melamed, Ph.D., Michigan

Rosa Oppenheim, Ph.D., Brooklyn Polytechnic Institute

Lian Qi, Ph.D., Florida

Yao Zhao, Ph.D., Northwestern

Adjunct Professor:

Donald Klock, M.B.A., Rochester

Associate Professors:

Weiwei Chen, B.S., M.S., Tsinghua; Ph.D., Wisconsin

Rudi Leuschner, Ph.D., Ohio State

Xiaowei Xu, Ph.D., Northwestern

Associate Professors of Professional Practice:

Ann Bagchi, Ph.D., Wisconsin

Sharon Lydon, Ph.D., George Washington

Kevin Lyons, Ph.D., Sunderland (UK)

William McLaury, M.A.S., Fairleigh Dickinson

Assistant Professors:

Temidayo Adepoju, Ph.D., Boston U.

Xin (David) Ding, M.S., South China; Ph.D., Utah

David Dreyfus, Ph.D., Michigan State

Mark Rodgers, Ph.D., Rutgers

Matthew Walsman, Ph.D., Cornell

Assistant Professors of Professional Practice:

Joseph Agresta, M.B.A., Fairleigh Dickinson

G. Tony Bell, D.Mgt., U. of Maryland.

Warren Cohen, M.S., The New School

Luke Greeley, Ph.D., Rutgers

John Hellriegel, M.B.A., Fairfield

John Impellizzeri, M.B.A., St. John's

James King, M.B.A., Rutgers

Hussan Peavey, M.B.A., NY Institute of Technology

Sundar Raman, M.B.A., U. of Buffalo

Anthony Taitt, M.B.A., Rutgers

Academic Policies and Procedures (RBS-NB)

ACADEMIC POLICIES AND PROCEDURES

In addition to Rutgers Business School: Undergraduate-New Brunswick policies, please see the **University Policies and Procedures** section in the Rutgers Main catalog for university-wide academic policies and procedures.

Academic Credit

Transfer Credit from Outside of Rutgers-New Brunswick

Transfer Credit from Other Rutgers Schools (School to School Transfers)

Registration

Leave of Absence, Withdrawal, & Reenrollment

Academic Standing Policy

Additional Resources

General Information (SC&I-U)

GENERAL INFORMATION

History and Aims of the School

Student Life

Admission

Scholarships and Financial Aid

Honors

Career Services

History and Aims of the School (SC&I-U)

History and Aims of the School

The School of Communication and Information (SC&I) is a dynamic center of learning at the heart of the Rutgers University-New Brunswick College Avenue campus. The school's competitive and renowned programs prepare students for top careers in today's digital environment. The school leads the university in the study of communication, information, and media processes, organizations, and technologies as they shape and define individuals, societies, and the relationships among them. Rapidly expanding communication and information technologies are drawing these distinct but allied fields closer together while, at the same time, extending beyond

them and exerting a major influence on our society and its economic and cultural endeavors. As a community of scholars and teachers, SC&I is committed to educating individuals who will make lasting contributions to the interdisciplinary study and professional practice of communication, journalism and media, library and information science, and to society at large.

The disciplines within the school have roots in Rutgers' programs beginning in 1926, and the school itself was founded in 1982 with the merger of the Graduate School of Library and Information Studies, the School of Communication Studies, and the Department of Urban Journalism.

Fast Facts

- About 85 full-time faculty members in three departments: Communication, Journalism and Media Studies, Library and Information Science
- Over 1,900 undergraduate students pursuing one of three undergraduate majors: communication, information technology and informatics, journalism and media studies
- Over 400 students in two undergraduate minors: digital communication, information, and media; and gender and media
- Over 600 students--both on campus and online--in two master's programs: communication and media, and information
- Over 90 doctoral students
- On-site and online continuing education classes available
- About 160 part-time faculty members, most of whom are highly accomplished communication, information, and media professionals working in the metropolitan area
- Over 35,000 alumni
- Tuition is competitive with the top 10 national programs in these disciplines
- Located less than 40 miles from New York City and 60 miles from Philadelphia
- Faculty and students win national awards every year from scholarly and professional associations

The most up-to-date information about the School of Communication and Information may be found on the school's website here.

Undergraduate Studies

The School of Communication and Information (SC&I) offers undergraduate courses open to students across the university that are of general interest and may fulfill requirements of the Core Curriculum, such as Public Speaking; Intercultural Communication; Gender and Technology; Gender, Race, and Class in the Media; Health Message and Campaign Design.

The school offers the following majors and minors that may be taken as part of a bachelor's program:

- Communication major
- Information technology and informatics major
- Journalism and media studies major
- Digital communication, information, and media minor
- Gender and media minor

Each of these programs has specializations that are outlined in the catalog section Programs of Study.

The school does not admit first-year or transfer students directly to the university. Students enter through a Rutgers school such as the School of Arts and Sciences, the School of Environmental and Biological Sciences, or the Mason Gross School of the Arts, and may choose a major or second major or minor in a SC&I program. All students must conform to the requirements and policies of their four-year school as well as the policies of SC&I for their major and/or minor.

Because the curricula of the school reflect the very dynamic disciplines and professional fields in the areas of communication, information technology, journalism, and media, new programs and new specializations within those programs are regularly developed and offered. Check the school's website for the most up-to-date information about programs offered.

Student Life (SC&I-U)

Student Life

Students of the School of Communication and Information (SC&I) have the opportunity to participate in residence life, dormitories, or nearby off-campus housing in New Brunswick. See the Residence Life website for further information.

Rutgers University-New Brunswick offers undergraduate students almost unlimited possibilities for co- and extracurricular activities. There are over 400 student organizations on campus, and their student leaders participate in advisement, organizational development programs, and support services. These groups range from academic to social action organizations and include the student government of the university, Rutgers University Student Assembly (R.U.S.A.). There are over 80 fraternities and sororities that offer opportunities for friendship, academic support, and housing. Rutgers has a wide range of intercollegiate and intramural athletics and is home to the Scarlet Knights

Within SC&I there are over a dozen student organizations that offer social, educational, service, and career development events. Most events are publicized and open to all students. Leadership opportunities are plentiful, and student leaders receive ongoing support and administrative assistance through the SC&I Office of Student Services.

The SC&I Leadership Council is an advisory group consisting of the presidents and vice presidents of each of the undergraduate and graduate student organizations recognized and supported by the school. The Leadership Council serves as a vehicle for collaborative opportunities and initiatives including: providing a voice for the student experience; promoting interactions and collaborations among student organizations; providing perspective and direct feedback to the school's administration; and developing models for leadership for all students.

Admission (SC&I-U)

Admission

Admission to the Majors

The School of Communication and Information (SC&I) requires an application to its majors separate from the one through which students apply to the university. Students already enrolled at a Rutgers four-year school as well as new transfer students may obtain the most up-to-date information about admission procedures from the school's website here.

The majors offered by SC&I include: communication; information technology and informatics; journalism and media studies.

Students who wish to apply for admission to any one of the three majors in the School of Communication and Information must meet the following minimum requirements prior to applying:

1) have completed College Writing (offered by the School of Arts and Sciences as 01:355:101) or an equivalent course or placement with a grade of C or better;
2) have completed at least 15 credits at Rutgers, or at least 15 transfer credits to Rutgers, with at least a 2.0 grade-point average; and
3) have completed with a grade of C or better the required course for the major of choice:

- For **communication major** applicants, the required prerequisite survey course is: **04:189:101 Introduction to Communication and Information Processes.**
- For **information technology and informatics major** applicants, the required prerequisite survey course is: **04:189:103 Information Technology and Informatics.**
- For **journalism and media studies major** applicants, the required prerequisite survey course is: **04:189:102 Introduction to Media.**

The school has a competitive application process and meeting the minimum application requirements does not guarantee admission to a major. Students' applications, transcripts, and written statements are reviewed by an admissions committee to determine suitability for admission. The school is committed to admitting a highly motivated and diverse student body to the undergraduate programs.

Students who earn a D or F in the prerequisite survey course will be allowed to retake the course one time.

Application Process

The school accepts applications to the major during the fall, spring, and summer semesters. Deadlines for submitting the application, which is online on the school's website, are published each year and allow for decisions to be announced in time for students who are admitted to preregister for the following semester as a major.

The website is located here and includes details about majors, courses, and the school.

Students who complete the prerequisite survey course may continue to take some additional core requirements and department electives in each program before being admitted to the major:

Students planning to major in communication may take 04:192:200, 201, and 300 after completion of 04:189:101 before being admitted to the major.

Students planning to major in information technology and informatics may take 04:547:111, 200, 215, and 220 after completion of 04:189:103 before being admitted to the major.

Students planning to major in journalism and media studies may take 04:567:274, 275, 276, 278, 324, 333, 334, 335, 350, 365, 379, and 380 after completion of 04:189:102 before being admitted to the major.

Completion of any of these courses does not guarantee admission to any major. Only courses completed with a grade of C or better will count toward the major once accepted.

Declaration of a Minor

Students may declare a minor in digital communication, information, and media after successful completion of one 100- or 200-level course with a grade of C or better. Students may declare a minor in gender and media after successful completion of one of the foundational courses with a grade of C or better. School of Arts and Sciences (SAS) students may declare the minor through the SAS myMajor system; other students may use the declaration form on the SC&I website.

Scholarships and Financial Aid (SC&I-U)

Scholarships and Financial Aid

The School of Communication and Information (SC&I) does not admit students directly to Rutgers. Students enter through one of the four-year schools of the university and are eligible for all financial aid from the university and from their four-year school. Rutgers University-New Brunswick financial aid information may be found here.

Students interested in financial support from Rutgers University or external sources are urged to file the Free Application for Federal Student Aid (FAFSA) each year since it is generally required for consideration for both School of Communication and Information and Rutgers financial assistance. Any awards for which financial need is a criterion require submission of the federal FAFSA form by March 15. Information may be found here.

Federal work-study employment may be offered as a self-help portion of a financial aid award. Application for this program is made by filing the Free Application for Federal Student Aid (FAFSA) available here. On-campus jobs are available in many areas. Selection for a particular job is based on skills, job availability, university needs, and student preference. The assigned employment opportunity is based on an expectation that the student will work between five and 15 hours weekly throughout the fall and spring academic semesters; in the case of summer assignments, the expectation is that the student will work between 20 and 35 hours per week. Off-campus employment, including paid community service positions and reading tutorial jobs in elementary schools, also are available. No job assignments are made until all paperwork required to accept the aid is complete.

SC&I offers a limited number of scholarships and a few prizes to high-achieving Rutgers undergraduates who are declared majors in the school. Continuing students are notified early in the spring semester of what scholarships will be available in the coming year, and have an opportunity to apply for them. Students' scholarship applications, transcripts, and written statements are reviewed by each program's scholarship committee to determine awards.

Detailed information about what scholarships and prizes were available in the most recent academic year can be found on the school's website here.

Honors (SC&I-U)

Honors

Honors Program

Undergraduates in the School of Communication and Information have the opportunity to apply to a senior honors program within their major if they meet eligibility requirements. Students in an honors program undertake an independent research project and complete a thesis under the supervision of a faculty adviser. Students do not need to be part of their four-year school honors program (e.g., School of Arts and Sciences Honors Program, School of Environmental and Biological Sciences Honors Program) in order to apply.

Students interested in entering the honors program should contact the undergraduate program director of their major or the school's Office of Student Services to discuss the program, eligibility requirements, and current application procedures.

Graduating with Honors in the Major

To receive the scholastic designation of graduating with honors in the major, students must meet the following requirements:

1) Student must have achieved a minimum 3.65 GPA in coursework for the major

AND

2) Student must have achieved a minimum 3.25 GPA overall in undergraduate studies

Students do not have to be a part of an honors program to graduate with the distinction of honors in the major.

Career Services (SC&I-U)

Career Services

The Office of Student Services provides targeted career support for students in all School of Communication and Information (SC&I) academic programs through career training workshops, job and internship fairs, and individual and group career counseling. SC&I students are also encouraged to seek additional career guidance and support through the university's Career and Exploration Success office.

SC&I cultivates relationships with employers and alumni to provide students with employment opportunities and information. In addition, each of our degree programs has an active internship program and most students do choose to participate in an internship as part of their academic experience.

For the most current information about career services and our placement portal, check the school's website here.

Academic Policies and Procedures (SC&I-U)

ACADEMIC POLICIES AND PROCEDURES

Note: See the **University Policies and Procedures** section in the Rutgers Main catalog for university-wide academic policies and procedures. School of Communication and Information students are subject to the academic policies and procedures of both the School of Communication and Information and the four-year school in which they are enrolled.

Academic Credit for Transfer Courses

Academic Advising

Undergraduate Enrollment in Master's Courses

Scholastic Standing

Programs of Study (SC&I-U)

PROGRAMS OF STUDY

The three undergraduate majors currently offered by the School of Communication and Information (SC&I) are communication, information technology and informatics, and journalism and media studies. Each major leads to a bachelor of arts degree. All students must satisfy the premajor requirements and the requirements of their major as well as the academic requirements of the four-year school through which they were admitted to the university. Most SC&I majors are based in the School of Arts and Sciences or the School of Environmental and Biological Sciences, but students from schools such as Mason Gross School of the Arts, Rutgers Business School, and the School of Nursing may choose a second major at SC&I. Students maintain their affiliation with their undergraduate school while enrolled at the School of Communication and Information.

SC&I also participates in the New Brunswick campus-wide major in Data Science, offering several core and elective courses and overseeing one specialization. See the Data Science program information in the New Brunswick undergraduate catalog.

The school offers two minors: digital communication, information, and media; gender and media. These are open to students from all Rutgers schools. Students should check with their four-year school to determine if the minor fulfills the requirements for that school or will count as elective credits. (New Brunswick School of Arts and Sciences students may use either program to fulfill their minor requirement.)

Students are urged to check the School of Communication and Information website for the latest requirements and course offerings. The school reserves the right, for any reason, to change or modify any course or program listed.

Communication 192 (SC&I-U)

COMMUNICATION 192

The Department of Communication is dedicated to advancing knowledge about communication and its practice in society. The department examines how meaning is created and negotiated in human interaction to address the personal, professional, and public communication challenges and opportunities posed by 21st century life. Students become leaders in private, public and civil sectors by developing a deep and practical appreciation of how communication shapes the world in which we live. Research from SC&I's renowned faculty experts examines the complexity of communication processes.

The undergraduate major in communication provides a broad education, covering ideas and applications in preparation for communication careers in business, education, or government, for the pursuit of graduate degrees in communication and other social science fields, or as a supplement for students whose primary interests are in other areas such as political science, computer science, business, human resources, health care, and more.

Available concentrations allow students to demonstrate targeted skills in the job market. They include:

- Communication and Technology
- Health and Wellness Communication
- Leadership in Organizations and Community
- Relationship and Family Communication
- Strategic Public Communication and Public Relations

The program website outlines effective ways to combine specializations based on students' career goals.

Graduates from the undergraduate program in communication gain:

- Competency in written communication in varied settings (including interpersonal, family, group, health, organizational, or mediated settings).
- Ability to use communication theories and concepts to analyze human behavior (including interpersonal, family, group, health, organizational, or mediated settings)
- Ability to apply communication theories and concepts to social and professional life (including issues of diversity, ethics, and civic engagement)
- Understanding of fundamental communication perspectives, theories, and concepts
- Proficiency in gathering and using evidence to study and understand communication processes and consequences (including asking questions and systematically attempting to answer them, understanding the value and limitations of the research processes and conclusions)
- Competency in oral communication in varied settings (including interpersonal, family, group, health, organizational, or mediated settings)

Career Opportunities

Communication graduates find opportunities in a wide variety of careers in business, education, government, and the nonprofit sectors. Skills in oral and written communication are some of the most sought-after characteristics all employers look for when hiring. Radio and TV, advertising and public relations, publishing, sales, and financial

services are but a few of the many areas in which these graduates find employment. Any work that involves communicating as its focal point is a potential career field. The communications industry is a competitive one, however, and experience gives everyone an extra advantage. The communication program offers internship opportunities for credit. In addition, an advanced degree can offer an edge, and the school offers a five-year bachelor's/master's program; for more information, see below.

Admission to the Major

Admission to the communication major is competitive; meeting the minimum requirements does not guarantee acceptance. Minimum requirements for admission include

- completion of at least 15 credits at Rutgers, or 15 transfer credits, with a grade-point average of 2.0 or better;
- a grade of C or better in the required prerequisite course 04:189:101 Introduction to Communication and Information Processes (or an equivalent transfer course);
- a grade of C or better in College Writing (offered by the School of Arts and Sciences as 01:355:101) or an equivalent course or placement; and
- completion of the application including a well-written personal statement.

The admissions committee seeks the following when reviewing student essays: (a) evidence of your interest in the major; (b) your future plans and their relationship to the major; (c) your strength as a writer; and (d) any other qualities that make you a strong candidate for admission to the communication major. Applications are available on the school's website. Students may be admitted for the fall, spring, and summer semesters; check the website for application deadlines each year. Students are strongly encouraged to consult the school's website for up-to-date information regarding admissions procedures.

Major Requirements

Prerequisite survey course required before admission to the major (3 credits):

04:189:101 Introduction to Communication and Information Processes (3)

SC&I interdisciplinary requirement (3 credits):

Either
04:189:102 Introduction to Media Systems and Processes (3)
or
04:189:103 Information Technology and Informatics (3)

Requirements for the remaining credits in the major include:

Core Requirements (15 credits):

04:192:200 Communication Theory (3)
04:192:201 Communication in Relationships (3)
04:192:300 Communication Research (3)
04:192:380 Public Speaking (3)
At least one of the following four classes:
04:192:354 Communication and Technology (3) or

04:192:355 Interpersonal Communication (3) or
04:192:357 Organizational Communication (3) or
04:192:359 Persuasive Communication (3)

Upper-level electives (15 credits):

Upper-level elective courses may include all 300- and 400-level courses and must include at least two 400-level courses except those completed as part of the core requirements. Courses 04:192:491,492 Independent Study in Communication and 04:192:495 Applied Study in Communication may not be used to fulfill this or the total credit requirement in the major. Students should check the communication website or undergraduate handbook to determine prerequisites for 300- and 400-level courses and should speak with an adviser for help in planning coursework for the major.

The specializations listed above are designed to provide essential knowledge of communication methods and techniques and help students build the necessary skills to start a career. The specializations require the same credits as the communication major in general, but are focused in one area and specific requirements for electives. Specializations can be combined with additional coursework to better create a narrative around a student's skills and knowledge. Combining specializations can expand career opportunities further. See the webpage for the most current information and additional details: Here.

Students must earn a grade of C or better in all 04:192 courses in order for those courses to count toward the major.

Internships and Other Educational Opportunities

The department encourages students to pursue internship experiences that complement their studies and potential career choices. Students must be accepted into the communication major in order to enroll in the internship. Students may apply up to 3 internship course credits toward their upper-division course electives in the major. Additional internship credits may be earned but do not apply to the communication major. Note that each four-year school in the university sets its own limits regarding the number of experiential credits a student may apply toward graduation.

Further information about the internship and about other educational opportunities such as specializations in the major is available at the communication program website.

Course Transfers

Courses that students have taken at other New Jersey colleges, which are articulated through the NJ Transfer system and recorded on a student's transcript with a communication course number, will be counted toward the major.

Students who wish to have a course they have taken elsewhere at Rutgers or externally at another university considered as one of their required or elective courses in the communication major must submit a request for transfer equivalency in writing to the SC&I Office of Student Services. To submit such a request, the letter of petition must include a copy of the full syllabus of the course, a copy of the student's transcript showing the grade achieved, a note which communication course it is requested to replace, and the reasons for consideration. The

courses are evaluated in terms of their very close match of content and skills to the communication course, the level of the course, and the grade achieved, which should typically be a C or better. Students will be notified in writing of the outcome of the petition.

Dual-Bachelor's/Master's Degree Program for Communication Majors

Communication majors in their junior or senior year may apply to the master's program in communication and media (M.C.M.) for a dual-B.A./M.C.M. program that allows completion of both degrees in as little as five years. If accepted, students may enroll in up to four M.C.M. courses during their senior year that will count toward both the undergraduate degree and the master's. Once the bachelor's degree is completed, students will be in the master's program and complete the requirements. Two to three semesters of full-time study, or four semesters of part-time study, would allow a student to complete the remainder of the master's program.

Admission requirements for the dual degree program are the same as for all M.C.M. applicants. Details about the application process and degree requirements are on the school's website.

Information Technology and Informatics 547 (SC&I-U)

Information Technology and Informatics 547

The information technology and informatics (ITI) major is a 39-credit program offered by the Department of Library and Information Science. This major emphasizes the evaluation, implementation, use, and management of information technologies for a wide range of organizations and corporations, as well as the social and organizational aspects of information and communication technologies. The major unites theories drawn from the humanities and social sciences with practical computer-based competencies. This combination prepares students to work in a diverse and highly competitive marketplace that demands individuals who understand the social, economic, and organizational impacts of technology locally and globally. The course of study combines rigorous thinking, problem-solving, and technology skills in a program that is based on sound research and current technology applications.

Upon successful completion of the major, students will be able to demonstrate these learning goals of the ITI program:

- *[CREATE]* Develop new technological solutions to real-world problems through innovative, collaborative, and computation approaches.
- *[COMMUNICATE]* Communicate to professional stakeholders utilizing evolving technological platforms.
- *[CRITICAL THINKING]* Analyze the ever-changing interactions of people and technology, regarding pertinent social, cultural, philosophical, ethical, legal, and economic issues.
- [COORDINATE] Evaluate, implement, use, and manage information technologies for a wide range of organizations and corporations.

Career Opportunities

New Jersey's growth industries--technology, pharmaceuticals, logistics, and finance--are driven by innovative applications of information technology. Graduates of the major in information technology and informatics seek positions in sectors such as government, health care, education, consulting, and finance where technology skills and an understanding of organizational and social informatics make them valuable employees. Examples of where ITI graduates have launched their careers include:

- Information technology analysis
- IT consulting and project management
- Technology policy analysis
- User experience analysis and design
- Web design and development
- Information assurance and cybersecurity
- Networking and systems administration and support

Admission to the Major

Admission to the information technology and informatics major is highly competitive; meeting the minimum requirements does not guarantee acceptance. Minimum requirements for admission include

- completion of at least 15 credits at Rutgers, or 15 transfer credits, with a grade-point average of 2.0 or better;
- a grade of C or better in the required prerequisite course 04:189:103 Information Technology and Informatics (or an equivalent transfer course);
- a grade of C or better in College Writing (offered by the School of Arts and Sciences as 01:355:101) or an equivalent course or placement; and
- completion of the application including a personal statement.

The admissions committee considers the following criteria when reviewing student essays: (a) evidence of your interest in the major; (b) your future plans and their relationship to the major; (c) your strength as a writer; and (d) any other qualities that make you a strong candidate for admission to the ITI major. Applications are available on the school's website here. Students may be admitted for the fall, spring, and summer semesters; check the website for the application deadlines each semester. Students are strongly encouraged to consult the school's website for up-to-date information regarding admissions procedures.

Major Requirements

Students must earn a grade of C or better in 04:547 courses in order for those courses to count toward the major.

Prerequisite survey course required before admission to the major (3 credits):

04:189:103 Introduction to Information Technology and Informatics (3)

SC&I interdisciplinary requirement (3 credits):

Either
04:189:101 Introduction to Communication and Information Processes (3)
or
04:189:102 Introduction to Media (3)

Core courses (12 credits):

04:547:200 Social Informatics (3)
04:547:201 Information Technology Fundamentals (3)
04:547:202 Object-Oriented Programming (3)
04:547:210 Designing Human-Centered Technology Solutions (3)

Elective courses (21 credits):

ITI students must select seven elective courses from the course listing for the ITI major.

Optional pathways:

Several optional areas of focus are available within the information technology and informatics program, including:

- cybersecurity and information assurance,
- data management, analytics, and information visualization,
- web design and development.

These guided pathways allow students to develop more in-depth knowledge and skills in focused areas. Please check the website for current offerings and course options.

Internships and Other Educational Opportunities

The ITI program encourages students to complete a 3-credit internship, which includes both work experience and an academic component. The program offers an independent study option to students who want to investigate a particular topic more fully under the supervision of a faculty member. High achieving students who qualify may apply to participate in a senior thesis. Students interested in the senior thesis must first take Application Research for Information Technology (04:547:300) and then conduct a research project, taking the Senior Thesis Course (04:547:465).

Course Transfers

A maximum of 6 transfer credits may be counted toward the information technology and informatics major. Only courses with a grade of C or better will be accepted for transfer.

Courses that students have taken at other New Jersey colleges, which are articulated through the NJ Transfer system and recorded on a student's transcript with an ITI course number, will be counted toward the major. However, such courses do count as transfer courses to the major and therefore a maximum of 6 credits may be applied to the major.

Students who wish to have a course they have taken elsewhere at Rutgers or externally at another university considered as one of their required or elective courses in the ITI major must submit a request for transfer equivalency in writing to the SC&I Office of Student Services. To submit such a request, the letter of petition must include a copy of the full syllabus of the course, a copy of the student's transcript showing the grade achieved, a note which ITI course it is requested to replace, and the reasons for consideration. The courses are evaluated in terms of their very close match of content and skills to the ITI course, the level of the course, and the grade achieved, which should typically be a B or better. Students will be notified in writing of the outcome of the petition.

Dual-Bachelor's/Master's Degree Program for ITI Majors

This degree pathway allows students to earn a bachelor's degree with an ITI major and a master of information (M.I.) degree in five years of continuous, full-time study, or longer if completed part-time. Students who have completed at least 90 credits in their undergraduate program can be considered for admission into the dual-degree pathway to the M.I. degree.

ITI majors who are admitted into the dual-degree pathway take two graduate courses in each of the fall and spring semesters of their senior year. Those courses are selected based on student goals and M.I. program requirements. These four courses (12 credits) count both as an undergraduate (ITI electives) and fulfill graduate (M.I.) requirements as long as the student earns a grade of B or better. Upon successful completion of coursework in the senior year, dual-degree students will graduate from the undergraduate program and transition into the graduate program as a M.I. student.

Details about the application process and degree requirements are on the school's website.

Journalism and Media Studies 567 (SC&I-U)

JOURNALISM AND MEDIA STUDIES 567

The journalism and media studies (JMS) major provides an opportunity to study print, broadcast, electronic journalism, and new media, including law and ethics as well as media theory, with an emphasis on how the media affects individuals, social groups, and political processes in a democratic society. The major provides undergraduate students with a broad spectrum of courses in the theory and practice of journalism and media, preparing them for professional careers in magazines, the creative industries, television, newspapers, radio, web production, media management, news agencies, and wire services, publishing, and public information service in the government and private sectors. Journalism and media studies students are encouraged to take electives outside the School of Communication and Information (SC&I) to complement both their studies in the major and their career interests.

Graduates who successfully complete the program will be able to:

- *[EXPRESSION]* Write fluently, produce content, and tell stories across evolving media platforms.
- *[ANALYSIS]* Demonstrate analytical and critical thinking, formulate research questions and use appropriate methods, evaluate and use appropriate sources, identify, and gather relevant data in journalism and media contexts.
- *[ETHICS]* Develop a critical understanding of the ethical standards and tensions in journalistic and media practices and institutions and apply this understanding to academic and professional activities.
- *[POWER]* Critically analyze issues of diversity, difference, social justice, and power in media in a global context.
- *[SYSTEMS]* Explain social, political, cultural, and economic dimensions of media technologies, institutions, practices, policies, and regulations.
- *[INNOVATION]* Innovate with tools and technologies appropriate for media professions.

Career Opportunities

The program offers a broad spectrum of courses in the theory and practice of journalism and media studies, preparing students for professional careers in print, broadcast, new media, advertising, public relations, and public information services in the government and private sectors. The courses focus on the practice of journalism and mass media and the impact of media on society, new technology and the media, public policy and understanding, and the planning and development of public information systems. The major also provides strong writing skills and academic preparation for students who are pre-professional for law school, M.B.A. programs, and other advanced degrees.

Admission to the Major

SC&I accepts applications to majors in the fall, spring, and summer semesters.

Admission to the journalism and media studies major is competitive; meeting the minimum requirements does not guarantee acceptance. General writing ability and communication skills, as evidenced in both the personal essay of the application and success in relevant courses are required. Minimum requirements for admission include

- completion of at least 15 credits at Rutgers, or 15 transfer credits, with a grade-point average (GPA) of 2.0 or better;
- a grade of C or better in the required prerequisite course 04:189:102 Introduction to Media (or an equivalent transfer course);
- a grade of C or better in College Writing (offered by the School of Arts and Sciences as 01:355:101) or an equivalent course or placement; and
- completion of the application including a personal statement.

If students do not earn a grade of C or better in 04:189:102, the course may be retaken one time.

Grades in other journalism and media studies courses will get particular attention, but applicants are not required to have taken such courses before applying. The admissions committee may seek evidence of interest in journalism and media studies including extracurricular involvement. The admissions committee considers the following criteria when reviewing student essays: (a) evidence of your interest in the major; (b) your future plans and their relationship to the major; (c) your strength as a writer; and (d) any other qualities that make you a strong candidate for admission to the journalism and media studies major. Students may be admitted for the fall, spring, and summer semesters; check the website for application deadlines each semester. Students are strongly encouraged to consult the school's website for up-to-date information regarding admissions procedures, program requirements, course offerings, and special programs.

Details about deadlines as well as application forms are available here.

Check the program's website for the most up-to-date list of courses and specializations. Students may take any course in the major as an elective.

Students must earn a grade of C or better in all courses in order for those courses to count toward the major.

Major Requirements

Prerequisite survey course required before admission to the major (3 credits):

04:189:102 Introduction to Media (3)

SC&I interdisciplinary requirement (3 credits):

Either
04:189:101 Introduction to Communication and Information Processes (3)
or
04:189:103 Information Technology and Informatics (3)

Core Courses (6 credits):

04:567:200 Writing for Media (3)
04:567:201 Media Ethics (3)

Foundation Courses

One foundation course from the following list:

- 04:567:205 Digital News Writing and Reporting
- 04:567:206 Broadcast News Writing and Reporting
- 04:567:207 Design and Digital Editing
- 04:567:210 Media Management and Strategy
- 04:567:211 Exploring New Media
- 04:567:212 Digital Media Production
- 04:567:215 Gender, Race, and Class in the Media
- 04:567:216 Digital Media and Society
- 04:567:217 Foundations of Media Analysis

Practice Courses:

Two courses

Concept Courses:

Two courses (one must be at the 400-level)

Elective Courses:

You must select twelve credits of major coursework from the course listing for the JMS major. You may take any course in the major as an elective, including foundation courses.

Diversity, difference, and social justice:

The Department of Journalism and Media Studies is committed to addressing issues of diversity, difference, and social justice. Majors must complete at least one of the following courses:

- 04:567:274 Consumer Media Culture
- 04:567:333 Media and Popular Culture
- 04:567:334 Gender, Race, and Class in the Media
- 04:567:351 Digital Media and Society
- 04:567:365 Mediating the Middle East

- 04:567:380 Media and Social Change
- 04:567:385 Irish Media, Politics, and Cultural Survival
- 04:567:420 Global News
- 04:567:457 Journalism and Civil Rights
- 04:567:475 International Media

Specializations

Students may also opt to select a specialization in sports journalism or in global media. Each specialization requires a total of six courses (18 credits). If you're using a specialization to fulfill JMS major requirements, at least 6 credits of the 18-credit specialization must be at the 400 level.

Global media specialization

Required Courses:

- 04:567:200 Writing for Media
- 04:567:201 Media Ethics and Law
- A foundation course

Specialization Courses (select 3 courses / 9 credits):

- 04:567:215 Gender, Race, and Class in the Media
- 04:567:317 Writing the Mediterranean
- 04:567:329 International Reporting
- 04:567:365 Mediating the Middle East
- 04:567:384 Media and the Struggles for Democracy in Central America
- 04:567:385 Irish Media, Politics, and Cultural Survival
- 04:567:405 Writing About Social Issues
- 04:567:420 Global News
- 04:567:475 International Media
- 04:567:488 Independent Study in Media Studies
- 04:567:489 Independent Study in Journalism
- Any Topics in Journalism and Emerging Media course that involves JMS faculty-led travel outside the United States

Sports journalism specialization

Required Courses:

- 04:567:200 Writing for Media
- 04:567:201 Media Ethics and Law
- A foundation course

Specialization Courses (select 3 courses / 9 credits):

- 04:567:430 Sports Writing and Reporting

- 04:567:432 Multimedia Sports Reporting
- 04:567:434 Critical Issues in Sports Media
- 04:567:488 Independent Study in Media Studies
- 04:567:489 Independent Study in Journalism

Internships, Study Abroad, Honors, and Other Educational Opportunities

An internship is a highly recommended capstone experience for JMS majors. Students pursue placements in major media outlets throughout the New Jersey, New York, and Philadelphia markets.

The department internship coordinator assists students in finding an internship. Students must qualify, receive permission, and then register for the 6-credit internship. To qualify, a student must be a major who completed a minimum of 75 overall credits and five journalism (567) courses, at least three of which must be skills courses; have an overall GPA of 2.5 or better; and have a 2.75 GPA or better in the major.

The JMS program offers a number of study abroad opportunities and financial aid is sometimes available to support participation.

Students with a cumulative GPA of 3.2 or better may apply to the JMS Honors Program. This program requires six credits of coursework that includes an independent project.

A second major is highly advantageous for students preparing for a career in mass media. Students are strongly encouraged to pursue a second major, or at least a minor, which must be outside of the School of Communication and Information since double majors within the school are not allowed.

The major demands that students carefully formulate their program of coursework. Students should consult an adviser for guidance at least once a year.

Course Transfers

A maximum of 6 credits from outside the JMS program may be counted toward the major. A maximum of 3 transfer credits (or one course) may be applied to the conceptual requirement and a maximum of 3 transfer credits (or one course) may be applied to the skills requirement.

Courses that students have taken at other New Jersey colleges, which are articulated through the NJ Transfer system and recorded on a student's transcript with a JMS course number, will be counted toward the major. However, such courses do count as transfer courses to the major and therefore a maximum of 6 credits may be applied to the major.

Students who wish to have a course they have taken elsewhere at Rutgers or externally at another university considered as one of their required or elective courses in the journalism and media studies major must submit a request for transfer equivalency in writing to the Office of Student Services. To submit such a request, the letter of petition must include a copy of the full syllabus of the course, a copy of the student's transcript showing the grade achieved, a note which JMS course it is requested to replace, and the reasons for consideration. The courses are evaluated in terms of their very close match of content and skills to the JMS course, the level of the course, and the grade achieved, which should typically be a B or better. Students will be notified in writing of the outcome of the petition.

Dual-Bachelor's/Master's Degree Program for Journalism and Media Studies Majors

JMS majors in their junior or senior year may apply to the master's program in communication and media (M.C.M.) for a dual-B.A./M.C.M. program that allows completion of both degrees in as little as five years. If accepted, students may take a limited number of M.C.M. courses in their senior year which will count toward both the undergraduate degree and the master's. Once the bachelor's degree is completed, students will be in the master's program and complete the requirements.

Admission requirements are the same as for all M.C.M. applicants. Details about the application process and degree requirements are on the school's website.

Digital Communication, Information, and Media (DCIM) Minor (SC&I-U)

DIGITAL COMMUNICATION, INFORMATION, AND MEDIA (DCIM) MINOR

The 18-credit digital communication, information, and media (DCIM) minor is open to all majors at Rutgers. This program prepares students to succeed in a diverse range of work environments through a combination of technical, analytical, interpersonal, and entrepreneurial skill sets. The DCIM program concludes with a capstone course that puts students in the driver's seat, defining and creating a project for their professional portfolio that they can use to launch their (next) career. The DCIM minor complements any major at Rutgers. Capstone projects can extend a student's particular interest in a major field of study, or take students in an entirely new direction. All courses are offered in hybrid format, with part of the course conducted in person and part of the course conducted online.

At the end of this program, students are able to:

- critically read, interpret, synthesize, and evaluate online information from a variety of media sources and effectively articulate an analysis and formulate opinions on the relevant topics;
- assess the influence of virtual environments on interpersonal and group interactions;
- identify communication opportunities and challenges when working with others in digital and virtual environments;
- successfully participate and enhance collaborative working relationships in virtual environments; and
- select and apply appropriate digital tools and media and design messages in order to communicate, persuade, and build relationships with stakeholders distributed across space, time, and cultures.

Career Development

Whether students are looking to enter the corporate, not-for-profit, or government sectors, whether in the life sciences, social services, business, or other fields, the DCIM program will enhance career possibilities by showing employers that they have proficiency in skills needed in all 21st-century workplaces.

Declaration of the Minor

Students may declare the minor after completing one 100-level or one 200-level DCIM course with a grade of C or better. Information for current Rutgers students who want to declare the minor may be found on the school's website. The process is different for different Rutgers four-year schools.

Requirements

Students must take six courses (18 credits) in the program to complete the minor:

Required:

- 04:189:151 Virtual Team Dynamics (3)
- 04:189:152 The Structure of Information (3)
- 04:189:251 Strategic Presentation Methods in Digital Media (3)
- 04:189:351 Leadership in Digital Contexts (3)

Choose one of these two:

- 04:189:352 Self and Society in Virtual Contexts (3)
- 04:189:353 Digital Technology and Disruptive Change (3)

Required:

- 04:189:451 Capstone in Digital Communication, Information, and Media (3)

Students must earn a grade of C or better in 04:189 courses in order for those courses to count toward the minor. Courses can be double-counted for the digital communication, information, and media minor and for any other major or minor at the School of Communication and Information.

Course Transfers

Only 100- and 200-level courses that transfer to Rutgers as a substitute for courses in the minor may be applied to the program.

Gender and Media Minor (SC&I-U)

Gender and Media Minor

Complementing any major, the gender and media minor is a cross-unit, interdisciplinary undergraduate minor offered jointly by the School of Communication and Information and the School of Arts and Sciences women's, gender, and sexuality studies program. Students are introduced to the minor through a foundational course that offers a shared vocabulary for analyzing issues of power and representation within the media. Students then have the choice of taking two electives in media production, as well as two electives in critical media/feminist theory. At the end of the program, students apply skills and knowledge of gender and the media in the completion of a project in a capstone course that offers internship, service learning, and multimedia project options.

Program-Level Learning Goals

The gender and media minor provides a course of study designed for students interested in a combination of theory and practice perspectives on the representation and production of gender in the media.

- Students will apply technical skills as media producers with the ability to add their own critical voices and unique perspectives.

- Students will also demonstrate critical thinking skills that enable them to critique and improve current conditions of media production and consumption.
- Students will articulate, create, examine, inform, and improve systemic and individual power dynamics of the contemporary landscape for gender and media.

Requirements

The minor is open to all majors at Rutgers. Students are required to complete six 3-credit courses with a grade of C or better, for a total of 18 credits. Students are strongly encouraged to speak with an adviser to create a plan for completing the program.

Note that courses taken to fulfill requirements in the gender and media minor will count toward the requirements of any other major or minor in the School of Communication and Information and/or for the program in women's, gender, and sexuality studies.

Foundation course (3 credits)

Choose one of:

- 01:988:202 Gender, Culture, and Representation (3)
  or
- 04:567:215 Gender, Race, and Class in the Media (3)

Practice/production courses (6 credits)

- 01:988:200 Gender, Digital Media, and Social Curation (3) - required

Plus choose one of the following courses for the second course:

- 04:189:251 Strategic Presentation Methods in Digital Media (3)
- 04:567:200 Writing for Media (3)

Conceptual courses (6 credits)

Only one of the conceptual courses (3 of the 6 credits) may be taken at the 200 level; the other must be taken as a 300 level.

Choose one of the following SC&I classes for the first conceptual course:

- 04:567:274 Consumer Media Culture (3)
- 04:567:380 Media and Social Change (3)
- 04:547:340 Gender and Technology (3)
- Some special topics courses from SC&I may be allowed to count towards the minor; approval of the program director is required.

Choose one of the following women's, gender, and sexuality studies classes for the second conceptual course:

- 01:988:255 Gender, Art, and Society (3)
- 01:988:257 Gender and the Body: Representations of Pornography (3)
- 01:988:258 Gender, Race, and Contemporary Art (3)

- 01:988:259 Homosexuality and Visual Culture (3)
- 01:988:317 Gender and Consumption (3)
- 01:988:385 Theories of Women and Film (3)
- 01:988:341 Gender and Popular Culture (3)
- Some special topics courses offered by women's, gender, and sexuality studies may be allowed to count towards the minor; approval of the program director is required.

Capstone course (3 credits):

Students may enroll in the capstone after completing a minimum of 12 credits in the minor. Choose one of the following courses to fulfill the capstone requirement:

- 01:988:499 Capstone in Gender and Media - offered within the women's, gender, and sexuality studies program
- 04:567:499 Capstone in Gender and Media - offered within the journalism and media studies program

Undergraduate Courses (SC&I-U)

UNDERGRADUATE COURSES

Explanation of Three-Part Course Numbers

Communication and Information 189 Courses

Communication 192 Courses

Digital Communication, Information, and Media 189 Courses

Gender and Media 438 Courses

Information Technology and Informatics 547 Courses

Journalism and Media Studies 567 Courses

Explanation of Three-Part Course Numbers (SC&I-G)

Explanation of Three-Part Course Numbers

The number preceding each course title is divided into three parts. The first two digits are the administrative code (standing for a faculty or a school), the next three digits are the subject code, and the final three digits are the course code.

Administrative Codes

The code for School of Communication and Information undergraduate programs is 04. For a complete list of administrative codes used in this catalog, see the beginning of the Programs of Study and Courses for Liberal Arts and Sciences Students section.

Subject Codes

A subject code comprises the third through fifth digits in all course numbers and indicates the subject matter of the course. Courses with the following subject codes are listed in this chapter (this does not constitute a list of majors).

189 Communication and Information (this includes courses in the Digital Communication, Information, and Media program)

192 Communication

547 Information Technology and Informatics

567 Journalism and Media Studies

Course Codes

The course code comprises the sixth, seventh, and eighth digits in all course numbers. Course codes from 100 to 299 indicate introductory and intermediate undergraduate courses. Codes from 300 to 499 indicate advanced undergraduate courses. Courses coded from 500 to 799 are graduate courses.

Two course codes separated by a comma indicate that each semester may be taken independently of the other (example: 04:189: 493,494). Two course codes separated by a hyphen indicate that satisfactory completion of the first semester is a prerequisite for the second semester; the first semester may be taken for credit without taking the second, except where a statement is added to indicate that both semester courses must be completed in order to receive credit.

Credits awarded for the successful completion of each course are indicated in parentheses following the course title. The notation BA indicates that the number of credits is determined by arrangement with the department offering the course.

Communication and Information 189 Courses (SC&I-G)

Communication and Information 189 Courses

04:189:101 ***Introduction to Communication and Information Processes (3)***
Survey of the field of communication: interpersonal, group, organizational, speech, mass, intercultural, and international communication; public relations and advertising.

04:189:102 ***Introduction to Media (3)***
Historical development of mass media institutions and the role of media in society. Particular attention to news, government regulation, effects, economics, emerging technologies, and audience dynamics.

04:189:103 ***Information Technology and Informatics (3)***
An overview of the key theoretical and professional themes. Theoretical emphasis is placed on social informatics; human-computer interaction; management of information technology; the relationship between technology, race, and gender; and information intelligence. Practical emphasis is placed on the effective and ethical use of information technologies including the World Wide Web in organizations, and on the development of critical thinking and problem-solving skills appropriate for the workplace. This course provides an understanding of the

concepts, culture, and underpinnings of the professions that encompass information technology and informatics in society today.
This course fulfills the SAS Permanent Core Curriculum learning goal I.c.: 21st-century challenge: analyze the relationship that science and technology have to a contemporary social issue.

04:189:151 ***Virtual Team Dynamics (3)***
Students learn to understand and navigate the dynamics of the modern technology-infused workplace in which the ability to apply well-developed communication, writing, and technological skills/competencies in virtual settings is vital. The course takes a multi-disciplinary approach to these topics, blending insights from multiple disciplines including communication, psychology, sociology, business, and human resources management.
This course counts toward the digital communication, information, and media minor.

04:189:152 ***The Structure of Information (3)***
Through the lens of different media such as newspaper articles, blogs, Wikipedia entries, social media posts, and news programs, students examine and judge the quality of information presented, analyze the economic and cultural factors that affect the availability and reliability of electronic information, and compare and contrast with other sources. After this exploration of information searching and evaluation, the class will address how information is organized and attributed.
This course counts toward the digital communication, information, and media minor. SAS Core Learning Goals met by this course: WCd: Communicate effectively in modes appropriate to a discipline or area of inquiry; evaluate and critically assess sources and use the conventions of attribution and citation correctly; and analyze and synthesize information and ideas from multiple sources to generate new insight. ITR-z: Students will be able to analyze and critically assess information from traditional and emergent technologies.

04:189:196 ***(F) School of Communication and Information Learning Community I (1.5)***
Explores School of Communication and Information learning community themes through readings, weekly discussions, lectures, and interactions with faculty and visiting scholars. Students will develop and present research and/or action projects. Enrollment is limited to, and required of, participants in school learning communities. Students participating in different learning communities will register for particular sections of the class.
04:189:196 is a fall class with enrollment by special permission only.

04:189:197 ***(S) School of Communication and Information Learning Community II (1.5)***
Explores School of Communication and Information learning community themes through readings, weekly discussions, lectures, and interactions with faculty and visiting scholars. Students will develop and present research and/or action projects. Enrollment is limited to, and required of, participants in school learning communities. Students participating in different learning communities will register for particular sections of the class.
04:189:197 is a spring class with enrollment by special permission only.

04:189:210 ***Disinformation Detox: Communication, Media and Information Studies Approaches to Mis- and Dis-Information (3)***
Dis- and misinformation have toxic implications for the wellbeing of individuals, groups, and societies. As interconnected producers and consumers of information we bring our own cognitive biases and beliefs, and frequently find ourselves questioning what information sources to trust. This course draws on interdisciplinary perspectives from communication, media, and information studies to explore ways to understand, navigate, and thrive in a polluted ecology of digital social systems. Through active coursework, students will learn to engage in these systems as aware, empowered, and responsible communicators and information agents.

04:189:215 ***Social Responsibility and Community Wellness (3)***
Examines intellectual, practical, and relational challenges faced in efforts to alleviate social disparities and risks to the quality of life that result from social choices and actions through required cross-disciplinary lectures and readings, service learning, and online peer collaborative learning.

04:189:220 ***Data in Context (4)***
This course introduces students to the interplay between data and its surrounding societal context. It will cover the basics of data science, focusing on the ethical, legal, and social implications of data and algorithms. Students will learn to conceptualize and evaluate practical applications of data science in communication, information, and media contexts.

04:189:251 ***Strategic Presentation Methods in Digital Media (3)***
This course examines theories and techniques for analyzing, producing, and disseminating messages. Students will learn how to use web-based and multimedia presentation tools to connect with a variety of audiences and convey a desired message. Each student will craft a message to support some social change by developing and shaping the message into compelling digital media presentations in a range of formats.
This course counts toward the digital communication, information, and media minor. SAS Core Learning Goals met by this course: WCd: Communicate effectively in modes appropriate to a discipline or area of inquiry; evaluate and critically assess sources and use the conventions of attribution and citation correctly; and analyze and synthesize information and ideas from multiple sources to generate new insight. ITR-z: Students will be able to analyze and critically assess information from traditional and emergent technologies.

04:189:351 ***Leadership in Digital Contexts (3)***
Students will use a variety of exercises and scenarios to employ creativity and innovation in problem solving, weigh risk, perform leadership and management roles with peers, and grapple with the consequences of making and implementing decisions in digital environments. Students will learn how to assess and select among various technologies for making and disseminating decisions. This course presents a framework for understanding the role of technology in leadership functions including planning, information dissemination, consensus building, negotiation and engagement with stakeholders for informed and participative decision-making in online and virtual settings.
This course counts toward the digital communication, information, and media minor. Prerequisites: 04:189:151 or 152; 04:189:251.

04:189:352 ***Self and Society in Virtual Contexts (3)***
Students explore what it means to have multiple and merging "identities" in an online community. How are interpersonal relationships and group interactions manifested in virtual environments? How are identity and selfhood expressed? What is the impact on communication when gender, race, and other physical attributes are self-selected and represented digitally? What are the implications for privacy and security? What does this mean for the workplace? What do "human rights" mean in a virtual society and is citizenship changed with purely online interaction? Students will evaluate the consequences of a digital context on the self and society
This course counts toward the digital communication, information, and media minor.

04:189:353 ***Digital Technology and Disruptive Change (3)***
This course explores whether and how emerging digital technologies--such as social, mobile, and wearable media; virtual worlds and games; sensor-laden devices and environments; robotics; drones; implantable chips; artificial intelligence--contribute to disruptive changes in relationships, organizations, societies, and selves. Multiple

perspectives on communication, information, and media will be applied in analyzing the extent to which the structure, norms, and dynamics of modern social life have changed and have experienced continuity and the conditions under which such changes can be considered disruptive. Micro- and macro-level processes and outcomes (interpersonal, cultural, political, global) of emerging digital technologies will be examined.
This course counts toward the digital communication, information, and media minor. SAS Core Learning Goals met by this course: CCO: Contemporary Challenges (CCO) Analyze the relationship that science and technology have to a contemporary social issue. ITR-z: Students will be able to analyze and critically assess information from traditional and emergent technologies.

04:189:396 ***(F) School of Communication and Information Learning Community III (1.5)***
Explores School of Communication and Information learning community themes through readings, weekly discussions, lectures, and interactions with faculty and visiting scholars. Students will develop and present research and/or action projects. Enrollment is limited to, and required of, participants in school learning communities. Students participating in different learning communities will register for particular sections of the class.
04:189:396 is an advanced fall class, primarily for juniors and seniors, with enrollment by special permission only.

04:189:397 ***(S) School of Communication and Information Learning Community IV (1.5)***
Explores School of Communication and Information learning community themes through readings, weekly discussions, lectures, and interactions with faculty and visiting scholars. Students will develop and present research and/or action projects. Enrollment is limited to, and required of, participants in school learning communities. Students participating in different learning communities will register for particular sections of the class.
04:189:397 is an advanced spring class, primarily for juniors and seniors, with enrollment by special permission only.

04:189:398 ***Special Topics in Communication and Information (3)***
Special topics classes may be offered by the School of Communication and Information that are of interest to all undergraduates in the school. A recent special topics class offered was Event Management and Design.

04:189:399 ***Service Learning Internship (1)***
A 1-credit service learning internship may be added to particular undergraduate courses in the school to allow students to add a service learning experience to a course. Contact the undergraduate program director of the major or minor for details.

Prerequisites: Must register for the associated SC&I course in the same semester.

04:189:441 ***Communication and Human Values (3)***
Seminar on communication and human values in a democratic society. Emphasis on the concept of cultural democracy in the formulation of public policy; historical evaluation of the philosophical problems related to matters of private taste versus public good.
Prerequisite: Permission of instructor. Course not offered on a regular basis. Open only to seniors and graduate students

04:189:451 ***Capstone in Digital Communication, Information, and Media (3)***
The capstone course is designed to facilitate students' synthesis of what they have learned in the program, through a directed project. Students will first work together in class to identify and refine projects or areas of research to complete. Capstone project presentations will be captured digitally for feedback from the larger community. Capstone projects may be done individually or in pairs. Projects will contribute to the students' websites; a portion of this class will include preparation of a website of material from the minor.

This course counts toward the digital communication, information, and media (DCIM) minor. Prerequisites: Completion of at least 15 credits within the minor, or completion of 12 credits and concurrent enrollment in one other DCIM course. The capstone is open only to declared DCIM students.

04:189:490 ***Senior Honors Seminar (3)***
For students admitted to the honors program.

Prerequisites: Permission of the department.

Communication 192 Courses (SC&I-G)

COMMUNICATION 192 COURSES

04:192:120 ***Beginning American Sign Language (3)***
Beginning skills in American Sign Language (ASL) and skills needed in communication with deaf persons.
Offered only during Summer Sessions. Does not count toward the major.

04:192:121 ***Intermediate American Sign Language (3)***
Beginning skills in American Sign Language (ASL) and skills needed in communication with deaf persons.
Prerequisite: 04:192:120 or equivalent course, or permission of the instructor. Offered only during Summer. Does not count toward the major.

04:192:200 ***Communication Theory (3)***
Basic concepts, models, and theories examining the role of communication in human behavior.
Prerequisite: 04:189:101.

04:192:201 ***Communication in Relationships (3)***
Patterns of human interaction, types and stages of relationships, verbal and nonverbal exchanges, and strategies and tactics.
Prerequisite: 04:189:101.

04:192:211 ***Parliamentary Debate Practicum (1)***
This course will explore the nature of persuasive argumentation as applied through the specific lens of parliamentary-style debating.

04:192:220 ***Fundamentals of Public Speaking (3)***
Development of effective oral presentation and participation skills in interpersonal, small group, organizational and public settings. Particular attention is given to issues of diversity and multiculturalism in presentation and participation.
Prerequisite: Limited to noncommunication majors. Does not count toward the major.

04:192:300 ***Communication Research (3)***
Exploration of the uses of experimental, descriptive, historical-critical, and field research approaches to the study of communication.
Prerequisite: 04:189:101.

04:192:301 ***Community Communication (3)***
This course examines types and qualities of civic infrastructure, civic engagement, and community leadership. Students are introduced to the methods and nature of community communication in varied contexts.

04:192:305 ***Introduction to Social Media (3)***
Social media platforms such as Facebook and Twitter represent a new class of communication platforms that have become quickly interwoven into the everyday lives of millions of people around the world. In this course we will draw on competing communication perspectives to explore the reasons behind the widespread popularity of these platforms. In doing so we will consider the role of individual choice, social influence, technological influence, and how these three perspectives can be combined. We will further explore the implications of social media for personal relationships, youth culture, organizations, social research, and personal privacy.

04:192:306 ***Social Network Analysis (3)***

Social networks are a core part of our lives. We are embedded in networks of friendship, support, and communication -- as well as in organizational, industry, and technological networks. This course explores the emergence and impact of networks, with a focus on understanding and analyzing their structure. Students will learn the fundamentals of network theory and social network analysis, gaining tools to critically evaluate social structures. The class will examine how social connections shape human behavior, success, and creativity.

04:192:307 ***Health Literacy (3)***
This class focuses on applying literacy principles to real-life health phenomenon, in clinical encounters, as well as in community and public health contexts with an emphasis on medically underserved and vulnerable populations.
Prerequisite: 04:192:200.

04:192:313 ***Message Design for Public Relations and Organizational Communication (3)***
Theories and techniques for collecting, selecting, packaging, and disseminating information within organizations and between organizations and their constituencies.
Prerequisites: 04:189:101; 04:192:200; 04:192:365.

04:192:315 ***Professional Writing and Communication (3)***
Analyzing and applying writing skills, techniques, design, and strategies to communication topics and processes. There are separate sections for research in the disciplines (popular culture, the family, globalization, technology, and society), writing for business and professions, and collaborative writing.
Prerequisites: 04:189:101; 04:192:200.

04:192:333 ***Political Communication (3)***
This course provides an overview of the field of political communication. Accordingly, we will analyze the role of advertising, polling, media coverage, image construction, and ethics in political campaigns through a historical and case study perspective. We will also discuss the role of current communication theories and their effects on contemporary political messages. We will focus specifically on the communication dynamics of political campaigns.
Prerequisites: 04:189:101; 04:189:102 or 103; 04:192:200; 04:192:201. Open only to communication majors. Note: This course fulfills a requirement for the leadership in organizations and community specialization within the communication major.

04:192:344 ***Language and Communication (3)***
Sociolinguistics, psycholinguistics, language acquisition and development, phonetics, and issues of bilingualism.
Prerequisites: 04:189:101; 04:192:200.

04:192:346 ***Intercultural Communication (3)***
Process of communication among individuals from different cultures or subcultures; influence of value orientations, concepts of time, thought patterns, and nonverbal styles.
Prerequisites: 04:189:101; 04:192:200.

04:192:347 ***Information Systems and Communication (3)***
Generation, classification, storage, retrieval, and use of information in human communication systems.
Prerequisites: 04:189:101; 04:192:200.

04:192:350 ***Visual Communication (3)***
Critical evaluation of the aesthetic and social impacts of visual communication.
Prerequisites: 04:189:101; 04:192:200.

04:192:354 ***Communication and Technology (3)***
Provides an overview of communication theory and research related to the use of a range of communication technologies in a variety of interpersonal, group, and societal contexts.
Prerequisites: 04:189:101; 04:192:200. Open only to communication majors.

04:192:355 ***Interpersonal Communication (3)***
Critical examination of the theory and research concerning the dimensions, dynamics, and functions of interpersonal interaction.
Prerequisites: 04:189:101; 04:192:200.

04:192:356 ***Group Communication (3)***
Principles of group communication, types of groups, group structure, leadership, and membership roles; techniques for working with groups.
Prerequisites: 04:189:101; 04:192:200.

04:192:357 ***Organizational Communication (3)***
Communication in organizations, communication networks, management and communication, decision-making, goal setting, and process consultation in varying organizational settings.
Prerequisites: 04:189:101; 04:192:200.

04:192:359 ***Persuasive Communication (3)***
Principles and techniques in persuasive communication: credibility, audience analysis, assessment of effects, media selection, resistance to persuasion, and attitude change.
Prerequisites: 04:189:101; 04:192:200.

04:192:360 ***Principles of Interviewing (3)***
Analysis of the interview as a unique communication context, including the application of theoretical concepts and practice in designing and conducting interviews of various types (e.g., surveys, employment, information giving, counseling).
Prerequisites: 04:189:101; 04:192:200.

04:192:365 ***Principles of Public Relations (3)***
Basic principles and policies of public relations and advertising; includes history, development, ethics, roles, functions, media selection methods, and message strategies of public relations.
Prerequisites: 04:189:101; 04:192:200.

04:192:366 ***Organizational Reputation and Representation (3)***
Organizations represent themselves to various stakeholder groups, both inside the organization and within the environment. In doing so, organizations encounter issues of reputation and identity. Combining theoretical foundations and a case study approach, this course will examine these issues critically and analytically.
Prerequisites: 04:189:101; 04:192:200. Only open to communication majors.

04:192:369 ***Internship in Communication I (3)***
Practical field experience in intercultural, international, interpersonal, group, organizational, or mass communication; or public relations and advertising.
Prerequisites: 04:189:101; 04:192:200; and permission of instructor. Open only by application to communication majors accepted to the School of Communication and Information.

04:192:370 ***Internship in Communication II (1-3)***
Continued practical field experience.
Prerequisites: 04:192:369 and permission of instructor. Open only by application to communication majors accepted to the School of Communication and Information. Does not count toward the major.

04:192:372, 373, 374, 375 ***Topics in Communication I, II, III, IV (3,3,3,3)***
Topical seminars dealing with issues of concern to contemporary communication studies.
Prerequisites are minimally 04:189:101, 04:189:200, 04:189:300, Open to communication majors only . Other prerequisites may vary with each offering.

04:192:380 ***Public Speaking (3)***
Principles of public speaking; practice in composition, delivery, and criticism of informative, persuasive, and entertaining speeches.

04:192:381 ***Argumentation (3)***
Principles and techniques of persuasion through argument, evidence, and logical inference.
Prerequisites: 04:189:101; 04:192:200.

04:192:382 ***Children and Media (3)***
This course examines children's and adolescent's interactions with media and technology and their influence on communication and social development.

04:192:383 ***Advanced Public Speaking (3)***
This workshop-based course aims to enhance students' current oral communication skills in a variety of real-life scenarios (personal and professional) with a focus on civic engagement.

Prerequisites: 04:192:380

04:192:390 ***Approaches to Leadership (3)***
Provides a multidisciplinary and collaborative environment focused on leadership theory and current practice in public and private sector organizations through a communication lens. Leadership models will be analyzed and

evaluated for effectiveness from a variety of perspectives providing opportunities to gain a greater understanding of theories, concepts, models, and approaches of leadership in diverse contexts (personal, team, group, organization, community, etc.).
Prerequisites: 04:189:101; 04:192:200.

04:192:403 ***Conflict Negotiation and Resolution (3)***
This course examines features of interpersonal conflict situations, explores individual conflict styles, and identifies strategies for managing or resolving interpersonal conflict.
Prerequisites: 04:189:101, 04:192:200, 04:192:300. Open only to communication majors.

04:192:404 ***Communicating about Relationship Challenges (3)***
Examines the role of interpersonal communication in managing a variety of challenging events in friendships, romantic relationships, and family relationships, such as hurt, conflict, jealousy, negotiating sexual intimacy, terminating relationships, etc.
Prerequisites: 04:189:101, 04:192:200, 04:192:300. Open only to communication majors.

04:192:405 ***Communication and Gender (3)***
Effects of gender roles in various communication contexts; examination of literature and research on differences between male and female patterns of interaction.
Prerequisites: 04:189:101; 04:192:200, 201, 300. Open only to communication majors.

04:192:406 ***Relationships and Identities in Interaction (3)***
Examines how relationships and identities are constructed in communication. Focuses on specific practices of interaction--the basic building blocks for communication--to discover those practices through which communicators build their actions and sometimes thereby, their relationships and identities.
Prerequisites: 04:189:101, 04:192:200, 04:192:300. Open only to communication majors.

04:192:407 ***Health Communication (3)***
Exploration of communication demands of health care and the development of effective communication strategies and skills for use in health care practice.
Prerequisites: 04:189:101; 04:192:200, 04:192:201, 04:192:300. Open only to communication majors.

04:192:408 ***Health Message and Campaign Design (3)***
Design, implementation, and evaluation of public communication campaigns designed to change health behavior of individuals, groups, and entire populations.
Prerequisites: 04:189:101, 04:192:200, 04:192:201, 04:192:300. Open only to communication majors.

04:192:409 ***Public Relations Management (3)***
Analysis and preparation of case studies in industry, labor, education, government, and trade organizations, and the application of public relations techniques.
Prerequisites: 04:189:101; 04:192:200, 04:192:201, 04:192:300, 04:192:365. Open only to communication majors.

04:192:410 ***Media, Marketing, and Communication***
This course links communication theory to the practice of marketing and media planning. Students work to analyze current trends in media and marketing while applying skills learned in previous communication courses.
Prerequisites: 04:189:101; 04:192:200, 04:192:201, 04:192:300. Open only to communication majors.

04:192:411 ***Crisis Communication and Public Information (3)***
Examines the processes through which organizations handle and disseminate information to the public with a specific emphasis on crisis communication.
Prerequisites: 04:189:101; 04:192:200; 04:192:201; 04:192:300; and either 04:189:102 or 04:189:103.

04:192:412 ***Communication and Management in Media Organizations (3)***
This course introduces students to the organizational structure of media and advertising organizations and focuses on the central role of communication particular to media and advertising. The course is designed to expose students to core concepts and principles of organizational theory as they apply to these organizations. Students will learn how to navigate modern media and advertising organizations in the current technological landscape.
Prerequisites: 04:189:101; 04:192:200; 04:192:201; 04:192:300

04:192:422 ***Communication and Facilitation (3)***
Theory and pragmatics of intrapersonal, interpersonal, and small-group process analysis, intervention, and facilitation.
Prerequisites: 04:189:101, 04:192:200, 04:192:201, 04:192:300. Open only to communication majors.

04:192:432 ***Communication, Technology, and Society (3)***
This course analyzes communication technologies, their consequences for society and individuals, and the social forces that affect their form and function. It critically examines the impact of communication technology on society through in-depth seminars and independent research.
Prerequisites: 04:189:101, 04:192:200, 04:192:201, 04:192:300. Open only to communication majors.

04:192:442 ***Supportive Communication (3)***
This course features critical exploration of the theory and research regarding personal and community experiences of social support, its influences on interpersonal relationships and health, and its social functions.
Prerequisites: 04:189:101, 04:192:200, 04:192:201, 04:192:300. Open only to communication majors.

04:192:443 ***Nonverbal Communication (3)***
Nonverbal aspects of human communication, including proxemics, kinesics, vocalics, eye behavior, human artifacts, and environments; the functions served by nonverbal behavior in interaction.
Prerequisites: 04:189:101, and 04:189:102 or 04:189:103; or 04:192:200, 04:189:201, 04:189:300. Open only to communication majors.

04:192:444 ***Language, Behavior, and Communication (3)***
Sociolinguistic, psycholinguistic, and general semantic analysis of language as a component of human communication systems.
Prerequisites: 04:189:101, and 102 or 103; 04:192:200, 201, 300. Open only to communication majors.

04:192:446 ***Communication and Social Change (3)***
Role of communication in social change, diffusion of innovations, and national development.
Prerequisites: 04:189:101, and 04:189:102 or 04:189:103; 04:192:200, 04:189:201, 04:189:300. Open only to communication majors.

04:192:447 ***Urban Communication (3)***

Urban communication addresses the ways individuals, institutions, and information communication technology use organize urban life. This course helps students appreciate the city as a communication environment with its own communicative practices and processes, as well as variations in urban communication related to geography, culture, inequality, and other factors. Students will learn how contemporary urban issues can be understood and addressed through communication and will practice doing urban communication research.

Prerequisites: 04:192:200, and 04:192:300. Open only to communication majors.

04:192:450 ***The Dark Side of Organizations (3)***
This course takes a communication-based approach to key workplace processes that operate in the shadows (e.g., violence, wrongdoing, harassment) and what are called hidden organizations (e.g., terrorist cells, informal economy, secret societies).

04:192:458 ***Leadership in Groups and Organizations (3)***
Examines leadership from a communicative perspective, integrating theory and practice. Combines traditional informational components of university courses with experiential learning activities, such as interactive simulations, exercises, case studies, and an organizational simulation.
Prerequisites: 04:189:101, 04:192:200, 04:192:201, 04:192: 300. Open only to communication majors.

04:192:459 ***Patient-Provider Communication in Health Care (3)***
This class explores facets of patient-provider communication and their impact on patient and provider satisfaction and health outcomes.
Prerequisites: 04:189:101; 04:192:200, 04:192:300. Open only to communication majors.

04:192:460 ***Advanced Health Communication (3)***
Application of principles and techniques in a targeted health communication campaign; social norms theory, experiential learning theories, effects of misperceptions on behavior, and needs of special student populations.
Prerequisites: 04:189:101; 04:192:200, 04:192:201, 04:192:300; and either 04:189:102 or 04:189:103. Open only to communication majors.

04:192:466 ***Audience and Market Analysis (3)***
Covers principles and methods of identifying, categorizing, and segmenting mass audiences. The more specifically a public relations or marketing/communications professional identifies targets by demographic or other means, the easier it is to find communication strategies and tactics that will reach those targets. The course will enable students to define his/her target audience, how to expose hot buttons for copy content and style, SEO/SEM keywords, hook development, and more
Prerequisites: 04:189:101; 04:192:200, 04:192:201, 04:192:300. Open only to communication majors.

04:192:470 ***Research in Communication (3)***
Research projects conducted under the direction of individual faculty members. Requires application.
Prerequisites: **04:189:101, 04:192:200, 04:192:201, 04:192:300*; faculty sponsor; and approval of chair. Open only by application to communication majors.***

04:192:472, 473, 474, 475, 477 ***Topics in Communication V, VI, VII, VIII, IX (3,3,3,3,3)***
Advanced topical seminars dealing with issues of concern to contemporary communication studies.
Prerequisites: **004:189:101, 04:192:200, 04:192:201, 04:192:300.** ***Open only to communication majors. Other prerequisites may apply depending upon the offering.***

04:192:476 ***Advanced Communication Theory (3)***
Issues in theory building in the field of communication.
Prerequisites: **04:189:101, 04:192:200, 04:192:201, 04:192:300.** ***Open only to Senior communication majors.***

04:192:478 ***Family Communication (3)***
Family communication theory, research, and practice. Includes assessment and measurement of interaction patterns, pathologies, and intervention strategies.
Prerequisites: **04:189:101, 04:192:200, 04:192:201, 04:192:300.** ***Open only to communication majors.***

04:192:481 ***Advanced Research (3)***
Research trends in current literature in interpersonal, group, organizational, mass, and intercultural communication, and in public relations and advertising.
Prerequisites: **04:189:101, 04:192:200, 04:192:201, 04:192:300.** ***Open only to communication majors by permission of the instructor.***

04:192:491,492 ***Independent Study in Communication (3,3)***
Independent study projects in communication.
Prerequisites: **04:189:101, 04:192:200, 04:192:201, 04:192:300.** ***Faculty sponsor and approval of chair. Open only by application to communication majors. Does not count toward major.***

04:192:493 ***Senior Thesis Independent Project I (1-3)***
Prerequisites:**04:189:101, 04:192:200, 04:192:201, 04:192:300.** ***Open only by application to communication majors.***

04:192:494 ***Senior Thesis Independent Project II (1-3)***
Prerequisite: **04:189:101, 04:192:200, 04:192:201, 04:192:300.** ***Open only by application to communication majors.***

04:192:495 ***Applied Study in Communication (3)***
Supervised study in communication pedagogy.
Prerequisites: 04:189:101, 102; 04:192:200, 201, 300. Open only by application to communication majors. Reserved for tutors. Does not count toward major.

Digital Communication, Information, and Media 189 Courses (SC&I-G)

Digital Communication, Information, and Media 189 Courses

04:189:151 ***Virtual Team Dynamics (3)***
Students learn to understand and navigate the dynamics of the modern technology-infused workplace in which the ability to apply well-developed communication, writing, and technological skills/competencies in virtual settings is vital. Theory, research, and case studies will be analyzed with regard to virtual teambuilding, managing conflict and power dynamics, enhancing creativity and innovation, gathering and disseminating information effectively and ethically, integrating virtual and face-to-face tasks and spaces as appropriate, embracing diversity and inclusion, and facilitating global, intercultural collaboration. The course takes a multi-disciplinary approach to these topics, blending insights from multiple disciplines including communication, psychology, sociology, business, and human resources management.

04:189:220 ***Data in Context (3)***
This course introduces students to the interplay between data and its surrounding societal context. It will cover the basics of data science, focusing on the ethical, legal, and social implications of data and algorithms. Students will learn to conceptualize and evaluate practical applications of data science in communication, information, and media contexts. (Note that ITI students have an ITI course number for this class, 04:547:225.)

04:189:251 ***Strategic Presentation Methods in Digital Media (3)***
This course examines theories and techniques for analyzing, producing, and disseminating messages. Students will learn how to use web-based and multimedia presentation tools to connect with a variety of audiences and convey a desired message. Each student will craft a message to support some social change by developing and shaping the message into compelling digital media presentations in a range of formats.

RU Learning Goals met by this course: Information Technology and Research (ITR) aa. Understand the principles that underlie information systems. WDd - Communicate effectively in modes appropriate to a discipline or area of inquiry; evaluate and critically assess sources and use the conventions of attribution and citation correctly; and analyze and synthesize information and ideas from multiple sources to generate new insights.

04:189:351 ***Leadership in Digital Contexts (3)***
Students will use scenarios, simulations, and game-playing as individuals, in small groups, and as a class to employ creativity and innovation in problem solving, weigh risk, perform leadership and management roles with peers, and grapple with the consequences of making and implementing decisions in digital environments. Students will learn how to assess and select among various technologies for making and disseminating decisions. This course presents a framework for understanding the role of technology in leadership functions including planning, information dissemination, consensus building, negotiation, and engagement with stakeholders for informed and participative decision making in online and virtual settings.
Prerequisite: 04:189:151 or 04:189:152.

04:189:352 ***Self and Society in Virtual Contexts (3)***
Students explore what it means to have multiple and merging "identities" in an online community by attending this seminar in person in a traditional classroom supported with interactions as avatars within a social virtual world. How are interpersonal relationships and group interactions manifested in virtual environments? How is selfhood expressed? What is the impact on communication when gender, race, and other physical attributes are self-selected and represented digitally? What are the implications for privacy and security? What does this mean for the workplace? What do "human rights" mean in a virtual society and is citizenship changed with purely online interaction? Through role-playing and discussion, students connect to evaluate the consequences of a digital context on the self and society.

04:189:353 ***Digital Technology and Disruptive Change (3)***
This course explores whether and how emerging digital technologies--such as social, mobile, wearable media; virtual worlds and games; sensor-laden devices and environments; robotics; drones; implantable chips; artificial intelligence--contribute to disruptive changes in relationships, organizations, societies, and selves. Multiple perspectives on communication, information, and media will be applied in analyzing the extent to which the structure, norms, and dynamics of modern social life have changed and have experienced continuity, and the conditions under which such changes can be considered disruptive. Micro- and macro-level processes and outcomes (interpersonal, cultural, institutional, political, global) of emerging digital technologies will be examined.

SAS Core Learning Goals met by this course: Information Technology and Research (ITR) y. Employ current technologies to access information, to conduct research, and to communicate findings. CCO-2: Analyze the relationship that science and technology have to a contemporary social issue.

04:189:451 ***Capstone in Digital Communication, Information, and Media (3)***
The capstone course is designed to facilitate students' synthesis of what they have learned in the program, through a directed project. Students will first work together in class to identify and refine projects or areas of research to complete. Capstone project presentations will be captured digitally for feedback from the larger community. Capstone projects may be done individually or in pairs. Projects will contribute to the students' websites; a portion of this class will include preparation of a website of material from the minor.
Prerequisites: Completion of at least 15 credits within the minor, or completion of 12 credits and concurrent enrollment in one other DCIM course. Open only to declared DCIM minors.

Gender and Media 438 Courses (SC&I-G)

Gender and Media 438 Courses

Courses in the gender and media minor draw from four different programs:

01:988 - Women's and Gender Studies
04:189 - Communication and Information
04:547 - Information Technology and Informatics
04:567 - Journalism and Media Studies

Below is a list of all of the courses in the program, linked to their descriptions in their programs. For requirements, check the gender and media minor description. Descriptions for the 988 (women's and gender studies) courses may be found on that department's website.

01:988:200 Gender, Digital Media, and Social Curation
01:988:202 Gender, Culture, and Representation
01:988:255 Gender, Art, and Society
01:988:257 Gender and the Body: Representations of Pornography
01:988:258 Gender, Race, and Contemporary Art
01:988:259 Homosexuality and Visual Culture
01:988:317 Gender and Consumption
01:988:341 Gender and Popular Culture
01:988:376 Theories of Women and Film
01:988:499 Capstone in Gender and Media
04:189:251 Strategic Presentation Methods in Digital Media
04:547:340 Gender and Technology
04:567:200 Writing For Media
04:567:215 Gender, Race, and Class in the Media
04:567:274 Consumer Media Culture
04:567:380 Media and Social Change
04:567:499 Capstone in Gender and Media

Information Technology and Informatics 547 Courses (SC&I-G)

Information Technology and Informatics 547 Courses

04:547:111 ***The Internet and the Information Environment: A Quantitative Approach (3)***
A quantitative and mathematically rigorous introduction to concepts that underlie the internet and web search engines. A challenging problem will introduce each topic, and the exposition of principles and relevant theorems will be followed by an application to the internet and at least one other application in the social sciences (e.g., social networks) or the humanities (e.g., author identification). **The course counts as one of the two mathematics courses that must be taken in order to meet the Rutgers graduation requirements in quantitative reasoning.**

04:547:200 ***Social Informatics (3)***
This course provides a survey of the key social issues related to information technology development, decision-making and use. Its focus is on the critical analysis of social, cultural, philosophical, ethical, legal, public policy and economic issues relating to information technologies, and how these interactions shape workplace decisions and technology use.
Prerequisite: 04:189:103 with a grade of C or better. Some sections open only to ITI majors.

04:547:201 ***Information Technology Fundamentals (3)***
As the introductory course to the technological concentration/area in the ITI program, Introduction to Computer Concepts explains the basic principles of computer systems and applications. It covers the basic mathematical-theoretical principles that govern the functioning of computers, the architecture and organization of computer systems, the role of hardware and software, and the role of creative thinking and problem solving in building software applications.
Prerequisite: 04:189:103 with a grade of C or better. Some sections open only to ITI majors.

04:547:202 ***Object-Oriented Programming (3)***Introduces students to the principles of object-oriented analysis, design, and programming. The focus is on developing creative thinking for analyzing a problem domain and designing a solution, and on using the Java programming language (or other appropriate programming language) to implement it.
Prerequisite: 04:547:201. Open only to ITI majors.

04:547:210 ***Designing Human-Centered Technology Solutions (3)***
This course focuses on the relationship among information, technology, and people in an applied context. Students will learn to define design-problem spaces, represent the problem, and suggest sociotechnical solutions.
Prerequisite: 04:547:201.

04:547:215 ***Social Impacts of Video Games (3)***
This course will examine video games from a cultural and social perspective. Rather than focusing on game design, it will explore the ways culture, socialization, and values are a part of gaming. Using a variety of theoretical and methodological approaches, a range of topics will be discussed in an attempt to understand not only the internal workings and social dynamics of computer games, but their place in the broader culture. Topics include: community

management and maintenance in games; social processes and interaction; games as communication spaces and virtual worlds; intellectual property and commodification in games; players as producers of game content; political/ideological analysis of games; gender and race in gaming; and design and values.

Prerequisites: Some sections are open only to ITI majors.

04:547:220 ***Retrieving and Evaluating Electronic Information (3)***
Students examine and analyze the information retrieval process in order to more effectively conduct electronic searches, assess search results, and use information for informed decision-making. Major topics include search engine technology; human information behavior; evaluation of information quality; business, economic, and cultural factors that affect the availability and reliability of electronic information; and the future of search.

04:547:221 ***Fundamentals of Data Curation and Management (3)***
This course introduces students to the use of large data sets and prepares them for work in organizational and research settings. The students will learn the basics of acquiring and curating practical data, discovering patterns, and managing large datasets with databases. Students will work multiple modalities of data such as textual, networked, and numerical datasets.
Prerequisites:04:547:202; or both 01:198:142/01:960:142 and 01:960:291.

04:547:225 ***Data in Context (3)***

This is an ITI Program course number for 04:189:220 DATA IN CONTEXT. This course introduces students to the interplay between data and its surrounding societal context. It will cover the basics of data science, focusing on the ethical, legal, and social implications of data and algorithms. Students will learn to conceptualize and evaluate practical applications of data science in communication, information, and media contexts.

04:547:230 ***Human-Computer Interaction (3)***
This course studies how best to design the interface between human users and computer systems. Emphasis is placed on learning how to involve the user at different stages in the design process to improve the interface in a cost-effective way. In particular, experience with iterative user-centered design, rapid prototyping, and usability testing methods are developed. Students evaluate several computer interfaces as well as iteratively design and evaluate an interface prototype.

04:547:240 ***Digital Hardware Basics (3)***
This course provides students the opportunity to develop the basic computer skills needed to manage an information technology operation in the business world. The class includes a broad coverage of technology concepts and trends underlying current and future developments in IT operations. We start by introducing the workplace environment of your staff, then moving to the background of the computer and its hardware devices components. The students will end with a broad base of knowledge and competency in hardware operations management including installation, configuration, diagnosing, preventative maintenance, and basic networking.

04:547:300 ***Application of Research in Information Technology (3)***
This course provides an introduction to systematic inquiry in information technology and informatics using quantitative and qualitative approaches with an emphasis on individual and organizational users of information working in electronic environments. It includes the analysis, synthesis, evaluation, and reporting of applied and theoretical research in the information technology field. Computer laboratory sessions are used to facilitate

statistical, textual, and graphical analyses of data. Methodologies of research in information technology are critically evaluated.
Prerequisites: 04:547:220.

04:547:310 ***Strategic Leadership in Informatics (3)***
This course focuses on leadership theory and its applicability in understanding the role of leadership in dynamic organizations. It places emphasis on cultural concerns and the importance of diversity in ensuring competitiveness in the increasingly diverse marketplace. It addresses global issues in information and communication technology, the importance of effective leadership at all levels in organizations, and the relationship between leadership and organizational success. An additional focus is the necessity for collaboration and ethical practices.
Prerequisite: 04:547:210.

04:547:311 ***Information Technology Project Management (3)***
Covers fundamental concepts and applied techniques for effective management of information technology development and implementation projects. Students will develop practical competencies with industry-standard software tools and techniques, applying traditional PM frameworks (e.g., Waterfall, Rational) and contemporary (e.g., Agile-based) techniques to the planning and monitoring of information technology implementation projects.
Prerequisite: 04:547:210. Open only to ITI Majors

04:547:315 ***Game Design Methodology (3)***
Examines the theory, practice, and methodology of the modern game designer. Content will cover everything from simple board game mechanics to the inner workings of massively multiplayer experiences. From developing ideas for new product concepts to writing strong game design documentation to fine-tuning gameplay mechanics, this course provides a survey of the best practices, key challenges, and unique opportunities for game designers.
Prerequisite: 04:547:201.

04:547:320 ***Web Design (3)***
This course focuses on the role that web pages play in an organization's public profile, and on establishing linkages between specific content and organizational and client needs in a web-based environment. It addresses principles and skills of web design using current W3C standards, website access, usability, and evaluation. It also addresses developing website content tailored to specific audiences.
Prerequisite: 04:547:201.

04:547:321 ***Information Visualization (3)***
Students learn how to effectively present complex information using the web, multimedia, or information visualization techniques. The course develops an understanding of how best to leverage human perceptual capabilities to communicate information or gain insights into large and abstract data.
Prerequisite: 04:547:201 or 01:198:142/01:960:142 and 01:960:291.

04:547:330 ***Database Technologies (3)***
This course introduces students to basic database design principles and applications, and the use of database technologies for the organization and management of large information systems. It focuses on development of data structures, database design principles, relational structures, database testing and use, query language, as well as translating organizational needs into database applications.
Prerequisite: 04:547:202.

04:547:331 ***Networking and Internet Technology (3)***
This course provides an introduction to computer network and internet technologies. It emphasizes the distinction between various logical concepts and entities such as networks, the internet at large, and the World Wide Web. Universal protocols and services such as SMTP, HTTP, DNS, and SNMP are explored. In addition, students will learn to deconstruct and identify components of common technologies. The context of these technologies within society and business is also introduced
Prerequisite: 04:547:201

04:547:332 ***Advanced Web Design Technologies (3)***
With the advent of the Extensible Markup language, web developers have the opportunity to build richer, more fully interactive sites by tapping into the power of a series of flexible and robust technologies that permit more effective sharing of information between organizations. Students will be starting with the fundamentals of XML and moving on into discussions and implementations of XHTML, Schema, DTDs, RSS, Web Services, AJAX, and other XML-based frameworks for web development. Particular attention will be paid to the issues surrounding open source development efforts and the business case for various technologies and their alternatives.
Prerequisite: 04:547:201 or 04:547:320.

04:547:333 ***Information Security (3)***
An introduction to the various technical and administrative aspects of information security and assurance. This course provides the foundation for understanding the key issues associated with protecting information assets, determining the levels of protection and response to security incidents, and designing a consistent, reasonable information security system, with appropriate intrusion detection and reporting features. The purpose of the course is to provide the student with an overview of the field of information security and assurance. Students will be exposed to the spectrum of security activities, methods, methodologies, and procedures. Coverage will include inspection and protection of information assets, detection of and reaction to threats to information assets, and examination of pre- and post-incident procedures, technical and managerial responses, and an overview of the information security planning and staffing functions.
Prerequisite: 04:547:201.

04:547:340 ***Gender and Technology (3)***
The course analyzes gender in relation to race, class, nationality, culture, religion, and sexuality in the context of technological innovation. Its focus is on fundamental concepts, the feminist critique of technoscience, and the impact of gender issues on the workplace inclusiveness and equity, in a transnational and historical perspective. It examines the effects of gender on the development and use of information technologies and on gender-based information and technology preferences.

04:547:400 ***Information Privacy (3)***
This course explores information privacy, security, and technology in contemporary organizations. Students analyze how regulatory, social, and ethical issues impact information privacy and data protection, and implement tools to manage information privacy risks.
Prerequisites: 04:547:200 and 04:547:333.

04:547:410 ***Electronic Commerce (3)***
This course examines the technologies used to transact business electronically. It investigates a range of social, economic and security issues related to such transactions, and the design of websites that facilitate these transactions.
Prerequisites: 04:547:202 or an equivalent course. Open only to ITI majors.

04:547:415 ***Digital Game Creation (Game Design) (3)***
Creating a digital game involves merging the skills of many disciplines into a single cohesive whole. It involves applying principles from computer programming, two- and three-dimensional digital art, animation, physics, mathematics, artificial intelligence, user interface and experience design, psychology, narrative design, and visual communication to provide an incomplete list. This course focuses upon understanding and demonstrating the technical implementation of game play mechanics within a game engine framework. It is designed to expand upon the work done in Game Design Methodology (04:547:315) to provide an introduction in working with these disparate skill sets by building subsets of a complete game in a digital form.
Prerequisites: 04:547:201 and 04:547:315.

04:547:420 ***Economics of Information Technologies (3)***
This course examines economic theories related to information technologies and systems. The concept of information as "commodity" is considered. Quantitative methods such as cost-benefit analysis and return on information technology investment evaluation are introduced. Alternative methods such as measuring the human costs associated with information technology implementations are also addressed.
Prerequisite: 04:189:210.

04:547:421 ***Data Analytics for Information Professionals (3)***
Data analytics linked to storage, curation, management, and mining with attention to alternative methodological approaches. The course will demonstrate various methods to explore how big data might be analyzed, stored, and retrieved.

04:547:440 ***Information Technology and Learning (3)***
This course focuses on understanding how organizations learn and how information technology can be used for the design and development of instructional systems and materials within the organization to facilitate workplace learning. It addresses workplace learning needs, learning styles, learning outcomes, representation of knowledge, problem solving, and assessment of the usability of e-learning systems in the workplace.
Prerequisite: 04:189:210.

04:547:445 ***Certification Practicum in ITI (3)***
This course will operate like an independent study course, where the students' work will be directed toward passing an IT certification test. Selected certificates--ones that are in demand by companies and organizations--will be options presented to the students. Certification options may include, but are not limited to: A+, CCNA, MCTS, etc.
Prerequisite: Permission by the department. Open only to ITI majors.

04:547:450 ***ITI Internship (1-3)***
The student negotiates or gains a work placement of approximately 50 to 150 hours. The internship provides supervised professional work experience in a corporate, research, or educational setting, where there is opportunity to apply and further develop knowledge and skills acquired in the Information Technology and

Informatics course work.
Open only to ITI majors. Approval of proposed work by ITI program director and academic supervisor, with the approval form filed prior to registration.

04:547:455 ***Capstone in Information Technology and Informatics (3)***
The Capstone in Information Technology and Informatics is designed to synthesize what students have learned in the ITI program through a directed project identified by the coordinator and the ITI director. Throughout the semester, students work together in teams to complete the selected project. Students may also complete written assignments that document the progress of the team, produce a final paper, and participate in a final presentation experience to showcase their work.
Prerequisites: Open to ITI majors only. Completion of at least 18 credits in the major and preferable in the last semester of major.. Permission of the department.

04:547:460 ***Independent Study (3)***
Students design, negotiate and manage a program of study under the advisement of a faculty member based on their existing experience and knowledge and on their career intentions. The study builds on existing knowledge and skills acquired during the major in an area not available through elective courses in the ITI major.
Prerequisites: 04:547:200,04:547:201, 04:547:202, and 04:547:210. Prior approval of proposed project by ITI program director and ITI faculty supervisor, with an approval form filed prior to registration.

04:547:465 ***Senior Thesis (3)***
Honors students will conduct original research under the supervision of a faculty adviser and an honors thesis committee. Students must be accepted into the honors program in order to enroll in this course.
Prerequisites: 04:547:300; special permission of the department. Open only to ITI majors.

04:547:470,471,472,473,474,475,476, 477 ***Topics in Information Technology I,II,III,IV,V,VI,VII,VIII (3,3,3,3,3,3,3)***
Special topics relevant to contemporary studies in information technology and informatics.
Prerequisites: To be determined on the basis of each semester's offering.

Journalism and Media Studies 567 Courses (SC&I-G)

Journalism and Media Studies 567 Courses

04:567:200 ***Writing for Media (3)***
Fundamentals of writing across media platforms. By the end of the course, students will be able to write in many journalistic and media-based styles using basic and accepted techniques accepted by each discipline. This course will serve as a foundation for understanding and using different styles of writing, research, and content development. (Required course)

04:567:201 ***Media Ethics and Law (3)***
Legal issues and ethical problems confronting journalists. (Required course)
Open only to journalism and media studies majors.

04:567:202 ***Creating Content (3)***
Students will master the fundamentals of audio and video production and gain an understanding of how to create engaging and editorially sound visual stories.

04:567:205 ***Digital News Writing and Reporting (3)***
Fundamentals of gathering information and journalistic writing. By the end of the course, students will learn basic journalistic newswriting and reporting techniques and concepts, including writing in journalistic style, fact-gathering, conducting observation, freedom of information, and professional ethics. (Foundational course)
Prerequisites: 04:567:200. Open only to journalism and media studies majors.

04:567:206 ***Broadcast Newswriting and Reporting (3)***
Newswriting for radio, with review of television newswriting approaches for comparison. (Foundational course)
Prerequisites: 04:567:200. Open only to journalism and media studies majors.

04:567:207 ***Design and Digital Editing (3)***
Fundamentals of copyediting and layout. (Foundational course)
Prerequisites: 04:567:200. Open only to journalism and media studies majors.

04:567:210 ***Media Management and Strategy (3)***
Focuses on the key economic and strategic concepts, challenges, and opportunities that are central to the management of contemporary media organizations. The course is grounded in the growing academic and professional literatures examining the unique nature of media products and services and the unique and rapidly changing marketplace dynamics in which media organizations operate. Given the ongoing convergence of media industries and technologies, this course focuses on concepts, analytical tools, and issues that have relevance across the full range of media industry sectors.
Prerequisites: 04:567:200. Open only to journalism and media studies majors.

04:567:211 ***Exploring New Media (3)***
This course examines the nature and impact of emerging media technology. Students study four primary ways new technology influences media, including 1) how media professionals do their work; 2) the nature of media content; 3) the relationships between and among media and relevant publics; and 4) the structure, culture, and management of media organizations and systems. Five areas of media technology are studied, including 1) acquisition tools; 2) storage technologies; 3) processing devices; 4) distribution technologies; and 5) display, access, or presentation tools. (Foundational course)
Prerequisites: 04:567:200. Open only to journalism and media studies majors.

04:567:212 ***Digital Media Production (3)***
Digital media production is the study of media creation and display through online and interactive experiences. This includes audio and video steaming in online contexts, but it also covers other types of new media that are hybrids of the two. Using various multimedia systems and formats, students will explore the foundations of development, content creation and distribution across multiple platforms. Focusing on multi-platform digital media, students will have the opportunity to write, produce and edit your own digital media content for online distribution
Prerequisite: 04:567:200. Open only to journalism and media studies majors.

04:567:215 ***Gender, Race, and Class in the Media (3)***
Content, treatment, and effects of women and minority group coverage in television, newspapers, magazines, popular music, and film. (Foundational course)

04:567:216 ***Digital Media and Society (3)***
Historical and contemporary social, cultural, political, and economic issues related to digital media in society. (Foundational course)

Prerequisite: Open only to journalism and media studies majors.

04:567:217 ***Foundations of Media Analysis (3)***
Survey of critical approaches to the analysis of media and its impact on society. (Foundational course)

04:567:250 ***Children and Media (3)***
This course examines children's relationship to media in its historic, economic, political, and social contexts. It begins by reviewing theories of child development as they inform children's relationship with and understanding of media. Next, it considers the political and economic forces that shape the landscape of children's media. Against this backdrop, the course examines research on the effects of media on children's physical, cognitive, social, and emotional development. Students in this course produce a proposal or prototype for an educational children's media property as their final project. (Concept and Analysis Course)

04:567:251 ***Topics in Journalism and Media Studies I (3)***

Specialized topics related to the practice of journalism are offered on a regular basis.

04:567:252 ***Topics in Journalism and Media Studies I (3)***

Specialized topics related to the practice of journalism are offered on a regular basis.

04:567:253 ***Topics in Journalism and Media Studies I (3)***

Specialized topics related to the practice of journalism are offered on a regular basis.

04:567:274 ***Consumer Media Culture (3)***
Provides a critical understanding of advertising's role in society. Examines the history of advertising, the commercial and social aspects of the messages conveyed by ads, and the advertising industry's influence on social relations and institutions. The basic orientation of the course is to study consumer media culture (advertising, public relations, and branded space) as a form unique to modern society. (Concept and Analysis course)

04:567:275 ***Social Media and Participatory Culture (3)***
This course takes a critical approach to understanding new media environments, especially with regard to what has been called at various moments "social media," "participatory culture," "digital media," "convergence," "Web 2.0," "social web," and "interactive media," among other things. Rather than focus on these emerging media practices as purely technological phenomena, the course situates them in broader social, political, and historical contexts. We will examine key dimensions of cultural life that make up our selves, including friendship, intimacy, labor, celebrity, power, gender, control, race, sexuality, activism, and privacy. (Concept and Analysis course)

04:567:276 ***Musical Cultures and Industries (3)***
This course looks at the invisible power of music over lives, exploring how music can influence how people feel, what they think, and how they think. Exploration of music's social power, delving into its rich history at the center of politics, religion, and a multibillion dollar global industry. Consideration of music's relationship to technology and how changes in the media landscape are altering the role music plays in human life. (Concept and Analysis course)

04:567:278 ***News Media and Government in America (3)***
Examines the relationship between media and institutions and the processes through which people and societies make political choices. (Concept and Analysis course)

04:567:314 ***Photojournalism (3)***
Fundamentals of still photography in print and audiovisual mass media with primary focus on print journalism. Must have a 35mm camera. (Concept and Analysis course)
Prerequisites: 04:567:200. Open only to journalism and media studies majors.

04:567:317 ***Writing the Mediterranean (3)***
Students will draw inspiration from great Mediterranean journeys, and learn to write compelling journey stories of their own. They'll travel with Homer, Mark Twain, Ernest Hemingway, Martha Gellhorn, George Orwell and other notable authors through one of the world's grandest regions, as they explore its legacy of war and exodus, cooking and eating, and romance and revenge. This course includes a spring break reporting trip to a Mediterranean country, such as Spain, Italy or Turkey.
Prerequisites: 04:567:200; open only to majors and MCM Digital Media Track students only, except by special permission. Students must also be registered for 1 credit through Rutgers Study Abroad.

04:567:318 ***Fashion Journalism (3)***
Fashion Journalism is a course for advanced students in the journalism and media studies major who have an interest in writing about fashion, a key industry in New York City. The course provides students with an overview of writing about fashion, the different types of fashion journalism, and the numerous formats for fashion journalism. Students will also look at how fashion journalism has changed and how digital has transformed coverage. Throughout the semester, students will use readings, televised fashion coverage, as well as online documentaries and collection showings to learn about the fashion journalism industry and to practice reporting techniques. Assignments will incorporate a multimedia focus with students working to produce a full range of fashion journalism that reflects the variety of journalism commonly produced in the industry. (Practice and Innovation Course)
Prerequisites: 04:567:200. Open only to journalism and media studies majors.

04:567:319 ***Podcasting and Audio Documentary (3)***
Explores the flourishing field of audio documentary and learn the skills required to use audio as a nonfiction storytelling language. You will be exposed to the process from beginning to end--from recording technique and choosing the right interview setting, to focusing and scripting your story, to digital editing and mixing on Pro Tools First. Along the way, we'll listen to and discuss audio documentary work in a variety of stylistic approaches. (Practice and Innovation Course)
Prerequisites: 04:567:205 or 04:567:206 or 04:567:212. Open only to journalism and media studies majors.

04:567:327 ***Public Information and Public Relations (3)***
Techniques of public information and media relations with focus placed on government, public affairs, and public interest issues. (Practice and Innovation course)
Prerequisites: 04:567:200. Open only to journalism and media studies majors.

04:567:328 ***The Hyperlocal Newsroom (3)***
This class will give students hands-on experience with traditional and digital journalism, including work in both written and multimedia formats, through the creation and management of a news-based website covering Rutgers and the city of New Brunswick. Students will report; write and edit stories; create video, audio, and graphics; take photos; and learn about the various uses of social media within the journalism field. Students will collaborate on

a news-based website that will synthesize learned skills, journalistic practices, and knowledge of information and technology. (Practice and Innovation course)
Prerequisites: 04:567:205 or 04:567:206, or 04:567:212. Open only to journalism and media studies majors.

04:567:329 ***International Reporting (3)***
This course prepares students to write about life in other countries, and to cover international issues from the United States. Students analyze award-winning global journalism, and learn about and practice techniques foreign correspondents use.(Practice and Innovation course)
Prerequisites: 04:567:200. Open only to journalism and media studies majors.

04:567:331 ***Digital Media Lab (3)***
Students use experimental new media tools to transform news reporting, media storytelling, and other media processes. Augmented reality, ereader technology, 360-degree cameras, immersive media, the Mobile Journalist Workstation, 3-D imaging and audio, 3-D printing, interactive video, video as input, geotagged content, animation and news, and other emerging new media tools are applied to journalism and media to create and test new story formats that in an analog world would be impossible, but in a digital, networked world can engage individuals across time and space; and provide much-needed context and customization and in-depth, context-sensitive news and mediated entertainment.(Concept and Analysis course)
Prerequisites: Open only to journalism and media studies majors.

04:567:333 ***Media and Popular Culture (3)***
This course examines the relationship between media and popular culture and their impact on society. This course introduces students to the shifting trends, ideas, and competing forces that will lay the foundation for the cultural battleground of the future. (Concept and Analysis course)

04:567:340 ***Science and Health Journalism (3)***
To introduces students to the specialized fields of science, health, and technology writing.,(Practice and Innovation course)
Prerequisites: 04:567:205 or 04:567:206. Open only to journalism and media studies majors.

04:567:345 ***Media Publishing and Design (3)***
Computer-based writing, design, and pagination for newsletters, magazines, websites,and newspapers. (Practice and Innovation course)
Prerequisites: 04:567:205 or 04:567:206 or 04:567:207 or 04:567:212. Open only to journalism and media studies majors.

04:567:347 ***Information Design for Web Journalists (3)***
Creation, design, and development of webpages as primary sites for distributing news content and to supplement other technologies for news transmission. (Skills course)
Prerequisites: 04:567:205 or 04:567:206 or 04:567:207 or 04:567:212. Open only to journalism and media studies majors.

04:567:350 ***Development of Media (3)***
This course examines what media are and what they do; how specific media technologies affect democratic discourse; how media shape narratives of class, race, ethnicity and gender; the long-running conflict between information and propaganda, and how media conglomerates came to wield such enormous power in modern society. (Concept and Analysis course)

04:567:351 ***Topics in Journalism and Media Studies IV (3)***

Specialized topics related to the practice of journalism are offered on a regular basis.

Prerequisites: 04:567:200 Open only to journalism and media studies majors.

04:567:352 ***Topics in Journalism and Media Studies V (3)***

Specialized topics related to the practice of journalism are offered on a regular basis.

Prerequisites: 04:567:200. Open only to journalism and media studies majors.

04:567:353 ***Topics in Journalism and Media Studies VI (3)***

Specialized topics related to the practice of journalism are offered on a regular basis.

Prerequisites: 04:567:200. Open only to journalism and media studies majors.

04:567:365 ***Race, Islamaphobia and Media (3)***
This course will critically analyze racial and religious stereotypes of Muslims and how they emerge from various historical and political contexts. Students will study films, news media reports, television shows, video games and other cultural products to understand how Muslims are racialized and how Islamophobia operates in popular discourse in the US. (Concept and Analysis Course)

04:567:370 ***Journalism in American Film (3)***
Exposes students to many of the best-known American films about journalism. Examines how the practice and societal impact of journalism has been depicted. (Concept and Analysis course)
Open only to junior and senior journalism and media studies majors.

04:567:373 ***Editing for Multimedia (3)***
In this course students will learn the workflows associated with editing audio, video, graphics, and text. A strong emphasis is placed on demonstration and hands-on experience in this course. Students will become familiar with developing editing scripts, managing content, importing media, editing, and encoding for distribution across multiple platforms. Instructors will also discuss editing concepts which provide a thorough understanding of technique and theory used by professional editors. Exploring these concepts will provide a better understanding of how messages and stories are told through editing. Editing media will be provided for all exercises and projects.
Pre-requisites: 04:567:205 or 04:567:206 or 04:567:212.

04:567:374 ***Media Field Production (3)***
This course introduces students to the working principals of Electronic Field Production (EFP). Special attention is given to on-location creative and technical aspects of media production. Valuable EFP knowledge and skills will be gained through production exercises, projects and readings. Students will learn the constraints and benefits of shooting on-location while producing, directing and operating production equipment.
Pre-requisites: 04:567:205 or 04:567:206 or 04:567:212.

04:567:375 ***Television Reporting (3)***
Fundamentals of television reporting and electronic news gathering. (Practice and Innovation course)
Prerequisite: 04:567:206. Open only to journalism and media studies majors.

04:567:376 ***Advanced Television Reporting (3)***
Advanced television reporting and electronic news gathering with students assigned to various projects. (Practice and Innovation course)
Prerequisite: 04:567:375. Open only to journalism and media studies majors.

04:567:379 ***Media and Politics (3)***
Examines who controls the media and how the media differentially serve the public and power holders. Attention to both news and entertainment media. (Concept and Analysis course)
Open only to junior or senior majors in journalism and media studies.

04:567:380 ***Media and Social Change (3)***
This course looks at how past and present social movements (e.g., environmental, civil rights, labor movements) challenge dominant social, economic, and political structures and how they have been portrayed in the mass media. It also examines how social activists use media technologies to organize themselves and communicate their messages to wide audiences in order to achieve social change. (Concept and Analysis course)

04:567:384 ***Media and the Struggles for Democracy in Central America (3)***
This course takes students to Guatemala for 10 days to study the role of media in historic and contemporary struggles for democracy. The class meets with Guatemalan journalists, human rights activists, Indigenous associations, women's collectives and other community groups. Students visit news agencies, community radio and TV stations and the office of the country's first and only feminist magazine. Using Guatemala as a case study, students will learn about the regional effects of colonization, US military intervention and neoliberal economic policies in the Central American region, as well as the key role of media in local struggles for political autonomy, human rights and democracy.
Prerequisites: 04:567:215 or 04:567:380

04:567:385 ***Irish Media, Politics, and Cultural Survival (3)***
This embedded course takes students to Ireland for 8 days to study the role of Irish (Gaelic) journalism and media in historic and current struggles for political autonomy and cultural identity. There are six 3-hour class meetings before we travel. In the heart of Galway's Irish-Gaelic speaking region, students will spend a few days in the lovely rural village of Carraroe, where Gaelic is the main language spoken (although everyone is bilingual in English). They will also spend two days in the cultural hub of historic Galway City, and two days in the county's bustling capital, Dublin. Through readings, films, lectures and site visits, students will learn the history of British colonialism in Ireland and the role of Irish-Gaelic journalism in the country's struggles for political independence from England. They will meet Irish civil rights activists who fought in the 1960s and 70s for the right to have Irish/Gaelic radio and TV stations in Ireland, and will visit Gaelic radio, TV, print and online news outlets to speak with journalists and other media makers. Focused on the political and cultural importance of native language media for minoritized and formerly colonized populations, students will see examples of Irish-language journalism and cultural programming such as documentaries, websites, children's cartoons, sports, music videos and soap operas (subtitled in English), and gain familiarity with contemporary debates about whether the Irish government should continue funding Irish language media. Connections will be emphasized between struggles for Gaelic media in Ireland and struggles by minoritized and indigenous populations in other parts of the world for the right to have media in their native languages.
Prerequisites: 04:567:215 or 04:567:380. Open only to majors in journalism and media studies.

04:567:389 ***Independent Study in Journalism and Media Studies (3)***
Independent study in journalism and media studies topics under faculty supervision. (Elective course)
Prerequisites: 04:567:200; 75 or more overall credits, five (5) courses in major, one foundation. Open only to junior or senior majors in journalism and media studies. Minimum 2.50 GPA overall, and 2.75 in the major, and permission of instructor.

04:567:393 ***Internship in Journalism and Media Studies (3)***
Supervised field experience at professional media outlets. Before registering, students must meet with the internship coordinator to determine eligibility and receive approval of the placement. Students must work at their site a minimum of 15 hours per week during the semester. Off-site (virtual) positions will not be accepted. Students will complete weekly journals and attend several in-class meetings during the semester. Note: Students will be allowed to take both the 3-credit internship and the 6-credit internship, but are not allowed to take both of them in the same semester. Also note that students are limited to a maximum of 9 out-of-classroom credits in the major; the courses that fall under this heading are: Internship, Practicum, and Independent Study.
Prerequisites: 04:567:200; 75 or more overall credits, five (5) courses in major, one foundation. Open only to junior or senior majors in journalism and media studies. Minimum 2.50 GPA overall, and 2.75 in the major, and permission of instructor.

04:567:394 ***Internship in Journalism and Media Studies (6)***
Supervised field experience at professional media outlets. Before registering, students must meet with the internship coordinator to determine eligibility and receive approval of the placement. Students must work at their site a minimum of 24 hours per week during the semester. Off-site (virtual) positions will not be accepted. Students will complete weekly journals and attend several in-class meetings during the semester. Students will be allowed to take both the 3-credit internship and the 6-credit internship, but are not allowed to take both of them in the same semester. Also note that students are limited to a maximum of 9 out-of-classroom credits in the major; the courses that fall under this heading are: Internship, Practicum, and Independent Study.
Prerequisites: 04:567:200; 75 or more overall credits, five (5) courses in major, one foundation. Open only to junior or senior majors in journalism and media studies. Minimum 2.50 GPA overall, and 2.75 in the major, and permission of instructor.

04:567:405 ***Writing about Social Issues (3)***
Students will cover the game-changing stories of our time, from the widening gap between the rich and the poor; to battles over immigration; to the climate change wars that may determine our very survival. They'll analyze groundbreaking journalism, and have an opportunity to write and shoot commanding stories of their own. (Practice and Innovation course)
Prerequisites: (04:567:215 or 04:567:380) and (04:567:205 or 04:567:206 or 04:567:329).

04:567:410 ***Magazine Writing (3)***
Magazine writing for publication, including consumer, trade, and business magazines. (Practice and Innovation course)
Prerequisites: 04:567:205 or 04:567:206. Open only to journalism and media studies majors.

04:567:413 ***Literary Journalism (3)***
This course analyzes great examples of nonfiction writing from the last century to appreciate what makes for enduring non-fiction journalism that rises to the level of literature.

04:567:415 ***Media and Climate Change (3)***
This course will consider the intersections of science, media, and society. With a focus on both theory and practice, it explores the media's role in understanding and communicating about the most critical science and environmental issues of our day. (Concept and Analysis course)
Prerequisites: Open only to junior or senior journalism and media studies majors.

04:567:420 ***Global News (3)***
Analyzes, and discusses global production, distribution, and consumption of news. Issues include global news flows, journalistic cultures and practices, and international news coverage. (Concept and Analysis course)
Prerequisites: Open only to junior or senior journalism and media studies majors.

04:567:423 ***Communication Law (3)***
Examines laws and regulations governing U.S. mass media. (Concept and Analysis course)
Prerequisites: Open only to juniors or seniors.

04:567:425 ***Copyright, Media, and Culture (3)***
In this course we will discuss one of the most powerful social, cultural, economic, and political institutions of our day: intellectual property (IP). How did we arrive at the notion that creative works and ideas can be owned, bought, and sold like tangible commodities? What impact does this concept have on the way we view the world? How does it help us achieve our social goals, and how does it present obstacles to reaching those goals? And, in the age of digitized information and networked communication, how can we understand the role of IP in light of the rapidly changing developments in the way culture is produced and consumed? In our efforts to better understand these issues, we will read both primary and secondary materials, covering subjects ranging from the birth of copyright to the latest developments in the global "copyfight" over information in the digital age; view relevant and interesting documentary films; and enjoy guest lectures from a variety of knowledgeable speakers. (Concept and Analysis course)
Prerequisites: Only open to journalism and media studies juniors or seniors.

04:567:430 ***Sports Writing and Reporting (3)***
Fundamentals of sports writing, reporting, and commentary for print and online media. (Practice and Innovation course)
Prerequisites: 04:567:205 and 04:567:206. Open only to journalism and media studies majors.

04:567:431 ***Sports Broadcasting and Reporting (3)***
A comprehensive introduction to sports broadcasting and reporting in various media outlets. Subject matter will include preparing radio and television sportscasts, interviewing, sideline reporting, podcasting, creating sports packages, and discussions on hosting sports talk shows and radio and television play-by-play.
Prerequisites: 04:567:205, OR 04:567:206, OR 04:567:212, OR 04:567:319 . Open only to journalism and media majors. By permission of the instructor.

04:567:432 ***Multimedia Sports Reporting (3)***
This course will explore the many facets of multimedia sports reporting, from conventional newspaper websites to robust sports sites. Examines the use of social networking services and newer technology to transmit sports news. (Practice and Innovation course)
Prerequisites: 04:567:205 or 04:567:206 or 04:567:212. Open only to journalism and media studies majors.

04:567:434 ***Critical Issues in Sports Media (3)***
Examines the critical issues in sports and sports media, including race, gender, class, politics, culture, economics, and the role of sport in society. (Concept and Analysis course
Prerequisite: Open only to journalism and media studies majors.

04:567:438 ***Media Industries in the Digital Age (3)***
This course will look at how media industries – such as TV, film, music, book publishing, and journalism – are using data analytics, algorithms, and generative AI to compete in a fierce battle for audiences' attention.
Prerequisites: 04:567:215 or 04:567:216 or 04:567:217. Open only to journalism and media studies majors.

04:567:445 ***Media, Movement, and Community Engagement (3)***
This course will enable students to participate in the development of a journalism and media production project. They will also learn how to harness technology and study its implementation and impact on social change.(Concept and Analysis and/or Practice and Innovation course)
Prerequisite: 04:567:215 or 04:567:380.

04:567:450 ***Promotional Media (3)***
What is a promotional culture? Bringing together elements of media studies, visual culture, critical branding/ marketing studies, and consumer culture, this course is designed to provide advanced undergraduate students with analytical tools to understand the extent to which promotional language, communication, and habits suffuse our everyday lives. (Concept and Analysis course)
Prerequisites: 04:567:274. Open only to Junior or Senior journalism and media studies majors.

04:567:451 ***Topics in Journalism and Media Studies VII (3)***
Specialized topics related to the practice of journalism are offered on a regular basis. (Practical course)
Prerequisites: 04:567:200 and one foundation course in Journalism and Media Studies. Open only to journalism and media studies majors.

04:567:452 ***Topics in Journalism and Media Studies VIII (3)***
Specialized topics related to the practice of journalism are offered on a regular basis. (Practice and Innovation course)
Prerequisites: 04:567:200 and one foundation course in Journalism and Media Studies. Open only to journalism and media studies majors.

04:567:453 ***Topics in Journalism and Media Studies IX (3)***
Specialized topics related to the practice of journalism are offered on a regular basis. (Practice and Innovation course)
Prerequisites: 04:567:200 and one foundation course in Journalism and Media Studies. Open only to journalism and media studies majors.

04:567:454 ***Practicum in Journalism and Media Studies (3)***
Specific directed project work conducted under faculty supervision. (Practice and Innovation course)
Prerequisites: Permission of the instructor required. Open only to junior and senior majors in journalism and media studies.

04:567:457
The Civil Rights Movement, whose high point lasted from roughly 1954 to 1968, was one of the most important social movements in American history. Encompassing legal, political, and social strategies, the movement strove to abolish segregation and other forms of racial discrimination, secure equal opportunity for all, and transform attitudes about race across society. Its high point coincided with an era of extremely high-quality journalism, and its historic achievements were recorded and analyzed by many of the country's most talented writers. This course examines the Civil Rights Movement through the work of the journalists who covered it. We will read the work of these journalists to understand better both the nature of the journalism they practiced and the significance of the events they wrote about.

04:567:458 ***Media, Government, and Politics (3)***
Examines interactions between media and political institutions, actors, and processes in light of theories of journalism, communication, and political practice. (Concept and Analysis course)
Prerequisites: Open only to junior and senior journalism and media studies majors.

04:567:459 ***Media, Democracy, and the Public (3)***
The course explores how the news media have figured in constituting a public sphere in American history. Readings juxtapose classics of political philosophy with historical or sociological works describing democracy in practice in the United States. (Concept and Analysis course)
Prerequisites: Open only to junior and senior journalism and media studies majors or by permission of the instructor.

04:567:460 ***News, Entertainment, and Politics (3)***
Examines the influence of entertainment media on political news, opinion, knowledge, and behavior. (Concept and Analysis course)
Prerequisites: Open only to junior and senior journalism and media studies majors.

04:567:465 ***Documentary Filmmaking and Storytelling (3)***
Long-form video journalism storytelling developed over a significant period of time teaching students critical thinking, research, writing skills, and various production techniques. (Practice and Innovation course)
Prerequisites: 04:567:206 or 04:567:212. Open only to journalism and media studies majors.

04:567:470 ***Critical Analysis of News (3)***
Surveys and critiques of social science research on news, journalists, and the news media. (Concept and Analysis course)
Prerequisites: Open only to junior and senior journalism and media studies majors.

04:567:475 ***International Media (3)***
Analyzes debates about media and cultural globalization, and theories about international media. (Concept and Analysis course)
Prerequisites: Open only to junior and senior journalism and media studies majors.

04:567:484 ***Workshop in Journalism and Media Practice I (1.5)***
Specialized topics directed at enhancing or introducing journalism and/or media-related skill sets. These are intense seven-week workshops teaching students specific skills applicable to the field. The specialized focus can be an accelerated introduction to basics or an advanced training in particular skills learned in previous offerings. (Practice and Innovation course)
Prerequisites: 04:567:205, 04:567:206, or 04:567:212 . Open only to journalism and media studies majors.

04:567:485 ***Workshop in Journalism and Media Practice II (1.5)***
Specialized topics directed at enhancing or introducing journalism and/or media-related skill sets. These are intense seven-week workshops teaching students specific skills applicable to the field. The specialized focus can be an accelerated introduction to basics or an advanced training in particular skills learned in previous offerings. (Practice and Innovation course)
Prerequisites: 04:567:205, 04:567:206, or 04:567:212. Open only to journalism and media studies majors.

04:567:488 ***Independent Study in Media Studies (3)***
Independent study in media studies topics under faculty supervision. (Elective course)
Prerequisites: 75 or more overall credits, five (5) courses in major, one foundation, 04:567:200, 2.75 major GPA, 2.5 overall GPA, and permission of instructor. Open only to junior and senior journalism and media studies majors.

04:567:489 ***Independent Study in Journalism (3)***
Independent study in journalism topics under faculty supervision. (Elective course)
Prerequisite: 75 or more overall credits, five (5) courses in major, one foundation, 04:567:200, 2.75 major GPA, 2.5 overall GPA, and permission of the instructor. Open only to junior and senior journalism and media studies majors.

04:567:490 ***Senior Thesis/Project (3)***
Honors thesis or project under faculty supervision. (Elective course)
Prerequisites: 04:567:488 or 04:567:489. Permission of instructor. Must meet minimum GPA requirements. Open only to senior journalism and media studies majors.

04:567:495 ***Investigative and In-Depth Reporting (3)***
In-depth reporting project using public records and other investigative journalism techniques. (Practice and Innovation course)
Prerequisite: 04:567:205 or 206. Open only to journalism and media studies majors.

04:567:499 ***Capstone in Gender and Media (3)***
In this capstone to the gender and media minor, students will develop, discuss, produce, and critique a project related to gender, media, and technology. Students will articulate and present the project in written and oral formats and will have the option to also (1) create an in-depth multimedia component to the project; 2) complete an internship; or 3) complete a service learning experience. Note: Students in the minor, especially those who are not otherwise SC&I majors, may choose to enroll in the capstone through the program in women's and gender studies, course number 01:988:499.
Prerequisite: Minimum of 12 credits in the gender and media minor must be completed before enrolling in the capstone.

Faculty and Administration (SC&I-U)

FACULTY AND ADMINISTRATION

Administration

Dean's Office Faculty

Department of Communication

Department of Journalism and Media Studies

Administration (SC&I-U)

Administration

Mark Aakhus, Interim Dean and Professor of Communication

Karen Hundert Novick, Associate Dean for Administration

Susan Keith, Associate Dean for Programs and Professor of Journalism and Media Studies

Blain Bradley, Assistant Dean for Development

Chandu Dondeti, Assistant Dean for Information Technology

Kevin J. Ewell, Assistant Dean for Student Services

Bernadette Gailliard, Assistant Dean for Diversity, Equity, and Inclusion

Julie Johnson, Director of Continuing and Professional Studies

Brenda Sheridan, Director of Marketing and Communications

Sharon Stoerger, Assistant Dean for Programs and Assessment

Simona Turcu, Director of Business and Administration

Dean's Office Faculty (SC&I-U)

Dean's Office Faculty

Interdisciplinary faculty members are not members of a particular department.

Mary Chayko, Director of Undergraduate Interdisciplinary Programs and Distinguished Teaching Professor; B.A., Seton Hall; Ed.M., M.A., Ph.D., Rutgers
Impact of media and technology on society and humanity

Roxane Gay, Gloria Steinem Endowed Chair in Media, Culture, and Feminist Studies; B.A., Norwich; M.A., Nebraska (Lincoln); Ph.D., Michigan Technological.

Department of Communication (SC&I-U)

Department of Communication

Chair: Marya Doerfel

Distinguished Professors (in all title series, both tenured and untenured):

Kathryn Greene, B.A., M.A., Ph.D., Georgia

Health message design targeting adolescent risk-taking; disclosure of health issues

Brent D. Ruben, Advisor for Strategy and Planning, Office of the Executive Vice President for Academic Affairs; Senior University Fellow, Rutgers Center for Organizational Leadership, B.A., M.A., Ph.D., Iowa

Communication theory; organizational quality; health and medical communication; communication and information systems; communication education

Professors (in all title series, both tenured and untenured):

Mark Aakhus, B.A., North Dakota; M.A., Washington State; Ph.D., Arizona

Collaboration and conflict processes; communication-information technology; discourse and organizations; corporate social responsibility; sustainability

Galina Bolden, B.A., Minnesota; M.A., Ph.D., California (Los Angeles)

Conversation analysis in English and Russian; communication across linguistic and cultural barriers; nonverbal communication

Marya Doerfel, B.A., M.A., Ph.D., SUNY (Buffalo)

Interorganizational communication; organizational communication; social networks; networked forms of organizing; collaboration; semantic networks

R. Richard Dool, B.A., Fordham; M.S., Thomas Edison State; M.A., Seton Hall; D.Mgmt., Maryland

Organizational renewal; leadership communication

Lea P. Stewart, B.A., Allegheny College; M.A., Ph.D., Purdue

Health communication campaigns; gender; communication ethics

Jennifer Theiss, B.A., St. Norbert; M.A., Ph.D., Wisconsin (Madison)

Interpersonal communication and romantic relationship development

Maria Venetis, B.A., M.A., Southern Mississippi; Ph.D., Rutgers

Interpersonal and health communication, patient-provider interactions, disclosure, resilience, social support

Itzhak Yanovitzky, B.A., M.A., Haifa (Israel); Ph.D., Pennsylvania

Health communication; persuasion; communication and social changes; research methodology

Associate Professors (in all title series, both tenured and untenured):

J. Sophia Fu, B.A., Hong Kong Baptist; M.A., M.S., Ph.D., Northwestern

Organizational communication; social networks; technology; innovation; entrepreneurship; computational social science; collaboration; nonprofit organizations

Brian Householder, B.A., Humboldt State, M.A., Wake Forest; Ph.D., Georgia

Interpersonal communication; social influence

Shawnika Hull, B.A., Arizona: M.A., Ph.D., Pennsylvania

Applied research; community-based research; behavior change; health communication; marginalized and under-represented populations; community engagement; inequality; race and ethnicity

Nikolaos Linardopoulos, B.A., McGill (Canada); M.S., Ph.D., Drexel

Mediated communication; pedagogy

Matthew Matsaganis, B.A., National and Kapodistrian (Greece); M.A., Emerson; M.A., Ph.D., Southern California

Organizational communication; health communication; communication and technology; political communication

Lisa Mikesell, B.A., Pennsylvania; M.A., Ph.D., California (Los Angeles)

Language and social interaction; health communication and health services

Jeffrey Lane, B.A., Wesleyan; M.A., Ph.D., Princeton

Urban ethnography, urban sociology; social affordances of internet technologies

Katherine Ognyanova, B.Sc., M.A., Sofia; Ph.D., Southern California

Computational social science and network analysis; impact of technology on social structures; political and civic engagement; the media

Kristina Scharp, B.A., Richmond; M.A., Ph.D., Iowa

Interpersonal, family, and health communication, family transitions, marginalization.

Matthew Weber, B.S., M.S., Northwestern; M.A., Ph.D., Southern California

Organizational change; communication; communication technology; computational social science; networks; global journalism trends; social media and society

Dajung (DJ) Woo, B.A., Ewha Womans; M.A., Kansas State; Ph.D. California (Santa Barbara)

Organizational Communication: collaborative design and society; community engagement; organizational socialization/assimilation; identity; knowledge sharing

Assistant Professors (in all title series, both tenured and untenured):

Mark Beal, B.A., Rutgers; M.A., Kent State

Public relations and communications

Erin Christie, B.A., Rowan, M.A., Montclair; Ph.D., Rutgers

Social interaction; identity and interaction; interpretive microanalysis

Eugene Lee; B.A., M.A., Ewha Womans ((South Korea); M.A., Minnesota Twin Cities; Ph.D., Southern California

organizational communication, strategic communication, media technology, and leadership communication

Jianing Li, B.A., Peking (China); M.A., Ph.D., Wisconsin-Madison

Digital Communication; information accuracy; media use, identity and disparities

Nitsan Navick, Assistant Professor; B.A., California State, Channel Islands; M.A., Ph.D., California (Santa Barbara)

Organizational Communication; digital transformation

Yonaira Rivera, B.S., Rutgers; M.P.H., Emory; Ph.D., Johns Hopkins

Health inequities; improving health of underserved populations; health communication; social media health misinformation; cancer control and prevention; disaster relief

Sarah Shugars, B.A., Clark; M.A., Emerson; Ph.D., Northeastern

Political communication, social media, and computational communication

Department of Journalism and Media Studies (SC&I-U)

Department of Journalism and Media Studies

Chair: Lauren Feldman

Distinguished Professors (in all title series, both tenured and untenured):

David Greenberg, B.A., Yale; M.A., Ph.D., Columbia

Amy B. Jordan, B.A., Muhlenberg; M.A., Ph.D., Pennsylvania

Dafna Lemish, B.A., Tel Aviv; M.A., Hebrew; Ph.D., Ohio State

John V. Pavlik, B.A., Wisconsin; M.A., Ph.D., Minnesota

Professors (in all title series, both tenured and untenured):

Melissa Aronczyk, B.A., Montreal; Ph.D., New York

Jack Bratich, B.A., Truman State; Ph.D., Illinois (Urbana-Champaign)

Lauren Feldman, B.A., Duke; M.A., Ph.D., Pennsylvania

Susan Keith, B.A., Montevallo; M.A., Southern Florida; Ph.D., North Carolina

Deepa Kumar, B.S., Bangalore (India); M.A., Bowling Green; Ph.D., Pittsburgh

Regina Marchi, B.A., Bates; M.A., San Francisco State; Ph.D., California (San Diego)

Steven Miller, B.A., M.A., Rutgers

Associate Professors (in all title series, both tenured and untenured):

Mary D'Ambrosio, B.S., Syracuse; M.Sc., London School of Economics and Political Science

Gina Marcello, B.A., M.C.I.S., Ph.D., Rutgers

Caitlin Petre, B.A., Wesleyan; M.A., Ph.D., New York

Khadijah Costley White, B.A., Swarthmore; M.A., Ph.D., Pennsylvania

Todd Wolfson, B.A., Duke; Ph.D., Pennsylvania

Assistant Professors (in all title series, both tenured and untenured):

Neal Bennett, B.A., Rowan; Ed.D, Rutgers

Brooklyne Gipson, B.A., California (Los Angeles); M.A.S., Arizona State; M.S., M.A., Ph.D., Southern California

Youngrim Kim, B.A., California (Berkeley); M.A., Seoul National; Ph.D. Michigan

David Love, B.A., Harvard; J.D., Pennsylvania

Caitlin Petre, B.A., Wesleyan; M.A., Ph.D., New York

Alyse Shorland, B.A., Virginia; M.A., New York

Celeste Wagner, Licenciature, San Andres (Argentina); M.A., Ph.D., Pennsylvania

Department of Library and Information Science (SC&I-U)

Department of Library and Information Science

Chair: Rebecca Reynolds

Professors (in all title series, both tenured and untenured):

Denise Agosto, B.S., Georgetown; M.L.I.S., Texas (Austin); Ph.D., Rutgers

Marija Dalbello, B.A., Zagreb (Croatia); M.L.S., Kent State; Ph.D., Toronto

Nancy Kranich, B.A., M.A., Wisconsin (Madison); M.S., New York

Lilia Pavlovsky, B.A., Buffalo; M.L.S., Ph.D., Rutgers

Associate Professors (in all title series, both tenured and untenured):

Amelia Acker, B.A., California (Irvine); M.L.I.S., Ph.D., California (Los Angeles)

Warren Allen, B.A., Delaware; M.A., Georgetown; Ph.D., Drexel

Marc Aronson, Ph.D., New York

Kaitlin Costello, B.A., Vassar; M.S., Illinois (Urbana-Champaign)

Sunyoung Kim, B.A., Yonsei; M.S., Georgia Institute of Technology; Ph.D., Carnegie Mellon

Jon Oliver, B.A., M.S., Ph.D., Rutgers

Britt S. Paris, B.J., Missouri; M.A., New School; Ph.D., California (Los Angeles)

Rebecca B. Reynolds, B.A., Tufts; M.A., Ph.D., Syracuse

Charles Senteio, B.A., Central Connecticut State; M.B.A., Ross School of Business; M.S.W., Ph.D., Michigan

Vivek K. Singh, B.S., M.S., Singapore; Ph.D., California (Irvine)

Anselm Spoerri, B.S., London; M.S., Ph.D., Massachusetts Institute of Technology

Joyce Valenza, B.A., Binghamton; M.L.S., City College of New York (Queens) and Villanova; Ph.D., North Texas

Assistant Professors (in all title series, both tenured and untenured):

Tawfiq Ammari, B.Sc., Jordan; M.S.I., Ph.D., Michigan

LeAnne Barclay-Platenburg, B.Sc., Long Island; M.S., New York; Ph.D., Walden

Jessica (Yi-Yun) Cheng, B.A., M.A., National Taiwan; Ph.D., Illinois (Urbana-Champaign)

Suchinthi Fernando, B.Sc., Moratuwa (Sri Lanka); M.Eng, and D.Eng, Nagaoka University of Technology (Japan)

Kiran Garimella, M.S., IIIT(Hyderabad), Ph.D., Aalto

Shagun Jhaver, B.Tech, Indian Institute of Technology (Bombay); M.S., Texas (Dallas); Ph.D., Georgia Institute of Technology

GoUn Kim, B.A., Sookmyung Women's University (South Korea); M.L.I.S., Ph.D. Rutgers

E.E. Lawrence, A.B., Michigan (Ann Arbor); M.L.S., Maryland (College Park); Ph.D., Illinois (Urbana-Champaign)

Alex (Jiahong) Lu, B.E. Nanyang Technological (Singapore); M.S.W., M.S.I., Ph.D., Michigan (Ann Arbor)

Brendan Mahoney, SUNY (Geneseo); M.A., Ph.D., Pennsylvania

Ali Motamedi, M.Sc., Amirkabir (Iran); M.F.A., Hunter College (CUNY); Ph.D.; Akron

Kaushal Trivedi, B.Eng, MS (Baroda); M.S., Stevens

Robert Wolfe, B.A., Maryland; M.A., M.S., Georgetown; M.S., Ph.D., Washington

Teaching Instructors:

Eiman Ahmed, B.S., Pace; Ph.D., Rutgers

About the School (SSW-U)

ABOUT THE SCHOOL

Established in 1954, the School of Social Work has a distinguished record of instruction, research, and public service. Classes were first offered during the Great Depression to meet the state's need for social workers. Today, the school offers undergraduate and graduate-professional degree programs; holds classes at Rutgers University-New Brunswick, Rutgers University-Newark, and Rutgers University-Camden; and is affiliated with social service agencies locally and worldwide.

Mission

The mission of the School of Social Work is to develop and disseminate knowledge through social work research, education, and training that promotes social and economic justice and strengthens individual, family, and community well-being in the diverse and increasingly global environment of New Jersey and beyond.

Location

The school offers classes in New Brunswick, Newark, and Camden. The Office of the Dean is located at 120 Albany Street, Tower One, Suite 200 near the university's historic Rutgers University-New Brunswick campus. Each location is close to major highways and rail systems and within easy commuting distance of New York City and Philadelphia.

School of Social Work at a Glance

- One of the largest schools in the nation devoted to education and research on social welfare
- Classes offered online, in New Brunswick, Newark, and Camden and at other sites throughout New Jersey
- Offers a B.A. with a major in social work, M.S.W., M.S.W./M.A .in C.J., M.S.W./M.P.H., M.S.W./M.P.P., M.S.W./J.D, M.S.W./M.Div. M.S.W./Ph.D., Ph.D. and D.S.W.
- Fully accredited by the Council on Social Work Education
- Approximately 1,750 students enrolled in degree programs
- More than 400 continuing education events offered each year
- More than 200 full-time faculty members and part-time lecturers

Additional information is available on the School of Social Work website here.

National Association of Social Workers Code of Ethics (SSW-U)

NATIONAL ASSOCIATION OF SOCIAL WORKERS CODE OF ETHICS: SUMMARY OF MAJOR PRINCIPLES

The following broad ethical principles are based on social work's core values of service, social justice, dignity and worth of the person, importance of human relationships, integrity, and competence. Developed by the National Association of Social Work (NASW), these principles set forth ideals to which all social workers should aspire.

Value: Service

Ethical Principle: Social workers' primary goal is to help people in need and to address social problems.

Social workers elevate service to others above self-interest. Social workers draw on their knowledge, values, and skills to help people in need and to address social problems. Social workers are encouraged to volunteer some portion of their professional skills with no expectation of significant financial return (pro bono service).

Value: Social Justice

Ethical Principle: Social workers challenge social injustice.

Social workers pursue social change, particularly with and on behalf of vulnerable and oppressed individuals and groups of people. Social workers' social change efforts are focused primarily on issues of poverty, unemployment, discrimination, and other forms of social injustice. These activities seek to promote sensitivity to and knowledge about oppression and cultural and ethnic diversity. Social workers strive to ensure access to needed information, services, and resources; equality of opportunity; and meaningful participation in decision-making for all people.

Value: Dignity and Worth of the Person

Ethical Principle: Social workers respect the inherent dignity and worth of the person.

Social workers treat each person in a caring and respectful fashion, mindful of individual differences and cultural and ethnic diversity. Social workers promote clients' socially responsible self-determination. Social workers seek to enhance clients' capacity and opportunity to change and to address their own needs. Social workers are cognizant of their dual responsibility to clients and to the broader society. They seek to resolve conflicts between clients' interests and the broader society's interests in a socially responsible manner consistent with the values, ethical principles, and ethical standards of the profession.

Value: Importance of Human Relationships

Ethical Principle: Social workers recognize the central importance of human relationships.

Social workers understand that relationships between and among people are an important vehicle for change. Social workers engage people as partners in the helping process. Social workers seek to strengthen relationships among people in a purposeful effort to promote, restore, maintain, and enhance the well-being of individuals, families, social groups, organizations, and communities.

Value: Integrity
Ethical Principle: Social workers behave in a trustworthy manner.
Social workers are continually aware of the profession's mission, values, ethical principles, and ethical standards, and practice in a manner consistent with them. Social workers act honestly and responsibly, and promote ethical practices on the part of the organizations with which they are affiliated.

Value: Competence
Ethical Principle: Social workers practice within their areas of competence and develop and enhance their professional expertise.
Social workers continually strive to increase their professional knowledge and skills and to apply them in practice. Social workers should aspire to contribute to the knowledge base of the profession.

To view the NASW Code of Ethics in its entirety, including the ethical standards, go here.

Nondiscrimination Policy Standards of the Council of Social Work Education (SSW-U)

NONDISCRIMINATION POLICY STANDARDS OF THE COUNCIL OF SOCIAL WORK EDUCATION

The School of Social Work adheres to the university's policy on nondiscrimination. The school also follows the standards of the Council on Social Work Education by conducting its programs without discriminating on the basis of race, color, gender, age, creed, ethnic or national origin, disability, or political or sexual orientation.

Centers (SSW-U)

CENTERS

The School of Social Work's faculty-led centers focus on research, evaluation, policy development, and training around special topics of interest to the human services community. Additional information is available using the links below.

Institute for Families (SSW-U)

Institute for Families

Founded in 2007, the Institute for Families (IFF) harnesses the extensive resources of Rutgers University to create a more humane, just, and equitable society. We develop and disseminate knowledge and information throughout New Jersey and beyond that leads to a greater understanding of a range of social issues, and implementation of capacity-building strategies and systems improvements to better address them.

We invite and enjoy strong partnerships and professional collaborations throughout the human service community, including the New Jersey Department of Human Services, the New Jersey Department of Children and Families, the New Jersey Department of Education, and various other community, state, and national organizations, foundations, and professional networks. For more information, visit here.

Mission

The mission of the Institute for Families at the Rutgers School of Social Work is to support and strengthen individuals, families, and communities by increasing the capacity of human service professionals and organizations. They achieve this through a three-pronged approach that mirrors and supports the university's mission of instruction, research, and public service:

- training, technical assistance, and professional development;
- applied research and evaluation; and
- direct service and advocacy.

Center for Gambling Studies (SSW-U)

Center for Gambling Studies

Founded in 2007, The Center for Gambling Studies (CGS) is an international, multidisciplinary center for the study of gambling-related issues. The center's mission is to promote empirical research, to evaluate gambling-related policies and serve as a legislative resource, and to provide nationally accredited training for compulsive gambling counselors. The CGS is housed in the School of Social Work at Rutgers University-New Brunswick.

The mission of the Center for Gambling Studies is twofold: to drive global decision-making on issues relative to gambling and gaming by conducting strategic, non-partisan research and policymaking and to benefit individuals and families adversely affected by problems with interactive technology through innovative prevention, training, and intervention programs.

Additional information is available online here.

Office of Global Social Work Programs (SSW-U)

Office of Global Social Work Programs

The Office of Global Social Work Programs works to bring the world into the classroom through global content that is infused throughout the curriculum as well as provided through specialized international education courses. It strives to expand international research, education, and service opportunities for students and faculty.

Our mission is to promote global citizenship and professional action among social work students, graduates, faculty, and practitioners. We achieve this through education, advocacy, research, and community service locally and globally.

Additional information is available online here.

Center for Leadership and Management (SSW-U)

Center for Leadership and Management

Established in 2014, the Center for Leadership and Management (CLM) seeks to bridge the discipline of social work with the fields of leadership and management from both academic and practice perspectives. It assists local, state, national, and global businesses, nonprofits, and governmental agencies in building their management and leadership talents and is dedicated to capacity-building, consultation, scholarship, and service activity across industries and sectors.

Drawing on the wealth of experience and talent available at the School of Social Work, as well as the emerging expertise of our management and policy program interns, CLM offers consultative services to nonprofits and governmental entities in New Jersey.

Additional information is available online here.

Center for Prevention Science (SSW-U)

Center for Prevention Science

The Center for Prevention Science was established in 2016 with a focus on community-level approaches to prevention. Our mission is to develop and disseminate knowledge through research that builds the capacity of community-based organizations to create changes in public policy or environmental conditions that cause social and health disparities.

The center has opened its doors to new opportunities and growth. Although much of the center's work has focused on substance abuse prevention, research in other areas of prevention has also been conducted (e.g., the prevention of sexual assault; child abuse and neglect). Research areas of the center include community organizing, substance abuse prevention, heath disparities, program evaluation, as well as empowerment theory and measurement.

Center for Research on Ending Violence (SSW-U)

Center for Research on Ending Violence

Founded in 2007, as the Center on Violence Against Women and Children's (VAWC) at the Rutgers School of Social Work, the Center for Research on Ending Violence strives to eliminate all forms of violence and the power imbalances that permit them. We accomplish our mission through a collaborative approach that focuses on multidisciplinary research, education, and community engagement. The mission is to work to eliminate physical, sexual, and other forms of violence against women and children and the power imbalances that permit them. These goals are accomplished through a collaborative approach that focuses on multidisciplinary research, education, and community engagement.

Our work is focused on the three major branches of the center:

- research and evaluation

- education
- community engagement

Additional information is available online here.

Huamin Research Center (SSW-U)

Huamin Research Center

The Huamin Research Center was established in 2012 through collaboration between the Huamin Charity Foundation and Rutgers University, and is based at Rutgers School of Social Work. The center's mission is to develop and disseminate knowledge through research and exchange that promotes professional development of nonprofit organizations and strengthens individual, family, and community well-being in China.

This is achieved through research projects and the exchange of information through conferences, workshops, training programs, visiting scholars, and book translations. The center cooperates with a number of major Chinese and American universities and research institutions and has a strong network of partners. Each year the center hosts several Chinese visiting scholars.

More information is available here.

Degree Programs (SSW-U)

DEGREE PROGRAMS

The School of Social Work offers four degree programs: the bachelor of arts with a major in social work (B.A.), master of social work (M.S.W.), doctorate in social work (D.S.W.), and, in conjunction with the School of Graduate Studies, the doctor of philosophy (Ph.D.). The bachelor of arts and the master of social work degrees are accredited by the Council on Social Work Education.

Bachelor of Arts (B.A.) Degree with Social Work Major (SSW-U)

BACHELOR OF ARTS (B.A.) DEGREE WITH SOCIAL WORK MAJOR

The bachelor of arts with a major in social work (B.A.), offered by the School of Social Work at both Rutgers University-New Brunswick and Rutgers University-Camden, is a professional degree program that prepares graduates for beginning social work practice. Students are prepared for professional practice as well as graduate study in social work and related fields. The focus for practice includes work with special populations, including the poor, the oppressed, and other at-risk groups. The program is fully accredited by the Council on Social Work Education. It stresses research-based instruction, individualized work with students, and "hands-on" experience

as part of the learning process. Participants are expected to acquire the knowledge base and professional ethics, values, and skills to work effectively within individual, family, group, organizational, and community levels of practice.

The bachelor of arts degree program is offered through the School of Arts and Sciences at Rutgers-New Brunswick and the College of Arts and Sciences at Rutgers-Camden. Additional information is available online here.

Additional information about undergraduate courses can be found in the New Brunswick Undergraduate Catalog here.

Newark Campus

A separate accredited undergraduate program leading to a bachelor of arts degree in social work is offered at Rutgers University-Newark through both the Newark College of Arts and Sciences and University College-Newark. For further information about the program in Newark, call 973-353-5092, visit here.

Bachelor of Arts (B.A.) Degree with Social Work Major (SSW-U)

Undergraduate Admission

UNDERGRADUATE ADMISSION

Admission to the Bachelor of Arts with a Social Work Major

Undergraduate students begin the social work major in their junior year, having completed approximately 60 credits. Students should plan to declare the major during the spring semester of their sophomore year. Prospective B.A.S.W. students are notified of approval for the major by the School of Social Work Office of Admissions.

Qualifications

In order to be approved for the major, students must have achieved the following:

1. Admission to the university in either the School of Arts and Sciences at Rutgers University-New Brunswick or the Camden College of Arts and Sciences at Rutgers University-Camden;

1. A cumulative grade-point average of 3.0 or better. Exceptions to the grade-point average requirement may be made on an individual basis.
2. Completion of approximately 60 credits, including the majority of prerequisites below:
    1. Basic Psychology
    2. Introduction to Sociology
    3. Human Biology
    4. Statistics
    5. Two liberal arts courses from the following areas (1 each): Anthropology, Art, Communication/ speech, Geography, History, Literature, Music, Philosophy, Religion, or Theater

For information about admission to the social work major, call 848-932-7520, or visit here. For information about admission to the university, visit the Office of University Undergraduate Admissions website or call 732-445-INFO (Campus Information Services).

Continuing Education and Professional Development (SSW-U)

CONTINUING EDUCATION AND PROFESSIONAL DEVELOPMENT

The Rutgers School of Social Work's Office of Continuing Education delivers courses for professional development and lifelong learning for social workers and other human service professionals.

Workshops are offered at the postbaccalaureate and post-master's levels. Learning activities are designed to help licensed and certified social workers in the state meet the continuing educational requirements for licensing and certification. All workshops, certificate programs, and training are approved by the New Jersey Board of Social Work Examiners. Information and brochures are available from the Office of Continuing Education, Rutgers School of Social Work, 390 George Street, 3rd Floor, New Brunswick, NJ 08901.

For More Information

Call: 848-932-8758
Online: Here

Professional Credit Courses (Nonmatriculated) (SSW-U)

PROFESSIONAL CREDIT COURSES (NONMATRICULATED)

Professional credit courses consist of nondegree, graduate-level courses. These courses provide an excellent opportunity for individuals who may be considering the master's program in social work to explore introductory classes without committing to a matriculated program. The courses are equivalent to those offered during the first half of the master's program. Upon acceptance into the Rutgers master's program in social work, up to 18 credits may be applied toward your degree.

Please note:

- A baccalaureate degree from an accredited college or university is the prerequisite for admission.
- Taking professional credit courses in no way guarantees admission to the School of Social Work. Anyone interested in the master's program should apply online here.

Courses

There are five required M.S.W. degree courses and several electives offered through the professional credit program. All courses are 3 credits. Please note: If you are accepted into the master's program, only one elective will be credited toward your degree.

Courses are offered online. Classes are limited in size, and applications are processed on a first-come, first-serve basis.

For more information about admission, locations, and course offerings, visit here.

Financial Aid (SSW-U)

FINANCIAL AID

The impact of educational expenses on students and their families is sizable, even though tuition at Rutgers covers only a small portion of the actual cost of instruction for each student. In order to allow students with limited financial resources to attend, every effort is made to assist these students in finding the funds to finance their education.

A majority of full-time graduate students at the university receive some financial aid. The amount of support each student receives depends, in part, upon the availability of funds. The level of support often is dependent upon the specific graduate program and the student's degree status. Limited funds are available to students from scholarships, fellowships, assistantships, grants, low-interest loans, and part-time employment. To apply for grants, loans, and employment, students must complete the Free Application for Federal Student Aid (FAFSA). For additional information, applicants should visit the Rutgers Office of Financial Aid.

School of Social Work Scholarships

The School of Social Work offers a limited number of scholarships for its students. Students are notified by the Office of Student Affairs at the School of Social Work as applications are made available.

Course Listings (SSW-U)

COURSE LISTINGS

Explanation of Three-Part Course Numbers

Throughout this catalog in course listings, the number preceding each course title is divided into three parts. The first two digits are the administrative code (standing for the school or faculty offering the course), the next three digits are the subject code, and the final three digits are the course code.

Administrative Codes

The following administrative codes are used in this catalog:

09 School of Social Work (Undergraduate)

16 School of Graduate Studies (Ph.D. program)

19 School of Social Work (M.S.W. program)

Subject Codes

The subject code indicates the subject matter of the course. The subject code for social work is 910.

Course Codes

Course codes for 100 to 499 indicate undergraduate courses; course codes from 500 to 799 indicate graduate courses.

Credits awarded for the successful completion of each course are indicated in parentheses following the course title.

Administration and Faculty (SSW-U)

ADMINISTRATION AND FACULTY

Administration

Faculty

Administration (SSW-U)

ADMINISTRATION

George S. Leibowitz, Dean and Distinguished Professor; M.S.W., Ph.D., Denver

Richard L. Edwards, Interim Dean (7/01/2023 - 6/30/2024) and Distinguished University Professor and Chancellor Emeritus, Rutgers - New Brunswick; A.M., Chicago; Ph.D., SUNY (Albany)

Antoinette Y. Farmer, Associate Dean for Diversity, Equity and Inclusion, Interim Associate Dean for Academic Affairs and Professor; M.S., Ph.D., Pittsburgh

N. Andrew Peterson, Director, Center for Prevention Science and Distinguished Professor; M.A., Ph.D. Missouri (Kansas City)

Lia Nower, Associate Dean for Research and Director, Center for Gambling Studies and Co-Director of the Addiction Counselor Training (A.C.T) Certificate Program and Distinguished Professor; J.D. St. Louis., Ph.D., Washington

Victoria Banyard, Vice Provost for Academic Affairs and Distinguished Professor: M.A., Ph.D., Michigan

Sharon Fortin, Associate Dean for Administration and Finance; M.H.R.M., Rutgers

Laura A. DiMarcantonio, Assistant Dean for Admissions and Recruitment; M.Ed., Virginia Commonwealth, Ph.D., Liberty University Virginia

Arlene M. Hunter, Assistant Dean for Student Affairs; M.A., Bowling Green State

Christine Morales, Assistant Dean for Lecturer Support and Assistant Professor of Teaching; M.S.W., University of Southern California, Ed.D., Rutgers

Christine Chapais, Director of Online MSW Programs and Assistant Professor of Teaching; M.S.W., Kean

Allison Zippay, *Director, Center for Leadership and Management* and Professor; M.S.W., Ph.D., California (Berkeley)

E. Goldblatt Hyatt, Director, D.S.W. Program and Associate Professor of Professional Practice for Reproductive Justice; M.S.W., M.B.E.; D.S.W. (Pennsylvania)

Cassandra Simmel, Director, Ph.D. Program and Associate Professor; M.S.W., Ph.D., California (Berkeley)

Judith L. McCoyd, Associate Director, Ph. D. Programs and Associate Professor; M.S.W., Columbia, Ph.D., Bryn Mawr

Edward J. Alessi, Director, Master of Social Work Programand Professor;; M.S.W., Columbia, Ph.D. New York

Jack Lewis, Director, Intensive Weekend Program and Associate Professor of Professional Practice; M.S.W., D.S.W., Pennsylvania

V. DuWayne Battle, Assistant Dean of Baccalaureate Programs, Director, BASW Program in New Brunswick and Teaching Professor; M.S.W., Rutgers; D.Min., Southeastern Seminary; Ph.D., Rutgers

Mark W. Lamar, Executive Director of Practicum Learning and Associate Professor of Professional Practice; M.S.W., M.B.A., Rutgers

Lia Nower, Associate Dean for Research, Director, Center for Gambling Studies and Co-Director of the Addiction Counselor Training (A.C.T.) Certificate Program, and Distinguished Professor, J.D., St. Louis, Ph.D., Washington

Natalie Bembry, Director, Baccalaureate (BASW) Program in Camden, and Assistant Professor of Teaching, M.S.W., Monmouth, M.A., Phoenix, Ed.D., Rowan

Theresa McCutcheon, Director, Institute for Families; M.S.W., Rutgers

Rebecca Davis, Director, Office of Global Social Work Programs and Associate Professor of Professional Practice; M.S.W., North Carolina (Chapel Hill) Ph.D., North Carolina (Greensboro)

Sarah McMahon, Director, Center for Research on Ending Violence, Professor and special advisor to the president for sexual misconduct prevention and response; M.S.W., Ph.D., Rutgers

Chien-Chung Huang, Associate Dean for Faculty Development and Professor; M.S.W., Chung-Cheng (China), Ph.D., Columbia

Doulgas Behan, Director of Continuing Education and Associate Professor of Professional Practice; M.S.W., D.S.W., Rutgers

Faculty (SSW-U)

FACULTY

The following list includes faculty from the bachelor's, master's, and doctoral degree programs offered through the School of Social Work.

Ayse Akincigil, Associate Professor; M.A., Ph.D., Rutgers

Edward Alessi, Professor and Director of the Master of Social Work (M.S.W.); M.S.W., Columbia; Ph.D., New York

Mary Beth Ali, Assistant Professor of Teaching; M.S.W., Fordham

Wen (Vivien) Li Anthony, Associate Professor); M.S.W., Ph.D., North Carolina (Chapel Hill)

Victoria Banyard, Distinguished Professor and Vice Provost for Academic Affairs; M.A., Ph.D., Michigan

V. DuWayne Battle, Teaching Professor and Assistant Dean of the Bachelor's Programs and Director of the BASW Program in New Brunswick; M.S.W., Rutgers; D.Min., Southeastern Seminary; Ph.D., Rutgers

Danielle Beatty-Moody, Associate Professor and Chenceloor-Provost's Scholar for Inclusive Excellence in Multilevel Racism and Life Span Health and Aging; M.A, North Carolina Central, Ph.D., City University of New York

Doug Behan, Associate Professor of Professional Practice and Director of Continuing Education; M.S.W., D.S.W., Rutgers

Natalie Bembry, Assistant Professor of Teaching and Director of the Baccalaureate (BASW) Program in Camden; M.S.W., Monmouth; Ed.D., Rowan

Mariann Bischoff, Assistant Professor of Teaching and Management and Policy Practicum Specialist; M.S., Cornell; M.S.W., Monmouth

Marla Blunt-Carter, Associate Professor of Professional Practice for Political Social Work; M.S.W., Rutgers

Emily Adlin Bosk, Associate Professor; M.S.W., Ph.D., Michigan (Ann Arbor)

Qiana Brown, Assistant Professor; M.P.H., M.S.W., Alabama; Ph.D. Johns Hopkins

Elsa Candelario, Professor of Professional Practice and Director of the Latina/o/x Initiatives for Service, Training, and Assessment (L.I.S.T.A.) Certificate Program; M.S.S.W., Columbia

Chistine Chapais, Assistant Professor of Teaching and Director or Online MSW Programs, M.S.W., Kean

Ryon Cobb, Assistant Professor and Chancellor-Provost's Scholar for Inclusive Excellence in Research on Black Americans; Ph.D., FLorida

Sandra Crewe, Sojourner Truth Social & Racial Justice Visiting Professor: M.S.W., Catholic University, Ph.D., Howard

Stephen Crystal, Distinguished Research Professor; M.A., Ph.D., Harvard

Laura Cuesta, Associate Professor; M.A., Ph.D., Wisconsin (Madison)

Julia Cusano, Assistant Professor of Research; M.S.W., Ph.D., Rutgers

Maxine Davis, Assistant Professor and Chancellor-Provost's Scholar for Inclusive Excellence in Intimate Partner Violence Prevention & Intervention; M.S.W., M.B.A., Dominican, Ph.D., Washington (St. Louis)

Rebecca Davis, Director, Associate Professor of Professional Practice and Director of the Office of Global Social Work Programs; M.S.W., North Carolina (Chapel Hill); Ph.D., North Carolina (Greensboro)

Ryan DiMeglio, Teaching Instructor and Co-Director for the Addiction Counselor Training (A.C.T.) Certificate Program; M.S.W., Rutgers

Richard L. Edwards, Chancellor Emeritus, University Professor, Distinguished Professor and Interim Dean 2023-2024; M.A.S.W., Chicago; Ph.D., SUNY (Albany)

Antoinette Y. Farmer, Professor, Associate Dean for Diversity, Equity and Inclusion and Interim Associate Dean for Academic Affiars; M.S., Ph.D., Pittsburgh

Adrian Gale, Assistant Professor; M.S.W., Ph.D., Michigan

E. Goldblatt Hyatt, Associate Professor of Professional Practice for Reproductive Justice and Director of the Doctoral (D.S.W.) Program; ;M.B.E., M.S.W., D.S.W., Pennsylvania

Emily Greenfield Cohen, Professor and Director of the Hub for Aging Collaboration; M.S., Ph.D., Wisconsin (Madison)

Anna Haley, Associate Professor; M.A., Ph.D., Chicago

Caroline Harmon-Darrow, Assistant Professor; M.S.W., Ph.D., Maryland (Baltimore)

Bernardo Hiraldo, Assistant Teaching Professor and Associate Director of Practicum Learning and Camden Campus Coordinator; M.S.W., New York

Chien-Chung Huang, Professor and Associate Dean for Faculty Development; M.S.W., Chung-Cheng (China); Ph.D., Columbia

Tawanda L. Hubbard, Associate Professor of Professional Practice; M.S.W., D.S.W., Rutgers

Amml F. Hussein, Associate Professor of Teaching, M.S.W., Rutgers, Ed.D., East Stroudsburg

Ashley Jackson, Assistant Professor; M.S.W., Chicago, Ph.D. Washington (St. Louis)

Rachel John, Assistant Professor and Chancellor-Provost's Scholar for Inclusive Excellence for Immigrant and Refugee Health;M.S.W., Pennsylvania, M.P.H., Drexel, Ph.D., Boston

Michael Myungkook Joo, Associate Professor; M.S.W., South Carolina; Ph.D., Washington (St. Louis)

Woojin Jung, Assistant Professor; M.S.W., Washington (St. Louis); Ph.D., California (Berkeley)

Christine E. Kephart, Writing Instructor, D.S.W. Program; M. Phil. Eng. Lit., Ph.D., Drew

Rupa Khetarpal, Associate Professor of Teaching and Director of the Interpersonal Violence & Trauma (I.V.T.) Certificate Program; M.A., Jadavpur (India); M.S.W., Rutgers

Joy Jeounghee Kim, Associate Professor; M.S.W., South Carolina; Ph.D., Washington (St. Louis)

Mark W. Lamar, Associate Professor of Professional Practice and Executive Director, Practicum Learning ; M.S.W., M.B.A., Rutgers

George S. Leibowitz, Dean and Distinguished Professor; M.S.W., Ph.D., Denver

Jack Lewis, Associate Professor of Professional Practice and Director of the Intensive Weekend Program; M.S.W., D.S.W., Pennsylvania

Jamey Lister, Associate Professor; M.S.W., Michigan; Ph.D., Rutgers

Angela Malorni, Assistant Professor; M.S.W., M.P.A., Ph.D., Washington

Katherine Marçal,, Assistant Professor, M.S.W., Ph.D.,Washington (St. Louis)

Judith McCoyd, Associate Professor and Associate Director of Doctoral Programs; M.S.W., Columbia; Ph.D., Bryn Mawr College

Sarah McMahon, Professor and Director, Center for Research on Ending Violence and Special Advisor to the president for sexual misconduct prevention and response; M.S.W., Ph.D., Rutgers

Christine Morales, Assistant Professor of Teaching and Assistant Dean of Lecturer Support; M.S.W., Southern California; Ed.D., Rutgers

Cory Morton, Assistant Research Professor: M.S.W., East Tennessee State, Ph.D., Rutgers

Felix Muchomba, Associate Professor; M.P.H., Ph.D., Columbia

Lenna Nepomnyaschy, Professor; M.S.W., Rutgers; Ph.D., Columbia

Lia Nower, Distinguished Professor and Associate Dean for Research, Director, Center for Gambling Studies and Co-Director of Addiction Counselor Training Certificate Program; J.D., St. Louis; Ph.D., Washington

Margaret O' Donoghue, Assistant Professor of Professional Practice and Director of the Certificate on Child Well-Being (C.H.A.P.) Program; M.S.W., Hunter, Ph.D., New York

Michael Park, Assistant Professor and Chancellor-Provost's Scholar for Inclusive Excellence in Racial Minority Health; M.S., Ph.D., Chicago

N. Andrew Peterson, Distinguished Professor and Director of the Center for Prevention Science; M.A., Ph.D., Missouri (Kansas City)

Cathryn C. Potter, Dean Emerita and Distinguished Professor; M.S.W., Washington; Ph.D., Denver

Kristen Gilmore Powell, Associate Research Professor and Associate Director, Center for Prevention Science and Director of the Northeast & Caribbean Prevention Technology Transfer Center; M.S.W., Ph.D., Rutgers

Chiara Sabina, Associate Professor and Associate Director, Center for Research on Ending Violence and Chancellor's Scholar for Inclusive Excellence in Interpersonal Violence Research; M.A., Ph.D., Loyola (Chicago)

Raymond Sanchez Mayers, Professor Emeritus ; M.S.W., Barry; Ph.D., Brandeis

Tangela Sawyerr, Assistant Teaching Professor and Assistant Director of Student Affairs (Camden); M.S.W., M.A. in Criminal Justice and D.S.W., Rutgers

Nancy Schley, Assistant Professor of Teaching and Associate Director of Practicum Learning; M.S.W., Columbia

Gina L. Sharpe, Assistant Professor of Teaching and Assistant Director, Continuing Education; M.S.W., New York

Cassandra Simmel, Associate Professor and Director of the Ph.D. Program; M.S.W., Ph.D., California (Berkeley)

Karun Singh, Professor of Teaching; M.S.W., Ph.D., Columbia

Lauren Snedeker, Assistant Professor of Teaching and Director of the Aging and Health (A&H) Certificate Program; M.S.W., New York, D.S.W., Rutgers

Jackie Stanmyre, Research Associate and Assistant Director of the Center for Gambling Studies; M.S.W., Rutgers

Amy Strickler, Assistant Professor of Teaching and Assistant Director, Intensive Weekend Program; M.S.W., Columbia

Trinay V. Thomas, Assistant Professor of Teaching, Associate Director of Practicum Learning and Newark Campus Coordinator; M.S.W., Rutgers

Emmy Tiderington, Associate Professor; M.S.W., Michigan (Ann Arbor); Ph.D., New York

Mark van der Maas, Assistant Professor; M.A., Ph.D., Toronto

Grant Victor, Assistant Professor; M.S.W., Ph.D., Kentucky

Abigail Williams, Assistant Professor; MA., M.S.W., Illinois (Urbana-Champaign); Ph.D., Michigan

Allison Zippay, Professor and Director, Center for Leadership and Management; M.S.W., Ph.D., California (Berkeley)

Karen Zurlo, Associate Professor; M.B.A., M.S.W., Ph.D., Pennsylvania

Academic Policies and Procedures (SSW-U)

ACADEMIC POLICIES AND PROCEDURES

Note: See the **University Policies and Procedures** section in the Rutgers Main catalog for university-wide academic policies and procedures.

Registration and Course Information

Class Schedules and Hours

Grades and Records

Academic Standing

Student Grievance/Complaint Procedures

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Graduation

General Information (ENG)

GENERAL INFORMATION

History of the School

Mission Statement of the School

Accreditation

Learning Goals of the School

The Engineering Profession

History of the School (ENG)

HISTORY OF THE SCHOOL

Instruction in engineering began at Rutgers in 1864, when the State of New Jersey designated the Rutgers Scientific School as the State College for the Benefit of Agriculture and Mechanic Arts. The College of Engineering was established as a separate entity in 1914. In 1999, the name was changed to the School of Engineering to reflect the comprehensive nature of its programs, including undergraduate education, graduate education, state-of-the-art research, and public service. Today instruction and research are provided at the bachelor of science (B.S.), master of science (M.S.) and master of engineering (M.E.), and doctor of philosophy (Ph.D.) levels.

Mission Statement of the School (ENG)

MISSION STATEMENT OF THE SCHOOL

Educate and train the future engineers for a complex, diverse, and global workplace.

- Provide innovative, high-quality, relevant education to undergraduate and graduate students using the latest technology and educational techniques.

- Engage a diverse student body that exemplifies the core values of an engineering education for the purpose of improving and developing systems that solve complex problems and improve quality of life.

Conduct state-of-the-art and relevant research that embraces technology to address societal challenges of a multifaceted United States and a globally connected world.

- Conduct cutting-edge research in strategically important engineering areas.
- Create an environment to encourage and assist faculty to become research leaders in their fields, gaining further national and international recognition.

Serve as a resource to local, state, and regional stakeholders to advance the public interest.

- Promote economic development through technology, entrepreneurship, and innovation.

Accreditation (ENG)

ACCREDITATION

Four-year undergraduate curricula leading to the degree of bachelor of science are offered in the fields of aerospace engineering, environmental engineering (joint degree with SEBS), biomedical engineering, chemical engineering, civil engineering, electrical and computer engineering, industrial engineering, materials science and engineering, and mechanical engineering. These curricula are accredited by the Engineering Accreditation Commission of ABET. In addition, a flexible four-year curriculum in applied sciences in engineering is administered by an interdepartmental committee. The field of applied sciences in engineering is not a professional engineering curriculum and is not subject to ABET accreditation.

Numerous areas of concentration are available within these disciplines, such as biochemical engineering, financial engineering, communications, computer engineering, pharmaceutical engineering, energy systems, and packaging engineering. Five-year, dual-degree programs are offered by the School of Engineering in cooperation with the School of Arts and Sciences. This program leads to a bachelor of science (B.S.) degree in any of the engineering fields listed above, and a bachelor of arts (B.A.) or a B.S. degree from the School of Arts and Sciences in any of its majors.

Finally, the School of Engineering welcomes transfer students to our community of learning and engagement. If you've attended a college or university after graduating from high school, you are considered as a transfer student. Each year, the school admits transfer students from other schools within Rutgers as well as colleges/universities in the United States and around the world. Please keep in mind that the School of Engineering is a full-time day program. You are expected to be a full-time student. Only if there are extenuating circumstances may our students request to be part-time students.

Learning Goals of the School (ENG)

LEARNING GOALS OF THE SCHOOL

The undergraduate curricula at the School of Engineering are designed as such that the students are expected to attain by the time of graduation

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors;
3. an ability to communicate effectively with a range of audiences;
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts;
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions; and
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The Engineering Profession (ENG)

THE ENGINEERING PROFESSION

Engineering is a profession in which a knowledge of the mathematical and natural sciences, gained by study, experience, and practice, is applied to develop ways to use the materials and forces of nature economically for the benefit of humanity.

Engineering touches every phase of modern life. It extends human physical power through machines; human reasoning power through computers; and human powers of observation through instruments, enabling people to explore the tiniest microscopic structure or the far reaches of the universe. It creates vehicles to move people rapidly and safely to all parts of the earth and into the space surrounding it. It makes possible complex production and distribution systems for providing ample food to urban populations. It permits rapid communication of information among people throughout the world. It has given people great power to control their environment and, with this power, the responsibility to control it wisely. It has provided people with the most sophisticated art form, the art of engineering design.

Administration and Faculty (ENG)

ADMINISTRATION AND FACULTY

Administration

Faculty

Administration (ENG)

ADMINISTRATION

Alberto Cuitiño, Dean

Susan Kilduff, Vice Dean, Administration and Planning

Peng Song, Associate Dean, Undergraduate Education

Kimberly Cook-Chennault, Associate Dean, Innovation in Engineering Education

Hao Lin, Associate Dean, Graduate and International Education

Ilene Rosen, Associate Dean, Student Services

Wade Trappe, Associate Dean, Academic Programs

UNDERGRADUATE EDUCATION

Jean Patrick Antoine, Assistant Dean and Director of Honors College at Engineering

Michael Brown, Assistant Dean and Director of Educational Opportunity Fund

Iris Zipkin, Assistant Dean and Director of Advising

Jesenia Cadena, Assistant Dean, First Year Students

Priscilla Calderon, Assistant Dean, Academic services

Robert Ciervo, Assistant Dean, Transfer Services

Debra Corcoran, Assistant Dean, Academic Services

Aiesha Long, Assistant Dean, Academic Services

Arron Rodriguez, Assistant Dean, Outreach & Engagement

Candiece White, Assistant Dean, Educational Opportunity Fund

Faculty (ENG)

FACULTY

Department of Biomedical Engineering

Department of Biomedical Engineering

Chair: David Shreiber

Professors:

Ioannis P. Androulakis, B.S., Athens; M.S., Ph.D., Purdue

Francois Berthiaume, Ph.D., Pennsylvania State

Nada Boustany, Ph.D., Massachusetts Institute of Technology-Harvard

Helen M. Buettner, B.S., Minnesota; Ph.D., Pennsylvania

Li Cai, Ph.D., Medicine and Dentistry (New Jersey)

Gary M. Drzewiecki, Ph.D., Pennsylvania

Joseph Freeman, Ph.D., Rutgers

Noshir A. Langrana, B.E., Bombay; M.S., Ph.D., Cornell

John K-J Li, Ph.D., Pennsylvania

Adrian Mann, D.Phil., Oxford

Prabhas V. Moghe, B.S., Bombay; Ph.D., Minnesota

Charles M. Roth, B.S.E., Pennsylvania; Ph.D., Delaware

Troy Shinbrot, B.A., Ph.D., Maryland

George K. Shoane, Ph.D., California (Berkeley)

David I. Shreiber, Ph.D., Pennsylvania

Maribel Vazquez, Sc.D., Massachusetts Institute of Technology

Martin L. Yarmush, B.S., Yeshiva; M.D., Yale; Ph.D., Rockefeller; Ph.D., Massachusetts Institute of Technology

Jeffrey D. Zahn, Ph.D., California (Berkeley)

Associate Professors:

Biju Parekkadan, Ph.D., Massachusetts Institute of Technology-Harvard

Mark Pierce, Ph.D., Manchester

Associate Teaching Professors:

Kristen Labazzo, Ph.D., Rutgers

Associate Research Professors:

Rene Schloss, Ph.D., Harvard

Assistant Professors:

Adam Gormley, Ph.D., Utah

Simiao Niu, Ph.D., Georgia Institute of Technology

Valerie Tutwiler, Ph.D., Drexel

Assistant Research Professors:

Rick Cohen, Ph.D., Rutgers

Anil Shrirao, Ph.D., Rutgers

Faculty (ENG)

Department of Chemical and Biochemical Engineering

Department of Chemical and Biochemical Engineering

Chair: Helen M. Buettner

Professors:

Ioannis P. Androulakis, B.S., Athens; M.S., Ph.D., Purdue

Tewodros (Teddy) Asefa, B.Sc., Addis Ababa (Ethiopia); M.Sc., SUNY (Buffalo); Ph.D., Toronto

Helen M. Buettner, B.S., Minnesota; Ph.D., Pennsylvania

Benjamin J. Glasser, B.Sc., M.Sc., Witwatersrand (South Africa); Ph.D., Princeton

Diane Hildebrandt, B.Sc., M.Sc., Ph.D., Witwatersrand (South Africa)

Prabhas V. Moghe, B.S., Bombay; Ph.D., Minnesota

Fernando J. Muzzio, B.S., Mar del Plata (Argentina); Ph.D., Massachusetts

Alexander V. Neimark, M.S., Moscow State; Ph.D., Institute of Chemical Industry (Russia); D.Sc., Moscow State

Henrik Pedersen, B.Ch.E., Rochester; M.S., M.Phil., Ph.D., Yale

Rohit Ramachandran, B.Eng., M.Eng., National (Singapore); Ph.D., Imperial (London)

Charles M. Roth, B.S.E., Pennsylvania; Ph.D., Delaware

M. Silvina Tomassone, B.S., Buenos Aires; Ph.D., Northeastern

Associate Professors:

Fuat E. Celik, B.S.E., M.Eng., Princeton; Ph.D., California (Berkeley)

Shishir P.S. Chundawat, B.Tech., Institute of Chemical Technology (Mumbai); Ph.D., Michigan State

Meenakshi Dutt, B.S., Delhi; Ph.D., Duke

Nina C. Shapley, A.B., Harvard; Ph.D., Massachusetts Institute of Technology

George Tsilomelekis, B.S., M.Sc., Ph.D., Patras (Greece)

Haoran Zhang, B.S., M.S., Xiamen (China); Ph.D., Tufts

Assistant Professors:

Gregory Dignon, B.S., Rensselaer Polytechnic Institute; Ph.D., Lehigh

Ashley Z. Guo, B.S., Caltech; Ph.D., Chicago

Benjamin S. Schuster, B.S., Minnesota; Ph.D., Johns Hopkins

Assistant Teaching Professor:

Nicholas J. Corrente, B.S., Seton Hall; B.S., New Jersey Institute of Technology; M.S., Ph.D., Rutgers

Faculty (ENG)

Department of Civil Engineering

Department of Civil Engineering

Chair: Nenad Gucunski

Professors:

Perumalsamy Balaguru, B.S., Madras (India); M.S., Indian Institute of Science; Ph.D., Illinois (Chicago)

Nicole Fahrenfeld, B.S., Johns Hopkins; M.S., Clemson; Ph.D., Virginia Tech

Jie Gong, B.S., Shanghai Jiao Tong (China); M.S., Texas Tech; Ph.D., Texas (Austin)

Nenad Gucunski, B.S.E., Zagreb (Croatia); M.S.E., Ph.D., Michigan-Ann Arbor

Qizhong Guo, B.S., Tianjin (China); M.S., Ph.D., Minnesota; P.E.

Ali Maher, B.S., Michigan; M.S., Northeastern; M.S., Ph.D., Michigan-Ann Arbor

Husam Najm, B.E., AUB (Lebanon); M.S., Michigan State; Ph.D., Michigan- Ann Arbor; PE, SE

Hani Nassif, B.S., M.E., Detroit; Ph.D., Michigan; P.E.

Hao Wang, B.S., M.S., Southeast (China); M.S., Virginia Tech; Ph.D., Illinois (Urbana-Champaign)

Yook-Kong Yong, B.S., Lafayette; M.S., Ph.D., Princeton; P.E.

Associate Professors:

Jing Jin, B.S., Tsinghua (China); M.S., Ph.D., Wisconsin (Madison)

Xiang Liu, B.S., Shanghai Jiao Tong (China); M.S., Ph.D., Illinois (Urbana-Champaign)

Efthymios Nikolopoulos, B.E. Technical (Crete); M.S., Iowa, Ph.D., Connecticut

Monica Mazurek, B.S., Ph.D., California (Los Angeles)

Assistant Professors:

Vassiliki Demetracopoulou, B.S., Patras (Greece), M.S., Ph.D. Texas (Austin)

Yalin Li,B.S., B.E., Tongji (China); M.S., Illinois (Urbana); Ph.D., Colorado (Mines)

Meiyin Liu, B.S., Wuhan (China), M.S., Ph.D. Michigan (Ann Arbor)

Tyler Othes, B.S., UC-Davis; M.S., UC-Davis, Ph.D., UC-Davis

Ruoqian Wang, B.S., Beihang (China); M.S., Singapore Stanford Partnership; Ph.D., MIT

Faculty (ENG)

Department of Electrical and Computer Engineering

Department of Electrical and Computer Engineering

Chair: Yingying Chen

Professors:

Waheed U. Bajwa, B.E., NUST (Pakistan); M.S., Ph.D., Wisconsin

Aggelos Bletsas, M.Sc. Massachusetts Institute of Technology, PH.D. Massachusetts Institute of Technology

Yingying Chen, B.S., Nanjing (China); M.S., North Carolina State; Ph.D., Rutgers

Kristin Dana, B.S., New York; M.S., Massachusetts Institute of Technology; Ph.D., Columbia

Zoran Gajic, Dipl. Eng., Belgrade (Serbia); M.S., Ph.D., Michigan State

Sasan Haghani, B.Sc., Isfahan (Iran); M.Sc., Ph.D., Alberta (Canada).

Mehdi Javanmard, B.S., Georgia Institute of Technology; M.S., Ph.D., Stanford

Shantenu Jha, M.Sc., Indian Institute of Technology; Ph.D., Syracuse

Narayan Mandayam, B.S., Indian Institute of Technology; M.S., Ph.D., Rice

Ivan Marsic, B.S., M.S., Zagreb (Croatia); Ph.D., Rutgers

Laleh Najafizadeh, B.Sc., Isfahan (Iran); M.Sc., Alberta (Canada); Ph.D., Georgia Institute of Technology

Athina Petropulu, Diploma, National Technical (Athens); M.S., Ph.D., Northeastern

Dario Pompili, Laurea, B.S., M.S., Ph.D., Rome La Sapienza (Italy); Ph.D., Georgia Institute of Technology

Shriram Ramanathan, B.S., IIT Madras, M.S., Houston, Ph.D., Stanford

Dipankar Raychaudhuri, B.Tech., Indian Institute of Technology; M.S., Ph.D., SUNY (Stony Brook)

Deborah Silver, B.S., Columbia; M.A., M.S.E., Ph.D., Princeton

Predrag Spasojevic, Diploma Ing., Sarajevo (Bosnia); M.S., Ph.D., Texas A&M

Emina Soljanin, Diploma, Sarajevo (Bosnia); M.S., Ph.D., Texas A&M

Wade Trappe, B.A., Texas (Austin); M.S., Ph.D., Maryland

Associate Professors:

Salim El Rouayheb, Diploma, Lebanese; M.S., American (Beirut); Ph.D., Texas A&M

Umer Hassan, B.S., Lahore: M.S., Ph.D, Illinois

Dov Kruger, B.E., M.S., Ph.D. Stevens Institute of Technology

Anand D. Sarwate, B.S., Massachusetts Institute of Technology; M.S., Ph.D., California (Berkeley)

Matteo Turilli, B.S., Amsterdam (Netherlands), M.S., Padua (Italy), Ph.D., University of Oxford (UK)

Sheng Wei, Ph.D., California (Los Angeles)

Chung-Tse Wu, B.S., National Taiwan; M.S., Ph.D., California

Bo Yuan, B.S, M.S., Nanjing (China); Ph.D., Minnesota

Assistant Professors:

Shirin Jalali, B.S., M.S., Sharif (Technology), M.S., Ph.D., Stanford

Bokyung Kim, M.S. Ewha Womans, Seoul, South Korea, Ph.D. Duke , Durham, NC

Yao Liu, B.S., Nanjing, Ph.D., George Mason

Jorge Ortiz, B.S., Massachusetts Institute of Technology M.S., Ph.D., California (Berkeley)

Maria Striki, Diploma, National Technical (Athens); Ph.D., Maryland

Guosong Yang, B.S., Hong Kong (Science and Technology), M.S., Ph.D., Illinois

Yuqian Zhang, B.S., Xi'an Jiaotong, Ph.D., Columbia

Minning Zhu, B.E. Harbin Institute of Technology, M.S. Shanghai, Ph.D., Rutgers

Instructors:

Demetrios Lambropoulos, B.S., M.S. Rutgers

Faculty (ENG)

Department of Industrial and Systems Engineering

Department of Industrial and Systems Engineering

Chair: Mohsen Jafari

Professors:

Melike B. Gürsoy, B.Sc., M.S., Bogazici (Turkey); Ph.D., Pennsylvania

David Coit, B.S., Cornell; M.B.A., Rensselaer Polytechnic Institute; M.S., Ph.D., Pittsburgh

Elsayed A. Elsayed, B.S., M.S., Cairo; Ph.D., Windsor (Canada); P.E.

Mohsen A. Jafari, B.S., M.S., Ph.D., New York

Myong K. Jeong, Ph.D., Georgia Institute of Technology

Tugrul Ozel, B.S., Istanbul Technical (Turkey); M.S., Dokuz Eylol (Turkey); Ph.D., Ohio State

Hoang Pham, B.S., Northeastern; M.S., Illinois; M.S., Ph.D., SUNY

Associate Professors:

Weihong (Grace) Guo, B.S., Tsinghua (China); M.S., Ph.D., Michigan

Zhimin Xi, B.S., M.S., Science and Technology (China); Ph.D., Nanyang (Singapore), Michigan (Houghton)

Farzad Yousefian, B.S., M.S., Sharif (Technology) (Iran), Ph.D., Illinois (Urbana-Champaign)

Assistant Professors:

Ahmed Aziz Ezzat, B.S., M.S., Arab Academy for Science Technology and Maritime Transport (Egypt), Ph.D., Texas A&M

Robert Mieth, B.S., M.S., Ph.D. Technische (Berlin)

Assistant Teaching Professor:

Randy A. Reagan, B.S., NJIT, M.S., Michigan, M.B.A., New York, Ph.D., New Jersey Institute of Technology

Elin M. Wicks, B.S., M.S., Rutgers; Ph.D., Virginia Tech

Faculty (ENG)

Department of Materials Science and Engineering

DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING

Chair: Richard L. Lehman

Professors:

Glenn Amatucci, B.S., M.S., Ph.D., Rutgers

Dunbar P. Birnie III, B.S., Ph.D., Massachusetts Institute of Technology

Stephen H. Garofalini, B.S., B.A., Rutgers; M.S., Washington; Ph.D., Stanford

Richard A. Haber, B.S., M.S., Ph.D., Rutgers

Lisa C. Klein, S.B., Ph.D., Massachusetts Institute of Technology

Richard L. Lehman, B.S., M.S., Ph.D., Rutgers

Adrian Mann, B.Sc., M.Sc., Nottingham (UK); D.Phil., Oxford

M. John Matthewson, B.S., M.A., Ph.D., Churchill College (UK)

Richard E. Riman, B.S., Rutgers; Ph.D., Massachusetts Institute of Technology

Ahmad Safari, B.S., M.S., Tabriz (Iran); Ph.D., Pennsylvania State

Thomas Tsakalakos, B.S., Athens; Ph.D., Northwestern

John Wenzel, B.S., Stanford; Ph.D., Chicago

Associate Professors:

Laura Fabris, B.S., M.S., D.Sc., Padua (Italy)

Deirdre M. O'Carroll, B.E., Ph.D., Cork (Ireland)

Assistant Professors:

Ashutosh Goel, Ph.D., Aveiro (Portugal)

Ryan Sills, B.S., M.S., Ph.D., Stanford

Assistant Teaching Professor:

Koray Akdogan, B.S., M.S., METU (Turkey); M.S., Ph.D., Rutgers

Research Professors:

Philip Batson, Ph.D., Cornell

Jennifer Lynch, B.S., Washington & Lee; Ph.D., Rutgers

Thomas Nosker, B.S., Georgia Institute of Technology; Ph.D., Rutgers

Faculty (ENG)

Department of Mechanical and Aerospace Engineering

DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING

Chair: Assimina Pelegri

Professors:

Prosenjit Bagchi, B.E., Jadavpur (India); M.E., Indian Institute of Technology; Ph.D., Illinois (Urbana-Champaign)

Haim Baruh, B.S., Bogazici (Turkey); M.S., Ph.D., Virginia Tech

Haym Benaroya, B.E., Cooper Union; M.S., Ph.D., Pennsylvania

William J. Bottega, B.E., CUNY (City College); M.S., Cornell; Ph.D., Yale

Alberto Cuitiño, Civil Eng., Buenos Aires (Argentina); M.S., Ph.D., Brown

Philip Demokritou, Ph.D., National Technical (Athens)

Mitsunori Denda, B.E., M.E., Kyoto; M.S., Ph.D., Harvard

F. Javier Diez-Garias, B.S., M.S., Saint Louis; Ph.D., Michigan (Ann Arbor)

Ellis H. Dill, B.S., M.S., Ph.D., California (Berkeley)

German Drazer, Ph.D., National (Cuyo) (Argentina)

Hae Chang Gea, B.S., National Taiwan; M.S., Southern California; Ph.D., Michigan (Ann Arbor)

Yuebin Guo, B.S., Shandong (China), M.S., Tsinghua (China); M.E., California (Berkeley); Ph.D., Purdue

Zhixiong (James) Guo, B.S., M.S., Beijing; Ph.D., Polytechnic (New York)

Yogesh Jaluria, B.S., Indian Institute of Technology; M.S., Ph.D., Cornell

Doyle D. Knight, B.A., Occidental; B.S., M.S., Ph.D., California Institute of Technology

Noshir A. Langrana, B.E., Bombay; M.S., Ph.D., Cornell; P.E.

Hao Lin, B.S., Peking; Ph.D., California (Berkeley)

Liping Liu, Ph.D., Minnesota (Twin Cities)

Michael R. Muller, B.S., Rochester; M.S., Ph.D., Brown

Andrew N. Norris, B.S., M.S., National (Ireland); Ph.D., Northwestern

Assimina A. Pelegri, Diploma, National Technical (Athens) (Greece); M.S., Ph.D., Georgia Institute of Technology

Jerry Shan, B.S., M.S., Ph.D., California Institute of Technology

Stephen D. Tse, B.S.E., Princeton; M.S., Ph.D., California (Berkeley)

George J. Weng, B.S., National Taiwan; M.Phil., Ph.D., Yale

Jingang Yi, B.S., Zhejiang (China); M.E., Tsinghua (China); M.A., Ph.D., California (Berkeley)

Qingze Zou, Ph.D., Washington (Seattle)

Associate Professors:

Xiaoli Bai, Ph.D., Texas A&M

Onur Bilgen, Ph.D., Virginia Tech

Kimberly Cook-Chennault, B.S.E., Michigan; M.S.E., Stanford; Ph.D., Michigan

Aaron Mazzeo, Ph.D., Massachusetts Institute of Technology

Rajiv Malhotra, Ph.D., Northwestern

Jonathan Singer, Ph.D., Massachusetts Institute of Technology

Assistant Professors:

Laurent Burlion, Ph.D., Paris-Sud

Edward DeMauro, Ph.D., Rensselaer Polytechnic Institute

Amin Reihani, Ph.D., Michigan

Assistant Teaching Professors:

Xi Gu, Ph.D., Michigan

Jennifer Lynch, Ph.D., Rutgers

Annalisa Scacchioli, Ph.D., L'Aquila (Italy)

Associate Research Professor:

Gerardo Callegari, Ph.D., Buenos Aires (Argentina)

Faculty (ENG)

Undergraduate Education

Undergraduate Education - ID3EA

Director: Katie Barillas

Associate Teaching Professors:

Philip Brown, B.S., Union; M.S., Duke; Ph.D., Virginia Tech

Assistant Teaching Professors:

Katie Barillas, B.S., Lafayette; M.S., Ph.D., Pittsburgh

Ashley Mont, B.S., Rutgers; M.S., Ph.D., NJIT

Instructors of Professional Practice:

Joseph Konczynski, B.S. CUNY; M.S. Johns Hopkins; PE

Labs and Facilities (ENG)

LABS AND FACILITIES

The facilities of the School of Engineering for laboratory instruction and other services are housed in buildings on the Busch campus, except for the laboratories of the program in bioenvironmental engineering, which are located on the George H. Cook campus. The Engineering Center on Busch campus contains spacious quarters for instruction and research in the fields of biomedical, chemical and biochemical, civil and environmental, electrical and computer, industrial and systems, materials science and engineering, and mechanical and aerospace engineering. The following summary of laboratories and equipment is organized by department.

Biomedical Engineering (ENG)

Biomedical Engineering

BME Teaching Facility. The first floor of the Biomedical Engineering (BME) building is designated for the classrooms and teaching laboratory space. This facility serves as the focus of biomedical engineering educational and training activities on the Rutgers campus. The first floor occupies an auditorium and classroom facilities for student instruction, teaching laboratories in molecular and cell biology, biomechanics, and bioinstrumentation, student computer laboratories, and student reading room and student society room.

BME Research Facilities. Biomedical engineering has research facilities located on the second and third floors. Each floor contains three self-contained tissue culture rooms. Each room is equipped with four temperature controlled water-jacketed incubators, three biosafety cabinets, a refrigerator/freezer, a tabletop centrifuge, an inverted microscope, an upright microscope, and a water bath.

In addition, the lab is equipped with inverted and upright microscopes, a digitized fluorescence microscopy station, a fluorescence activated cell sorter, an autoclave, and cryopreservation facilities. A confocal microscope, housed in the basement of the building is also available for our experimental use. The cell and tissue engineering laboratory is thus suitable for mammalian tissue culture, cell function analysis, cell separation, and protein expression evaluation. The cell and tissue analysis and characterization lab contains a full complement of biochemical and molecular biological equipment including vertical and horizontal gel boxes, power supplies, a spectrophotometer, a gel imaging and analysis workstation, several microcentrifuges, a -80°C freezer, and all necessary biochemicals and electrophoresis supplies needed for protein and nucleic acid separation and analysis. This facility also contains three biosafety cabinets and a light cycler for nucleic acid isolation, purification, amplification, and general PCR technology. In addition, a separate bacterial culture and analysis laboratory contains a bacterial culture incubator, independent centrifuges, and electrophoresis gel boxes. These laboratories are thus equipped for dynamic evaluation of cells and tissues from the macroscopic and microscopic levels to molecular analysis of protein and gene expression.

Optical Imaging and Microscopy Laboratories. The lab has optical coherence tomography and laser scanning confocal microscopy instruments which can be customized for imaging *in vivo* or *ex vivo* cells and tissues. The lab is equipped with an 8' x 4' vibration isolated optical table, four networked PCs, a fiber-optic polisher, and general purpose test and measurement equipment including power supplies, a function generator, and an oscilloscope. The lab is also equipped with an inverted microscope, Zeiss Axiovert 200M with DIC 63x NA 1.4 oil, and 20x NA 0.75, Phase 40, 20, 10x and Fluorescence: FITC/GFP, TRITC, YFP, DAPI capabilities. The microscope has also been customized for central dark field/optical scatter imaging for sizing and morphological assessment.

BioMEMS and Microfabrication Laboratory. This laboratory integrates micro- and nanotechnology within various engineering disciplines with life sciences and medical applications, which are rapidly converging to spawn new platforms for point-of-care diagnostics, biomedical imaging, and regenerative therapies, creating a highly technical and thoroughly collaborative biomedical engineering environment. The laboratory supports research, training, and education to prepare the next generation of scientists and engineers. It maintains a fully equipped 1,000-square-foot clean room microfabrication facility housed within the BME building with photolithography, physical vapor deposition, plasma etching, and other capabilities.

Stem Cell Biology and Bioengineering Laboratory. This laboratory is equipped for all cellular, histological, and molecular recombinant DNA techniques, with a dedicated microscope room for imaging analysis. A modern animal facility is available in the basement of the BME building for rodent animal model research. It is equipped with surgical areas and a biosafety cabinet. Major equipment items include: PCR machine for recombinant DNA applications; BTX ECM 830 electroporator for in vivo/ovo electroporation experiments; Thermo 620E cryostat for tissue sectioning; fluorescence stereomicroscope (Leica M16FA); injection station for mouse and chick embryos; epifluorescence upright microscope (Zeiss Axio Imager M1) for image data analysis.

Chemical and Biochemical Engineering (ENG)

Chemical and Biochemical Engineering

The department's instructional laboratories for chemical engineering majors contain modern analytical instruments and process engineering apparatus. Most equipment, such as the computer-coupled, closed-loop, continuous-flow distillation unit, features advanced microprocessor design, representing the state-of-the-art in automation.

As a special feature, the department's research equipment is available for students conducting undergraduate research, whether by individual arrangement or through programs such as the Chemical and Biochemical Engineering Research Scholars Academy and the James J. Slade Scholars Program. The impetus for this unique offering stems from the department's strong commitment to research and its active involvement with sponsored research projects at the university and state high-tech centers. Research is in such areas as advanced materials, bioengineering and biotechnology, sustainable energy and biofuels, process systems engineering, kinetics and catalysis, pharmaceutical engineering, and polymer science.

The department's major instructional laboratories include a chemical process engineering laboratory, a biochemical engineering laboratory, and pharmaceutical engineering laboratories.

The ***Chemical-Process Engineering Laboratory*** is devoted to the study of chemical reactions and physical phase separations for multicomponent systems. Typical apparatus includes distillation, gas absorption, liquid extraction, wiped-film evaporation, falling-film evaporation, and computer-coupled process control units. Special devices are used for the study of fluid flow in pipe systems and heat transfer in heat exchangers. Analyses of changes in chemical compositions are aided by gas chromatographs, UV and IR spectrophotometers, refractometers, and many other modern analytical instruments.

The department's ***Biochemical Engineering Laboratory*** is devoted to the study of biochemical engineering processes and the detection and separation of biospecies resulting from these bioprocesses. Specific experiments in enzyme and fermentation kinetics, for batch and continuous systems, are provided. This fully equipped biolaboratory contains a wide range of analytical instruments and specialized devices, including a Pharmacia Fine-Chemicals microprocessor-controlled and automated liquid chromatograph analyzer, and a computer-coupled BIOFLOW III fermentor system.

The ***Reaction Engineering Laboratory*** contains custom built quartz tube reactors with attached Raman, UV, and IR spectrophotometers for *in situ* measurements. Gas and liquid chromatography are also available. For synthetic work, there is a wide range of synthetic equipment to prepare various nanostructured materials, catalysts, and electrocatalysts. It includes rotovaps, vacuum lines, centrifuges, ultrasonicators, ovens, tube furnaces, and oven furnaces.

The ***Soft Materials Characterization Laboratory*** contains various equipment, especially for particle synthesis and characterization, including an optical microscope, UV/Vis spectrophotometer, benchtop Nutsche filter, and Abbe refractometer, as well as syringe pumps, filters, blenders, and homogenizers. There is additional catalyst manufacturing equipment, such as impregnators, and drying equipment. There also is a facility for the investigation of theoretical properties of polymers and soft materials by thermodynamics and statistical mechanics and other methods, and for computer modeling of their behavior.

The ***Pharmaceutical Engineering Laboratories*** are environmentally controlled and capable of reproducing moisture and temperature conditions used in pharmaceutical manufacturing. In total, these modern facilities contain over 20 laminar flow hoods, three temperature and humidity-controlled rooms, and laboratory bench space designed for both small and large equipment and instruments. Equipment that relates to the synthetic production and purification of active pharmaceutical ingredients include stirred tanks, crystallizers, granulators, a rotating fluidized bed coater, dryers, a wipe-film evaporator, batch distillation column, liquid-liquid extractors, and a Particle Imaging Velocimeter/Laser-Induced Fluorometer. The research facility currently contains extensive solids-processing equipment used by major pharmaceutical, food, and agrochemical companies for the formulation of new products. This combination of equipment is rare in educational engineering programs. For example, the program currently owns a pan-coater, two tablet press, mills, fluidized-bed equipment, and essentially every category of powder blenders used in the industry, including a five-cubic-foot capacity ribbon blender and a 10-cubic-foot capacity bin blender. The Continuous Pharmaceutical Advanced Manufacturing Laboratory is a fully integrated, control-enabled, commercial-scale pilot plant for continuous manufacturing. This facility is the only one of its kind at a university anywhere in the world and has served as a model for numerous commercial facilities around the world.

Civil and Environmental Engineering (ENG)

Civil and Environmental Engineering

The curriculum requires that all students obtain firsthand experience in the use of a wide range of modern experimental equipment. The purpose of the laboratory instruction is to complement the theoretical and analytical coursework and to verify the fundamentals learned in the courses. The department's laboratory facilities are located in the Civil Engineering Laboratory Building and the Civil Engineering Building, which are equipped to carry out a broad spectrum of sophisticated research and instruction in virtually all aspects of civil engineering.

Visualization and Building Information Modeling (BIM) Laboratory. The Building Information Modeling (BIM) Laboratory is a computational laboratory that provides a network of advanced graphic workstations and a full suite of building and infrastructure modeling, remote sensing data analysis, energy simulation, data mining, and software development software packages to both graduate and undergraduate students for learning computational tools that will be indispensable to their future career. The laboratory allows the students to design and engineer building and infrastructure systems in a highly collaborative and interactive manner and to analyze their performance as it provides the basic network structure for data synchronization and information sharing. The laboratory will also provide continued education opportunities related to BIM to the general public.

Computing Laboratory. Undergraduates use this facility extensively for course and laboratory work and computer graphics. The laboratory is equipped with the latest personal computers. Several software packages are available for computer-aided design, construction engineering, geotechnical engineering, structural engineering, and water resources. The laboratory is updated continually as computer technology advances.

Concrete Materials Laboratory. This laboratory has facilities for instrumentation and testing for failure of reinforced and prestressed long-span beams, columns, connections, and large-panel slabs. The equipment includes a 1,000,000 lb. capacity compression tester; a 650,000 lb. capacity girder and frame tester for testing simple and continuous girders; a 350,000 lb. capacity slab, pipe, and frame tester; two Hewlett-Packard 100-channel data acquisition and processing systems; a 20 x 25-foot temperature- and humidity-controlled environmental chamber; and facilities for rapid freezing and thawing tests.

Environmental Engineering Laboratory. This laboratory is equipped for performing the analysis of water and wastes and the unit processes associated with treatment. Molecular level and advanced analytical chemical measurements are available for complex environmental samples, including water and air matrices. The microbiological equipment includes a cell homogenizer for DNA extraction, quantitative PCR (qPCR), PCR, fluorescent microscope, microcentrifuge, electrophoresis equipment, gel imager, constant-temperature water baths, incubators, and laminar flow hoods. Analytical chemistry equipment includes an FTIR-microscope, high-pressure liquid chromatograph (HPLC) with UV detection, a total carbon/total nitrogen analyzer, pH meters, field meters for conductivity/pH/ORP, chemical fume hood, drying and annealing ovens, centrifuge, mixing devices, chemical metering pumps, spectrophotometers (including Hach), and turbimeters. A variety of field sampling equipment, devices to simulate unit processes (e.g., jar test, annular biofilm reactor, sunlight simulator), and refrigerated storage is available.

Large-Scale Structures Laboratory. This laboratory features a 25 x 50-foot reaction floor having tie-down points designed to resist uplift forces of 30 kips each. A five-ton bridge crane spans the floor. "Erector set"-type fixtures are utilized to provide maximum flexibility for testing a variety of full-scale structural components. Hydraulic jacks with capacities of up to 100 tons are available for application of structural loads. An MTS Closed Loop Electrohydraulic Test System capable of more than 125,000 lb. of force and velocities of up to 350 in. per minute is available for the application of dynamic and repeated loads.

Soil Mechanics Laboratory. This laboratory contains up-to-date equipment for the performance of soil identification and classification tests and for the determination of physical, hydraulic, and mechanical properties. The equipment includes standard as well as back-pressured consolidometers; direct, triaxial, and laboratory vane shear strength devices; and various permeameters. An automatic triaxial testing system also is available.

Solid Mechanics Laboratory. This laboratory is equipped to determine the strength and physical properties of engineering materials. There are universal testing machines, with a maximum capacity of 60,000 lb. for tension and compression tests; a torsion machine; Brinell and Rockwell hardness testers; an impact machine; beam-testing rigs; and strut buckling apparatus.

Sustainable Infrastructure Laboratory. This laboratory is equipped to perform field evaluation of infrastructure and geotechnical systems. The infrastructure evaluation is supported by a wide range of nondestructive evaluation (NDE) equipment: from acoustic and electrical to electromagnetic and electrochemical systems. The geotechnical system evaluations concentrate on studying wave propagation characteristics through soil and rock, the basic dynamic properties of particulate materials, and the interaction between foundation structures and underlying soils. A cross-hole apparatus are available for subsurface investigation.

Urban and Coastal Water System Laboratory (Fluid Mechanics Lab, Hydro-environmental Informatics Lab). Urban and Coastal Water System Laboratory, consisting of fluid mechanics lab and hydro-environmental informatics lab, is dedicated to addressing water resources engineering challenges through fundamental and applied research taking the advantage of our advanced lab, field, and computational facilities. The Fluid Mechanics Lab is equipped with a hydraulic, wave, and sediment flume, hydrology apparatus, volumetric hydraulic benches with a variety of experimental modules, various field flow and water quality monitoring devices, and a stormwater green infrastructure testing platform. The Hydro-environment Informatics Lab houses environmental modeling and informatics facilities with access to the leading-edge computational clusters, a real-time environment monitoring center, and a sensor fabrication space with testing equipment.

Electrical and Computer Engineering (ENG)

Electrical and Computer Engineering

Departmental Computer Facilities. The Department of Electrical and Computer Engineering has three computer labs available at all times to students studying electrical and computer engineering. The EE103/EE105 computer labs have 63 PCs with two printers. Each PC has both Windows 10 and Linux operating systems. The EE219 VLSI computer lab is also open to all students at all times. The software installed on each computer includes PSpice for circuit design and simulation, Matlab for mathematical programming, Visual Studio for programming languages including C, C++ and Java. Microsoft Office is available for writing lab reports, homework, and research papers. VLSI design software from both Cadence and Synopsys is available on each computer for designing integrated circuits. The Eclipse software workbench with the Android software development kit is available for programming mobile apps on cellphones. National Instruments LabView with the modulation toolkit is installed for communications students to program software programmable radios. More specialized instructional labs associated with the digital signal processing (DSP), virtual reality, and VLSI design classes also have dedicated computer lab rooms.

Teaching Labs:

Computer Architecture Laboratory. This laboratory consists of experimental stations that provide students with opportunities to gain experience with the internal workings of a microcomputer, learn assembly programming for a standard commercial microprocessor, and learn how to interface input/output memory, serial I/O, and parallel I/O chips to a standard microprocessor.

Digital Logic Design Laboratory. This laboratory provides practical experience with the design and hardware implementation of digital circuits for sophomore students. The laboratory is based on the understanding of basic waveforms to simulate and debug a circuit that is then implemented in hardware using SSI and MSI ICs. The experiments cover all the relevant topics about combinational and sequential logic with circuits of increasing complexity.

Electronics Laboratory. This laboratory contains equipment for the study of solid-state devices and circuits. Experiments involve studies of biasing and low-frequency operations of discrete solid-state devices, frequency response, and the effect of feedback on single- and multistage BJT and MOSFET amplifiers. Further studies include OP-AMP parameters, frequency response, and OP-AMP linear and nonlinear circuits and systems. The laboratory is well equipped for a range of student projects in electronic circuit designs.

Embedded System (FPGA). The Embedded System laboratory provides opportunities for the students to gain hands on exercises in building embedded systems. The laboratory is equipped with Altera DE2-115 FPGA boards and computer work stations to train students with skills required for modeling and implementing embedded systems.

Power Electronics Laboratory. This laboratory provides opportunities for students to gain hands-on experiences with devices and circuits used in power electronics applications. Students become familiar with the practical aspect of various topics including modern power semiconductor devices, power inductor design, thermal management methods, power rectification, and DC/DC converter design.

Software-Defined Radio Instructional Laboratory. This laboratory is available for undergraduate and graduate instruction and special projects. National Instruments-funded software-defined radio stations operating Universal Software Radio Peripherals and LabView programming software provide flexibility in the design and analysis of various real-time end-to-end algorithms. Experiments in digital communications introduce students to design and testing of the basics as well as radio frequency phenomena. The setup provides opportunities for advanced capstone project designs involving analog filtering (National Instrument's my-DAQs) as well as human-computer interfaces (Microsoft Kinect).

Solid-State Electronics Laboratory. In addition to the facilities provided by the Micro-nanofabrication and Characterization Facility, facilities exist for the study of microwave devices; high-current switching devices; electro-optical modulation; heterojunction lasers; and electrical characterization of materials, as well as their use in communications, different solar cells, and related devices.

In addition to the above-mentioned laboratories, students interested in special projects in electrical and computer engineering may take advantage of the many well-equipped, faculty-supervised research laboratories, available in such specialties as robotics, computer graphics, computer database design, speech processing, image processing, machine vision, and software engineering.

Research Labs:

Cyber Physical Systems Laboratory (CPS Lab). The Cyber Physical Systems Laboratory's (CPS Lab) overarching mission is to propose novel sensing paradigms to transform raw sensed heterogeneous data into valuable information (by giving semantic meaning to the collected data) and, finally, into knowledge through information fusion and integration. The paradigms will apply to those distributed systems that need to timely react to sensor information with an effective action such as cyber-physical systems, which feature a tight combination of, and coordination between, the system's computational and physical elements. The significance of the research is to leverage the acquired knowledge to broaden the potential of cyber-physical systems in several dimensions, including: augmentation of human capabilities, understanding of human activities, coordination of heterogeneous (infrared) cameras, operation in dangerous or inaccessible environments, and efficiency. The multidisciplinary research team comprising of graduate and undergraduate students as well as of visiting researchers is guided by Dr. Dario Pompili, Professor of Electrical and Computer Engineering, Rutgers University.

Data Analysis and Information SecuritY (DAISY) Lab. Dr. Yingying Chen leads Data Analysis and Information Security (DAISY) Lab in Electrical and Computer Engineering Department at Rutgers University. DAISY lab has extensive equipment to support research activities in the general areas of: Applied Machine Learning in Mobile Computing and Sensing, Internet of Things (IoT), Security in AI/ML Systems, Smart Healthcare, and Deep Learning on Mobile Systems. The lab consists of an experiment room located on the 5th Floor of the CoRE building in Busch Campus, Rutgers University. It has 4 Dell Precision high-performance workstation servers installed with high-end Intel Xeon CPUs (3 equipped with NVIDIA GV100/P4000 GPUs for deep learning acceleration), 5 desktops, 12 laptops, and 5 mini PCs, for data processing and machine learning computation. The lab has 17 802.11 Intel 5300 WiFi network interface cards, 20 Atheros WiFi network interface cards, 10 Texas Instruments xWR1642 millimeter-wave radars, 1 ImpinJ Speedway R420 RFID reader, 200 Avery Dennison RFID tags, 1 Avisoft Ultrasonic Speaker equipped with 1 Avisoft amplifier, 1 Tektronix oscilloscope, and 2 Keysight function generators, to support broad mobile sensing topics. Additionally, we have 16 Android phones, 2 Android Tablets, 3 Google Wear OS smartwatches,18 Raspberry Pis, 4 programmable robot cars, 7 drones, 2 3D printers, and 1 ECG monitor, for long-term data collection on diverse smart IoT platforms for applied machine learning.

Information, Networks, and Signal Processing Research (INSPIRE) Lab. Dr. Waheed Bajwa. The INSPIRE Lab within the Department of Electrical and Computer Engineering at Rutgers University, New Brunswick, is a research lab that focuses on providing fundamental mathematical understanding of and theoretically optimal, computationally efficient, and algorithmically robust solutions for some of the most pressing problems arising in information processing an umbrella term that subsumes mathematical signal processing, high-dimensional statistics, and machine learning, and networked systems, such as the internet of things, multiagent systems, (online) social networks, wireless sensor networks, and brain networks.

Laboratory of Immuno-Engineering and Micro/Nano-technologies for Personalized Healthcare (LIMPH). Dr. Umer Hassan**.** The laboratory contains equipment and tools needed to develop, test, and validate biomedical sensors. Equipment includes Formlabs 3D printer, Flow Cytometer, Spectrophotometer, ELISA plate reader, Fluorescence Microscopy, PCR Thermocycler, Infusion pumps, ZI Lock in amplifier, current preamplifiers, data acquisition cards, smartphones, and computers.

Integrated Systems & NeuroImaging Laboratory. Dr. Laleh Najafizadeh. The NeuroImaging Laboratory accommodates single-subject and hyperscanning functional neuroimaging experiments using EEG. The laboratory is equipped with computer stations for stimuli presentation and recording behavioral responses, E-prime 2.0 professional software for designing cognitive tasks and stimuli presentations, and high-end EEG recording systems. Students will gain experience in designing functional neuroimaging experiments, collecting data and processing the signals.

Oxide Electronics Laboratory. Dr. Shriram Ramanathan. The laboratory comprises facilities for growth of thin film semiconductor crystals with tailored structure and doping; measurement of electrical transport properties in devices. Principal goals include design of quantum materials for emerging computing technologies and adaptive electromagnetic systems.

Virtual Reality Laboratory. This laboratory provides facilities for students to gain hands-on experience with several virtual reality (VR) specific interfaces, such as stereo glasses, 3-D trackers, force feedback joysticks, and sensing gloves. It also trains students in the intricacies of 3-D graphics and authoring real-time simulation.

Wireless Information Network Laboratory (WINLAB). WINLAB At the Electrical and Computer Engineering Department and Computer Science Department, Rutgers University, has extensive laboratory and equipment facilities to support research activities in the general areas of:

- Software defined radio (SDR) hardware and software, RF circuits and FPGA
- Emulation, simulation, and analysis of large scale complex wireless systems
- Software-defined radio (SDR) and software-defined networking (SDN)
- 5G/6G radio access and mobile core networks
- Edge cloud computing systems
- Security and privacy of wireless networks
- Internet of Things (IoT) devices and systems

WINLAB has the capability of fabricating prototype devices and printed circuits with K&S wedge bonder, SMT rework equipment as well as various FPGA development platforms and programmable embedded platforms (APTIX, GNU radio USRP, etc.). The laboratories are also equipped with various network analyzers, RF spectrum analyzers, high-speed digitizing oscilloscopes, function generators, power meters and other general purpose laboratory equipment (shielded enclosures, antennas, etc.). WINLAB also maintains state-of-the-art computing

facilities including 12 compute servers, 4 storage servers, a 20-processor HPC cluster and 12 high-performance workstations, and over 200 networked computers and laptops. The center maintains software licenses for a variety of simulation tools including Matlab, OPNET, all major hardware design tool chains including Cadence, Synopsys and Mentor Graphics, as well as specialized wireless communications tools like EEs of EDA, Wise, XFDTD and numerous other public domain simulation tools. In addition, WINLAB operates and maintains two NSF community research testbeds - ORBIT and COSMOS - for large-scale reproducible wireless experiments and real-world evaluation of 5G/6G systems respectively. These testbeds can be accessed by experimenters over the Internet, and are also connected to national research networks including GENI, Fabric and Internet2.

Environmental Engineering (ENG)

Environmental Engineering

Environmental Engineering Process Laboratories (Cook Campus)

These laboratories are equipped to establish, monitor, and analyze physical, chemical, and biological processes in engineered and natural systems. A Gas Chromatography (GC) system equipped with Flame Ionization and Electron Capture detection is used for quantifying volatile compounds in gas samples. There are two high-performance liquid chromatography (HPLC) systems used for quantifying chemical pollutants or microbial metabolites. An Ion Chromatography (IC) system is available for quantifying dissolved charged chemical species in natural and treated water. An Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES) system is available for the quantitation of trace elements in soils or water. A supercritical CO_2 extractor is used for activated carbon regeneration and extraction of organic pollutants from soil and sediment matrices. The laboratory is equipped for analyses of microbial communities via: phase-contrast microscopy for enumeration and identification; spread or membrane plating for selective cultivation; and DNA extraction, visualization, polymerase chain reaction (PCR) amplification, and quantitative PCR for detection and identification. A UV-visible spectrophotometer, various ovens, dissolved oxygen meters, pH meters, and electronic balances are also available.

Physical and chemical processes are demonstrated using a computer-controlled flow-through reactor system with multiple sensors. The system allows students to establish and monitor processes in a plug flow reactor (PFR), a completely mixed flow reactor (CMFR), CMFRs in series, and other reactor configurations used in water and wastewater treatment. Jar test systems are available for investigation of interparticle interactions resulting in turbidity removal. Bench scale batch reactors are employed for investigation of chemical reactions, ion exchange, and adsorption processes. Computer software packages for activated carbon adsorber design, air stripper design, and modeling of pollutant distributions among multimedia are available.

Biological processes are investigated using small-scale reactors. Students establish anaerobic digesters that are monitored for COD removal, fatty acid production, and methane production. Nonlinear curve-fitting is used to parameterize a biokinetic model of the digestion process. Bioremediation techniques are tested in microcosms using soils collected by students. Removal of gasoline and chlorinated solvents are evaluated by monitoring contaminant profiles and microbial populations. In situ water quality is measured in the field using handheld meters equipped with probes for dissolved oxygen, pH, conductivity, and turbidity. Biochemical oxygen demand (BOD), chemical oxygen demand (COD), bacterial indicator plate counts, and nutrient (phosphorus and nitrogen) analysis are carried out using standard methods or commercial (Hach) kits.

Environmental Engineering Laboratory (Busch Campus)

This laboratory is equipped for performing the analysis of water and wastes and the unit processes associated with treatment and valorization. Molecular level and advanced analytical chemical measurements are available for complex environmental samples, including water and air matrices. The microbiological equipment includes a cell homogenizer for DNA extraction, quantitative PCR (qPCR), PCR, fluorescent microscope, microcentrifuge, electrophoresis equipment, gel imager, constant-temperature water baths, incubators, and laminar flow hoods. A ranger of stirred and non-stirred pressure vessels (Parr) are available for hydrothermal reactions. Analytical chemistry and other auxiliary equipment includes an FTIR microscope, high-pressure liquid chromatograph (HPLC) with UV detection, pH meters, field meters for conductivity/pH/ORP, chemical fume hood, nitrogen evaporator, drying and annealing ovens, muffle furnace, centrifuge, mixing devices, chemical metering pumps, spectrophotometers (including Hach), and turbidimeters. A variety of field sampling equipment, devices to simulate unit processes (e.g., jar test apparatus, annular biofilm reactor, sunlight simulator), and refrigerated storage are available.

Air Sampling and Analysis Laboratory (Cook Campus)

This laboratory is equipped to provide students with experience in ambient and indoor air sampling. Students learn how to use air flow rate and velocity measurement devices (i.e., wet test meter, dry gas meter, bubble calibrator, mass flow meter, rotameters, S-type and regular pitot tubes), particle samplers (i.e., Button inhalable aerosol sampler, IOM inhalable aerosol sampler, PM2.5 impactor, cyclone), particle measurement instruments (i.e., optical particle counter, condensation particle counter, aerosol mass photometer), and bioaerosol samplers (i.e., 1-stage Anderson impactor, 6-stage Anderson impactor, and portable bioaerosol samplers). Students gain experience in analyzing gases using Draeger tubes and ozone meters.

Soil and Water Laboratory (Cook Campus)

This laboratory is equipped to teach students how to determine the properties of soils. Ovens and electronic balances are available for soil moisture content analysis. pH meters are available for characterization of soil and water samples. Instruments for manual or automated measurement of soil particle size distributions; and sensor-enabled measurement of soil water content and pressure potential are available. Pressure extractors and automatic systems to measure water retention curves and saturated hydraulic conductivity, along with two types of tension infiltrometers that can be connected to data loggers for automatically quantifying water movement through unsaturated soils and sediments enable study of flow in porous media. A physical aquifer model allows students to visualize and manipulate movement of water and contaminants in a groundwater environment.

Industrial and Systems Engineering (ENG-I&S)

Industrial and Systems Engineering

Advanced Simulation Laboratory. This laboratory is intended to serve student term projects in the areas of simulation, design, statistical modeling, and machine learning. With access to large screens, fast computers, and different media tools, the students are able to analyze and simulate large volumes of data and build models using R, Phyton, MATLAB, ARENA, LINDO, and other commercial tools. The lab also includes 3-D modeling tools such

as Solid-Works and FactoryTalk for student projects. There is also a PLC server that can be connected to remote devices and robots for real-time motion and supervisory controls, and for cyber-physical systems controls. This PLC is usually used in two or three student design projects every year.

Automation Laboratory. The laboratory is equipped with two CNC milling machines, a CNC lathe, an automated storage and retrieval system, and testing equipment and devices that support undergraduate courses (e.g., Manufacturing Processes and Design I and II). There are also two ROS stations for robot-to-robot communication and control applications. This lab is also home to a number of machines and systems that were developed in the prior student design projects (including two autonomous tennis ball collectors, a soccer ball collector). This equipment is used for departmental tours and for lecturing Design I classes. The laboratory has a prototype sheet-folding machine capable of folding creative patterns for different applications.

Automation and Mechatronics Laboratory. This laboratory provides students with hands on experience in motion and supervisory controls. With WiFi connection to the ISE remote PLC and a host of PLCs and instructional kits (with motors, sensors, I/O boards) in the lab where students are able to work on hands-on projects that involve control of devices, motors, actuators, and higher level supervisory controls. This lab is used primarily for the Automation and Systems Design course and lab. The lab also includes a small-scale physical simulation of IOT sensors and devices for student projects.

Design Laboratory. The Department of Industrial and Systems Engineering (ISE) has shared space for ISE and mechanical and aerospace engineering (MAE) design projects. The shared space is intended to promote interdisciplinary design activities and will include primary tools that can be used for system assembly and testing, with remote access to other department resources. This lab is located in the Richard Weeks Hall building (second floor).

Energy Laboratory. This lab has been developed to allow students to have hands-on experience on how Industrial & Systems Engineering concepts and methods in data analytics, reliability engineering, and efficiency/productivity analysis can be used to improve the operation of energy systems. The laboratory has a wide array of energy-related equipment, ranging from renewable energy sensors (solar pyranometers, sun tracker, sky imager, etc.), a solar generation array, battery testing equipment, and a visual/thermal inspection drone Building energy simulation software is also available for educational and research activities.

Manufacturing Processes Laboratory. Basic machine tools such as turning, milling, drilling, grinding, and measuring machines are available to help the student become familiar with metal-processing operations. In the academic year 2016-2017, the Department of Industrial and Systems Engineering acquired two CNC machines: conversational milling and turning machines. It also acquired an array of 3-D printing machines that are frequently used in undergraduate courses and design projects. The equipment is also used to perform laboratory experiments in heat treatment, chip formation, tool life, cutting forces, temperature, chip metallurgy, and power consumption.

Quality and Reliability Engineering Laboratory. This laboratory allows students to have hands-on experience in actual methods of quality control and reliability engineering. A variety of software for control charts, sampling plans, and design of experiments is available. The laboratory has a wide array of metrology equipment such as digital calipers and micrometers, roundness measuring equipment, surface profilometers, and a coordinate measuring machine. It also has various materials testing equipment such as voltage stressing equipment and measuring microscopes. LABVIEW, Minitab, and STATGRAPHICS software are available for student use.

Materials Science and Engineering (ENG)

Materials Science and Engineering

The Department of Materials Science and Engineering contains extensive instructional and research facilities focusing on the analysis, characterization, manufacturing, and control of the wide variety of conventional and advanced materials including ceramics; glasses; composites; electrical, optical, and magnetic materials; and nanomaterials required by modern technology. Students who utilize the laboratory equipment and facilities learn to solve problems related to the design, processing, and evaluation of conventional and specialty materials. Special equipment exposes our students to the preparation and evaluation of the newer types of ceramics, metals, polymers, and composites required in aerospace, advanced engine, biotechnology, photonics, and electromagnetic applications.

An attractive feature of the department is the small class sizes, which makes instruction more interactive. The curriculum includes a large number of laboratory courses, which provide hands-on experience and learning to students. Generally, the laboratories are located within the A-wing of the Engineering Building, the McLaren Center for Ceramic Research Building, or the Fiber Optic Materials Research Building. Equipment is housed in an instructional facility and several advanced technology centers, including the Center for Ceramic Research, the Fiber Optic Materials Research Center, the Center for Advanced Materials via Immiscible Polymer Processing (AMIPP), and the Corning Glass Science and Engineering Laboratory. Major grants from industry and the New Jersey Commission on Science and Technology have provided these instructional and research facilities.

Evaluation and Measurement. Microscopy equipment includes petrographic and metallographic microscopes, a transmission electron microscope, and scanning electron microscopes. Several X-ray diffraction units provide the capability of identifying phases, with computer-automated, high-resolution systems available for advanced study of particle size, strains, and quantitative phase analysis. Chemistry can be evaluated with techniques such as energy dispersive spectroscopy, atomic absorption, inductively coupled plasma, Fourier transform IR, and laser Raman. Energy dispersive X-ray analysis systems used with the scanning electron microscopes permit microchemical analysis. Virtually all types of particle-size analysis are represented. A surface analysis system provides scanning Auger microscopy coupled with secondary ion mass, X-ray photoelectron, and ion scattering spectroscopies. Thermal analysis equipment includes simultaneous differential thermal analysis, thermogravimetric analysis, differential scanning calorimetry, thermomechanical analysis, and high-temperature X-ray diffraction. Dielectric properties of ceramic materials can be measured over a frequency range from 0.01 hertz to 10^10 hertz. There is equipment for measuring heat capacity, thermal expansion, thermal conductivity, and thermal diffusivity over a wide temperature range. Mechanical properties that may be measured and that are currently being studied include elasticity, viscosity, and plasticity. Mechanical testing instrumentation includes microhardness, toughness, and modulus- and strength-testing equipment, including advanced computer-controlled servo-hydraulic, electromechanical, and high-temperature creep systems. Various room- and elevated-temperature viscometers permit rheology to be determined. An advanced torque rheometer permits optimization of such industrial processes as mixing, extrusion, and injection molding. Tribology is studied with a specially designed, automated machine that measures friction and wear.

Processing and Forming. Microprocessor- and computer-controlled furnaces with carefully controlled atmospheres and closely regulated temperatures are especially suitable for materials studies. Hot pressing and hot extrusion may be done in a wide range of presses and furnaces, including both cold and hot isostatic presses, atmosphere-

controlled hot presses, nitriding furnaces, and injection molders. Advanced materials production technologies include special equipment for composites; laser synthesis of ultrafine powders; R.F./D.C. film sputtering; chemical vapor deposition; and evaporation-deposition. The properties of electronic substrates, packages, and magnetic and superconducting materials and devices can be studied in the Howatt Laboratory for Electronic Ceramics.

Laboratories

Computer Laboratory. This laboratory is equipped with many networked computers with links to the Rutgers computer center for massively parallel computing and to supercomputers at the national level. Computations are performed in CAD/CAM related to design, manufacture, and properties of materials; in molecular dynamic simulations of materials; and in theory of materials.

Electron Microscopy Laboratory. This laboratory is equipped with a Zeiss field emission scanning electron microscope (FESEM), a transmission electron microscope, JOEL 2010F, and a Nion UltraSTEM Electron Microscope with 10 meV energy-loss spectroscopy resolution. The supporting equipment includes an evaporator, ion-milling, and chemical and electropolishing units for thin foils.

Mechanics of Materials Laboratory. The facilities of this laboratory are used for instruction in determining the mechanical and physical properties of various materials. The available facilities include a hydraulically controlled Instron testing machine with a high- and low-temperature environmental chamber, an Instron universal testing machine, a torsional pendulum apparatus, a sonic modulus tester, a differential scanning calorimeter, an infrared apparatus, a density gradient column, and an apparatus for the study of surface friction.

Nanomaterials and Devices Laboratory. This laboratory is equipped with state-of-the-art synthesis as well as electrical measurement apparatuses for nanoscale devices. The laboratory has RF sputtering, thermal evaporation, and filtered cathodic arc apparatuses for catalyst and thin film deposition. In addition to nanomaterials synthesis, we have also set up a fully automated probe station with a semiconductor parametric analyzer for electrical characterization of our nanoelectronic devices.

Scanning Probe Laboratory. Scanning probe microscopes can be used to study a wide range of properties with a resolution of one namometer or less. The laboratory is equipped with atomic force microscopes including a Digital Instruments Nanoscope IV and a Park Instruments AFM. These are used to study nanoscale surface morphology, surface forces, frictional forces, structure of physisorbed films, and the conformation of biomolecules. In addition, there is a near-field scanning optical microscope that enables optical characterization to be performed with a resolution of around 25 nm. Nanoscale mechanical characterization is performed using a Hysitron Triboindenter which combines many features of an AFM with the mechanical capabilities of a nanoindentation system.

X-Ray Laboratory. This laboratory provides a variety of equipment used to determine chemistry and crystal structure, map out defect structure, identify unknown crystalline phases, measure lattice parameters, quantify phase mixtures, measure residual stresses, study surface roughness at the atomic level, determine the interfacial roughness in a thin film structure, prepare reciprocal space maps, analyze rocking curves of near-perfect crystals, and measure misfit strains. Three diffractometers are available for these studies. Two Siemens D500 instruments are available for routine powder analysis, while the Panalytical X'Pert MRD is available for high-end research work that requires the highest resolution. The Panalytical system is equipped with a variety of beam conditioners, a Eulerian cradle for x-y-z-omega-phi-psi sample movements, and detector stages to convert the instrument into a double-crystal or triple-crystal diffractometer. Jade software is available for routine phase ID, lattice parameter

measurements, residual stress, and quantitative analysis on all the instruments. Additional software is available for the Panalytical instrument to obtain pole figures and perform a variety of tasks related to single crystals and thin films.

Mechanical and Aerospace Engineering (ENG)

Mechanical and Aerospace Engineering

The laboratory curriculum in mechanical and aerospace engineering has been structured to help students integrate physical understanding with theoretical knowledge, and to familiarize them with advanced engineering systems and instrumentation for multidisciplinary problem solving in the 21st century. Laboratory exercises begin with introductions to basic measurement concepts and culminate in the exploration of complex, open-ended engineering problems. Facilities are continuously upgraded to provide an effective learning environment. State-of-the-art facilities, which are integral parts of the undergraduate laboratory experience, include a stereolithography rapid prototyping machine, a Mach 4 supersonic wind tunnel, and a pair of industrial-quality robotic arms. The undergraduate and research laboratory space is integrated physically to provide personal, often informal, contact and communication among undergraduate students, graduate students, and faculty. Undergraduate participation in research is widespread and strongly encouraged. A summary listing of facilities comprising the undergraduate laboratories follows.

Design and Manufacturing. Mechanical and aerospace engineering analysis, design, and synthesis problems are investigated in the computer-aided design (CAD) laboratory. Students gain hands-on experience on CAD workstations through exercises in computer-aided drafting, 3-D solid modeling and parametric design, simulation of kinematic and dynamic problems, and stress analysis using finite element methods. Extensive software is available, including AutoCAD, Inventor, Pro/Engineer, ANSYS, Matlab, Maple, and programming in C/C++ and Fortran. Exposure to advanced manufacturing techniques is provided through machine-shop training as well as utilization of two Rapid Prototyping (RP) machines (3-D Viper System and Stratasys Fused Deposition 3000 System). CAD and RP are available on the internet and the design iteration cycles have been reduced significantly. A complete design cycle experience from concept to fabrication, followed by evaluation, has been implemented.

Dynamics and Controls. Prediction and control of the response of structures subject to dynamic loadings are a central component of mechanical and aerospace engineering design and analysis. Experiments have been designed to illustrate dynamic response of single and multiple degree of freedom systems, as well as to carefully examine frequency and amplitude response of structural components. Diagnostics are conducted using advanced laboratory computers and digital spectrum analyzers, in addition to conventional strain gages and impact hammers.

Fluid Dynamics. Fundamental principles and advanced systems involving fluid flows, ranging from demonstrating Bernoulli's principle to assessing the lift and drag characteristics of airfoil designs, are examined in the undergraduate curriculum. Facilities include four low-speed wind tunnels and a mach 4 supersonic wind tunnel; a large free-surface water tunnel also is used for undergraduate participation in independent or sponsored research. Advanced instrumentation includes hot-film anemometry with computerized data acquisition and optical diagnostics techniques.

Material Characterization. Mechanical properties of materials are examined in the newly completed solid mechanics laboratory. Facilities include three Instron tensile testing machines with digital data acquisition and control and three hardness-testing machines. Laboratory exercises have been structured to highlight phenomena associated with deformation and failure of engineering materials. Additional research-quality facilities available to undergraduates include larger MTS and Instron testing machines. These instruments are used in research on biomechanical systems and composite materials, respectively. Undergraduate research also may be conducted in a high pressure, ~100,000 psi, materials testing/processing laboratory.

Nanomaterials. Nanostructured materials synthesis and characterization are examined in the laboratories. Facilities include flame-based chemical vapor condensation/deposition chambers and plasma reactors. Laboratory exercises involve synthesis of nanoparticles and carbon nanotubes, probing of the processing flow field using laser-based spectroscopic techniques, and characterization of the properties of the resulting nanomaterials. The lab courses include introduction to atomic force microscopy, scanning electron microscopy, X-ray diffraction, and scanning mobility particle sizing. These dual-purpose educational/research laboratories engage significant undergraduate independent research, as well as high school outreach through internships.

Robotics and Mechatronics. Critical concepts in system control as well as advanced theories of robotics and mechatronics are investigated using a series of industrial robots including a three-axis SCARA robot (Adept Cobra s600), a three-axis planar transportation system (Genmark AVR-3000), and two five-axis general purpose robots (Mitsubishi RV-M2). Kinematics, motion planning, hybrid force/position control for object manipulation, and automated assembly operations are the topics addressed in the laboratory exercises. This dual-purpose educational/research laboratory enjoys a particularly high degree of undergraduate student participation in the research component.

Particle Image Velocimetry. Particle image velocimetry (PIV) data will be obtained using a LaVision stereoscopic-PIV system, consisting of a pair of 16-bit scientific CMOS (sCMOS) cameras, with a pixel resolution of 2560-2160 pixels. The cameras can be arranged in a stereoscopic configuration to provide for correction to out-of-plane particle motion and slight misalignment of the laser sheet with the viewing plane. A pair of 105 mm Nikon Nikkor lenses can be used for large field of view imaging of the flow field, while zoomed-in measurements can be made using a pair of 200 mm lenses. The lenses will be mounted to Scheimpflug adapters. As the tunnel operates for a minimum of 10 seconds, 150 vector fields can be obtained during a single run, whereas 10-20 runs may be required for converged statistics for a given flow condition.

The light source for the PIV will be provided by a Quantel Evergreen 200 mJ/pulse double-pulsed Nd:YAG laser, which produces 532 nm light at a maximum rate of 15 Hz. The laser will be expanded into a thin laser sheet, with a desired thickness of ~1.5 mm. Timing for the cameras and the laser will be provided through either a LaVision programmable timing unit (PTU) or externally using a Stanford Research Systems digital delay generator. Processing of the PIV raw images will be performed using LaVision DaVis v8.3 software.

Seeding options for SWT are currently under investigation. Constraints for the selection of proper seeding include safety, particle size, and particle response. To address the safety and environmental concerns, mineral oil options are being considered. Use in comparable tunnel facilities have confirmed particle sizes of 1 mm or less, which allows for Stokes numbers of under 0.1. As has been demonstrated by Samimy & Lele (1991), this is sufficient for faithfully tracking the flow.

Schlieren Imaging. The schlieren system is a z-type configuration, using a 29.21 cm diameter parabolic mirror to collimate light prior to passing through the test section. The light source for the schlieren system is a Thorlabs mounted LED, which produces white light. A second parabolic mirror reflects the light to a set of optics that help to steer the beam into a CCD camera. For schlieren experiments, data can be obtained with the knife edge positioned either vertically or horizontally, to image density gradients tangential or normal to the flow direction, respectively. Images are recorded using a LaVision 12-bit Pro-X camera. The camera is a thermo-electrically cooled CCD camera with a resolution of 1600 x 1200 pixels, and a maximum quantum efficiency of 55% at 500 nm. The camera can operate at a maximum frame rate of 29 Hz; therefore, the data obtained are not time-resolved. Imaging of the full field of view is performed with a Nikon Nikkor 105 mm camera lens. Timing for the system is accomplished using a LabSmith LC880 programmable experiment controller, that supplies a 5 V square-wave TTL signal trigger to the camera. Finally, post-processing of the acquired images is in Matlab.

Supersonic Wind Tunnel. Rutgers University's Mach 3.45 supersonic wind tunnel (SWT) facility is a fixed-Mach number, blowdown-to-atmosphere tunnel with dried air as the test gas. SWT is fed by a compressed air storage system, that supplies a total volume of 8 m3 of air, pressurized to 16.6 MPa. Expansion of the flow is accomplished using a half-nozzle, creating Mach 3.45 flow at the entrance to the test section. The test section is a square cross-sectional area measuring 152 mm x 152 mm. SWT operates at a typical stagnation temperature (290 K), and variable stagnation pressure typically around 1.5 MPa. These conditions correspond to a freestream velocity of 641 m/s and a unit Reynolds number of 4.9 x 107/m . Typical run times at these conditions are approximately 10-15 seconds. The tunnel boundary layer develops naturally and is fully turbulent at the entrance to the test section. Previous measurements have established a boundary layer momentum thickness of 0.85 mm.

Thermal Sciences. A variety of energy-related experiments are offered in the undergraduate curriculum from basic sciences of thermodynamics and heat transfer to assessing the performance and environmental impact of a steam turbine power generating system. Specific experiments include convection and radiation heat transfer exercises, and experiments carried out in an internal combustion engines laboratory and the steam power generator facility. A partnership with local industry to design the applied engineering laboratories has provided students with realistic simulations of actual engineering problems and scenarios.

Computers (ENG)

Computers

Computer facilities are available at the university, school, and departmental levels. The university's computing services are managed by the Office of Information Technology (OIT). School of Engineering facilities are managed by Engineering Computing Services (ECS). Each School of Engineering department also maintains its own computer laboratories that provide specialized software for the use of its students and faculty. On the New Brunswick campuses there are over 15 public computer laboratories or hubs provided by New Brunswick Computing Services; many are located near the engineering buildings. Scanning and printing services and a wide range of software are provided in these computer labs.

Engineering Computing Services maintains two major instructional laboratories within the engineering complex. These include the Design, Simulation, and Visualization (DSV) Lab and the Engineering Information Technology (EIT) Lab. Each facility is available for instruction, research, and general student use. The EIT lab has 45 workstations and the DSV Lab has 60 workstations. Both computer labs support a variety of engineering specific software including MATLAB, SolidWorks, AutoCad, and SPICE.

Libraries (ENG)

Libraries

With holdings of over three million volumes, the Rutgers University Libraries rank among the nation's top research libraries. Composed of 26 libraries, centers, and reading rooms at Rutgers University-New Brunswick, Rutgers University-Camden, and Rutgers University-Newark, and RU-Online, a digital library, the libraries provide the resources and services necessary to support the university's mission of teaching, research, and service. Details regarding facilities and services are available here.

Engineering students and faculty are primarily served by the Library of Science and Medicine located on the Busch campus near the engineering complex. Other smaller specialized libraries on the Busch campus house collections in chemistry, mathematical sciences, and physics. Students and faculty can also access the catalog, a wide variety of electronic indexes and abstracts, full-text electronic journals and research guides, and other library services online, both from campus and remotely. At the Library of Science and Medicine, professional librarians, including an engineering librarian, assist students and faculty with engineering resources. Library instruction classes are also available to improve students' information-seeking skills for lifelong learning.

Degree Requirements (ENG)

DEGREE REQUIREMENTS

Students must complete a prescribed program of study in their declared major, outlined in the Programs of Study chapter, including the distribution requirements for departmental, technical, general, and humanities/social sciences electives. The total number of credits required for graduation varies from 120 to 132 credits in the four-year program, depending on the major.

The degree of bachelor of science from the School of Engineering is not awarded to any candidate who has earned fewer than 30 credits at Rutgers. No more than 12 of the last 42 credits for the degree may be taken outside Rutgers.

Students must earn a cumulative grade point average (GPA) of at least 2.000 and a cumulative grade point average in the major (as designated by "M" prefixes) of at least 2.000 to be awarded the degree of bachelor of science from the School of Engineering.

Graduation and Diploma. Degrees are conferred by the university upon recommendation of the faculty only at annual commencement at the end of the spring semester. Students completing degree requirements in August or January may ask the Registrar for a certificate attesting to their completion of degree requirements. Students must complete a Diploma Application, and diplomas will be distributed by the Registrar's Office soon thereafter (in July for May grads, in October for August grads, in March for January grads).

Graduation with Honors. Honors are noted on the student's diploma and in the list of degrees and honors conferred. Students whose cumulative grade point averages at the end of the senior year are at least 3.200, 3.400, or 3.650 may be graduated with "Honors," "High Honors," or "Highest Honors," respectively.

Programs of Study (ENG)

PROGRAMS OF STUDY

The following curricula are offered by the School of Engineering. The numbers indicate the curriculum code for each major program. Curricula shown below are listed by the name of the department. In several cases the specific title of the bachelor of science degree is different than the name of the department. All programs except Applied Sciences in Engineering (073) are accredited by the Engineering Accreditation Commission of ABET.

Curriculum Code	Curriculum
021	Aerospace Engineering
073	Applied Sciences in Engineering
125	Biomedical Engineering
155	Chemical Engineering
180	Civil Engineering
332	Electrical and Computer Engineering
366	Environmental Engineering
540	Industrial Engineering
635	Materials Science and Engineering
650	Mechanical Engineering

Students in the first year of a four-year curriculum are assigned curriculum code 004. Students who elect to take nonengineering courses for a semester to prepare for transfer are assigned curriculum code 001.

First-Year Program

Aerospace Engineering

Applied Sciences in Engineering

Biomedical Engineering

Chemical Engineering

Civil Engineering

Electrical and Computer Engineering

Environmental Engineering

Industrial Engineering

Materials Science and Engineering

Mechanical Engineering

Other Programs of Study

First-Year Program (ENG)

FIRST-YEAR PROGRAM

Curriculum Code 004

(common to all four-year curricula)

First Semester

14:440:101 Introduction to Data-Driven Design for Engineering Applications (2)

01:640:151 Calculus for Mathematical and Physical Sciences (4)

01:750:123 Analytical Physics IA (2)

01:160:159 General Chemistry for Engineers (3)

01:160:171 Introduction to Experimentation (1) *

01:355:101 College Writing (3) *

Humanities/Social Sciences Elective (H/SS) (3) *#

Second Semester

14:440:102 Integrated Data-Driven Design for Engineering Applications (2)

01:640:152 Calculus for Mathematical and Physical Sciences (4)

01:750:124 Analytical Physics IB (2)

01:160:160 General Chemistry for Engineers (3) &

14:440:221 Engineering Mechanics: Statics (3)

Humanities/Social Sciences Elective (H/SS) (3) #

Total Credits = 35

* May be taken in the second semester of first year.
# H/SS electives may be completed at anytime before graduation; it is recommended that students take one lower H/SS during the first year if their course load is not too heavy with the required courses.
& Not required for Electrical and Computer Engineering.

Aerospace Engineering (ENG)

AEROSPACE ENGINEERING

Field of Study

Field of Study

The aerospace engineering degree at Rutgers provides a broad education on unmanned aerial systems, airplane and space vehicle design and performance, propulsion, flight technology, aerodynamics and astrodynamics, aerospace materials and structures, and aerospace systems, among other areas. Regardless of the particular product involved, aerospace engineers rely upon knowledge of matter and energy conversions, motions, and forces obtained from computer simulations and experimental investigations of processes and systems. Each aerospace engineer is able to learn and apply the fundamentals of aircraft and spacecraft design while applying their knowledge from courses such as spacecraft mission design, propulsion, system dynamics and controls, orbital mechanics, aerodynamics, and flight control dynamics to name a few. The curriculum in aerospace engineering provides these skills and prepares students for graduate study and research.

The undergraduate program in aerospace engineering trains students in a technically sound, challenging, and professional manner, laying the foundation for a productive career and enabling graduates to make positive contributions to their profession and society. This is achieved with a thorough preparation in the humanities, mathematics, and basic sciences as well as up-to-date aerospace engineering fundamentals and applications using the most advanced tools and methods available. In the senior year, the capstone aerospace design course allows students to solve open-ended, multicriteria engineering problems. Emphasis is placed on teamwork, project management, conceptualization, detailed design, computational analysis, and manufacturing. At the end of the yearlong course, students will have experienced a full product development cycle from concept to construction and testing.

Career prospects for aerospace engineers extend beyond the aeronautics and astronautics fields into other industrial sectors such as manufacturing, energy, and automotive.

Four-Year Undergraduate Curriculum

Four-Year Undergraduate Curriculum

Four-Year Curriculum Code 021

The undergraduate program in Aerospace Engineering is accredited by the Engineering Accreditation Commission of ABET, under the commission's General Criteria and Program Criteria for Aerospace Engineering.

The Department of Mechanical and Aerospace Engineering offers a standard curriculum leading to a BS degree in Aerospace Engineering, covering the areas of aeronautical engineering and astronautical engineering with an optional Energy Systems or Packaging Engineering Concentration.

Students who select the Energy Systems or Packaging Engineering Concentration are required to take three of the departmental elective courses related to the energy or packaging engineering fields, respectively. These three courses can count towards the technical electives for degree completion. The Packaging Engineering Concentration also requires a fourth course, Introduction to Packaging Engineering. Details of the standard AE curriculum and the energy or packaging engineering concentrations are presented in the AE Curriculum section of the Aerospace Engineering Undergraduate Handbook on the Rutgers MAE website.

First Year

See First-Year Program (35)

Sophomore Year

First Semester

14:440:222 Engineering Mechanics: Dynamics (3)*
01:640:251 Multivariable Calculus (4)
14:650:210 Introduction to Aerospace Engineering (3)
01:750:227 Analytical Physics IIA (3)
01:750:229 Analytical Physics IIA Laboratory (1)
14:650:291 Mechanics of Materials (3)*

Second Semester

14:540:343 Engineering Economics (3)*
01:640:244 Differential Equations for Engineering and Physics (4)
14:650:351 Thermodynamics (3)*
14:650:361 Introduction to Mechatronics (4)*
14:650:388 Computer-Aided Design in Mechanical and Aerospace Engineering (3)*

Junior Year

First Semester

01:640:421 Advanced Calculus for Engineering (3)*
14:650:312 Fluid Mechanics (3)*
14:650:342 Design of Mechanical Components (3)*
14:650:350 Mechanical Engineering Measurements with Lab (4)*
humanities/social science elective (200+) (3)

Second Semester

14:650:401 Dynamic Systems and Controls (3)*
14:650:449 Aerospace Materials (3)
14:650:458 Aerospace Structures (3)
14:650:460 Aerodynamics (3)
14:650:471 Aircraft Flight Dynamics (3)

Senior Year

First Semester

14:650:431 Mechanical and Aerospace Engineering Laboratory I (2)
14:650:439 Multiphysics Simulations (3)*
14:650:457 Spacecraft and Mission Design (3)
14:650:465 Orbital Mechanics (3)
14:650:487 Aerospace Engineering Design I (2)
technical elective (3)

Second Semester

14:650:433 Aerospace Engineering Laboratory (3)
14:650:459 Aerospace Propulsion (3)
14:650:463 Compressible Fluid Dynamics (3)
14:650:488 Aerospace Engineering Design II (2)
humanities/social science elective (200+) (3)
technical elective (3)

Total Credits = 132

Notes

*May be taken during the first or second semester, within the listed year.
All mechanical and aerospace engineering department electives may count as technical electives.

Department Electives (count as technical electives)

14:650:443 Vibrations (3)
14:650:447 Probabilistic Models in Mechanical and Aerospace Systems (3)
14:650:451 Vehicle Dynamics (3)
14:650:455 Design of Mechanisms (3)
14:650:461 Internal Combustion Engines
14:650:462 Power Plants

14:650:474 Alternative Energy I
16:650:605 Renewable Energy
14:650:478 ME Aspects of Electrical Packaging
14:650:481 Heat Transfer (3)

Energy Departmental Electives (select three for energy concentration)

14:650:461 Internal Combustion Engines (3)
14:650:462 Power Plants (3)
14:650:474 Alternative Energy Systems I (3)
16:650:605 Renewable Energy (3)

Packaging Engineering Technical Electives (select three plus 440:301 - four in total - for packaging engineering concentration)

14:440:301 Introduction to Packaging Engineering (required)
14:440:371 Packaging Evaluation Methods
14:440:373 Packaging Manufacturing
14:440:378 Sustainable Packaging
14:440:403 Safety Engineering in Packaging and General Industry
14:440:406 Packaging, Printing, and Decoration
14:440:468 Packaging Machinery
14:440:471 Distribution Packaging
14:440:477 Packaging Manufacturing II

Applied Sciences in Engineering 073 (ENG)

APPLIED SCIENCES IN ENGINEERING 073

Applied Sciences in Engineering 073 (ENG)

Field of Study

Field of Study

The curriculum in applied sciences in engineering is intended to meet the needs of students whose goals might not be served by the professional engineering programs. The curriculum permits the development of a wide range of interdisciplinary programs individually tailored to the needs of the student outside the accredited or professional engineering fields. A faculty committee advises each student in the preparation of a sound educational program from courses available in the regular engineering programs. The applied sciences in engineering curriculum is not accredited as a professional engineering program.

Courses are not offered specifically for this curriculum, but must be chosen from among those scheduled by the professional engineering programs. Several areas of specialization currently are available, such as packaging engineering, engineering physics, and preparatory programs for law school or medical school.

Four-Year Undergraduate Curriculum

Four-Year Undergraduate Curriculum

Four-Year Curriculum Code 073

First Year

See First-Year Program (35)

Sophomore Year

First Semester

01:640:251 Multivariable Calculus (4)

01:750:227 Analytical Physics IIA (3)

01:750:229 Analytical Physics II Laboratory (1)

engineering or technical elective (6)

humanities/social sciences elective (3)

Second Semester

01:640:244 Differential Equations for Engineering and Physics (4)

01:750:228 Analytical Physics IIB (3)

01:750:230 Analytical Physics II Laboratory (1)

14:540:343 Engineering Economics (3)

engineering or technical elective (3)

engineering or technical elective (3)

The last two years of the program must be developed with the assistance of the designated faculty adviser. The overall program must meet the student's career objectives and must be sufficiently different from the accredited engineering programs so as not to permit incorporation into an existing program. *Applied sciences in engineering is not accredited as a professional engineering program; it is an individualized interdisciplinary program that is not subject to professional accreditation.*

The minimum degree requirement is 120 credits. In addition to other specific requirements, the following distribution of courses must be completed:

Humanities/social sciences electives: 12 credits

Engineering electives: 10 courses of 3 credits or more

Technical electives: 30 credits

Some examples of possible concentrations in applied sciences in engineering are listed below. Other fields may be covered to meet the special interests of engineering students. Courses are not offered specifically for this curriculum (except for courses in packaging engineering). Appropriate courses are to be selected from those offered by the departments (see Course Listing). Since departmental course offerings may change from year to year, availability of a particular course cannot be guaranteed.

Biomedical Science and Engineering (Premed). This specialty is intended primarily for those students who plan to go on to medical school or graduate study in biomedical engineering and who wish to take advantage of the flexibility in curriculum planning that the applied sciences program offers. Engineering electives may be chosen from any engineering discipline, including undergraduate courses offered by the Department of Biomedical Engineering.

Packaging Engineering. The packaging engineering concentration is designed to prepare engineers and scientists for a major role in the field of packaging. The program is structured to meet the technical requirements for the development and growth of total packaging systems. Details are available here and on the catalog page here.

Packaging Engineering Concentration

Packaging Engineering Concentration

Four-Year Curriculum Code 073

First Year

See First-Year Program (35)

Sophomore Year

First Semester

01:640:251 Multivariable Calculus (4)
01:750:227 Analytical Physics IIA (3)
01:750:229 Analytical Physics IIA Laboratory (1)
14:440:301 Introduction to Packaging Engineering (3)
14:540:343 Engineering Economics (3)
_____ Humanities/Social Sciences (3)

Total Credits: 17

Second Semester

33:799:301 Introduction to Supply Chain (3)
01:640:244 Differential Equations for Engineering and Physics (4)
14:440:222 Engineering Mechanics: Dynamics (3)
14:440:302 Computer-Aided Design (CAD) for Packaging Engineering (3)
14:440___ Packaging Elective (3)*

Total Credits: 16

Junior Year

First Semester

14:440:371 Packaging Evaluation Methods (3)
14:440:470 Packaging Lab I (2)
14:440:419 Innovation and Design (3)
_____Mechanics (3)*
_____ Statistics (3)*

Total Credits: 14

Second Semester

01:355:302 Scientific and Technical Writing (3)
14:440:473 Packaging Lab II (2)
14:440:471 Distribution Packaging (3)
14:440:490 Special Problems in Packaging (3)
_____Junior Elective (3)*

Total Credits: 14

Senior Year

First Semester

14:440:373 Packaging Manufacturing Methods (3)
14:440:___Packaging Elective (3)*
14:440:___Packaging Elective (3)*
_____ Technical Elective (3)
_____ Technical Elective (3)

Total Credits: 15

Second Semester

14:440:420 Senior Project (3)
14:440:___Packaging Elective (3)*
14:440:___Packaging Elective (3)*
_____Humanities/Social Sciences (3)
_____ Technical Elective (3)

Total Credits: 15

Total Credits Required: 120

***Notes**

Packaging Electives: 14:440:378, 14:440:406, 14:440:408, 14:440:468, 14:440:489, 14:440:490, 16:731:5xx
Mechanics Electives: 14:635:314, 14:635:407, 14:180:243, 14:650:291
Statistics Electives: 01:960:379, 01:960:384, 01:960:401
Science Electives: 14:155:208, 14:635:206, 14:650:351, 01:160:209, 01:160:307, 14:635:361, 14:635:312

Biomedical Engineering (ENG)

BIOMEDICAL ENGINEERING

Biomedical Engineering (ENG)

Field of Study

Field of Study

The undergraduate program in Biomedical Engineering is accredited by the Engineering Accreditation Commission of ABET, under the commission's General Criteria and Program Criteria for Bioengineering and Biomedical Engineering. This program offers a core engineering, mathematics, and science curriculum organized into three main options, called tracks: (1) biomedical computing, imaging, and instrumentation (BCII); (2) biomechanics and rehabilitation engineering (BRE); and (3) tissue engineering and molecular bioengineering (TEMB). The BCII track is designed to train students who are interested in academic or industrial careers that involve the measuring and modeling of physiological systems, medical imaging, medical image processing and analysis, and the graphics and visualization industries. Emphasis is placed both on understanding the physiological system as well as the engineering and development of new sensors and measurement devices. The BRE track offers instruction on mechanical aspects of the body and on the development of load-bearing devices for improved human performance. The biomechanics option has added emphasis on tissue and fluid mechanics, whereas the rehabilitation option has an emphasis on prosthetics and assisted devices. The TEMB track is designed for students who desire to apply engineering principles to develop new biocompatible materials for the fields of tissue engineering and regenerative medicine, and to study and solve problems on the cellular and molecular scales.

The broad education provided by these tracks allows students to choose from a wide variety of careers. The degree program is designed to prepare qualified graduates for graduate study leading to the master of science (M.S.) or doctor of philosophy (Ph.D.) degree in biomedical engineering. In addition, students are prepared to meet the graduate entrance requirements for medical and law schools, business administration, and other professional disciplines. Aspiring graduates with industrial experience and outlook can work in large corporations and smaller companies as practicing biomedical engineers. Curricular emphasis on innovation and entrepreneurship helps prepare students to pursue opportunities at start-up companies or develop their own ideas into marketable products. Increasing numbers of graduates are finding rewarding jobs in state and federal institutions, including the National Laboratories.

The achievements of biomedical engineering constantly touch our daily lives. Past and current breakthroughs that were pioneered at Rutgers include heart-assisted devices for cardiac surgery; techniques for online analysis and operating room lesioning of brain tissue for Parkinson's disease; an artificial hand with finger dexterity; the use of virtual reality in the rehabilitation of limbs; revolutionary techniques for making large numbers of new biopolymers for implants; and rapid NMR analysis of protein structure. There are several exciting opportunities for undergraduates in biomedical engineering to further their training and experience. The Honors Academy is designed for those high-achieving students who will immerse themselves in an accelerated research program. Internship and co-op programs allow students to gain industrial experience within their education and training. The department also participates in the James J. Slade Scholars Program. These selective programs can serve as springboards for qualified students who wish to begin working toward an M.S. or Ph.D. degree in their senior year.

Biomedical Engineering (ENG)

Four-Year Undergraduate Curriculum

Four-Year Undergraduate Curriculum

Four-Year Curriculum Code 125

The degree awarded upon completion of this program is the B.S. in biomedical engineering, which is professionally accredited by the Engineering Accreditation Commission of ABET.

First Year

See First-Year Program (35)

Sophomore Year

First Semester

01:119:115 Biology I (4)

01:640:251 Multivariable Calculus (4)

01:750:227 Analytical Physics IIA (3)

01:750:229 Analytical Physics II Laboratory (1)

14:125:201 Introduction to Biomedical Engineering (3) (also offered in second semester)

humanities/social sciences elective (3)

Second Semester

01:119:117 Biology Lab (2)

14:540:343 Engineering Economics (3)

01:640:244 Differential Equations for Engineering and Physics (4)

01:750:228 Analytical Physics IIB (3)

01:750:230 Analytical Physics II Laboratory (1)

14:125:255 BME Systems Physiology (3) (also offered in first semester)

Junior Year

First Semester

14:125:303 Biomedical Transport Phenomena (3) (also offered second semester)

14:125:305 Numerical Modeling in Biomedical Systems (3) (also offered second semester)

14:125:309 Biomedical Devices and Systems (3)

14:125:310 Biomedical Devices and Systems Laboratory (1)

14:125:308 Introduction to Biomechanics (3) (also offered second semester)

technical elective (3)

Second Semester

14:125:304 Introduction to Biomaterials (3) (also offered first semester)

14:125:306 Kinetics and Thermodynamics of Biological Systems (3) (also offered first semester)

14:125:315 BME Measurement and Analysis Laboratory (2)

technical elective (3)

life science elective (3)

Senior Year

First Semester

14:125:401 Biomedical Engineering Senior Design I (1)

14:125:421 Biomedical Engineering Senior Design Projects I (2)

14:125:___ departmental elective (3)

14:125:___ departmental elective (3)

technical elective (3)

humanities/social sciences elective (3)

Second Semester

14:125:402 Biomedical Engineering Senior Design II (1)

14:125:422 Biomedical Engineering Senior Design Projects II (2)

14:125:___ departmental elective (3)

14:125:___ departmental elective (3)

technical elective (3)

general elective (3)

Total Credits = 129

Notes

Organic Chemistry I,II and laboratory are required for the premedical option and strongly recommended for the tissue engineering and molecular biology (TEMB) track (total of 9 credits counted as three technical electives). Students not in the premedical or TEMB track may choose technical electives in place of organic chemistry and laboratory.

Chemical Engineering 155 (ENG)

CHEMICAL ENGINEERING 155

Chemical Engineering 155 (ENG)

Field of Study

Field of Study

Chemical engineering deals with the chemical, biological, and physical processes for converting raw materials to valuable products and with the design of such products. Students apply principles of physics, chemistry, mathematics, biology, and health and safety sciences to the analysis, design, and automatic control of these processes. The biochemical engineering option focuses on biochemical and biological processes that require the integration of biochemistry and molecular biology with the core chemical engineering curriculum and other basic sciences. Special programs are available for those who wish to pursue careers as chemical engineers in medicine or biomedical engineering, polymer process engineering and science, environmental engineering, energy engineering, pharmaceutical engineering, and food engineering.

The achievements of chemical and biochemical engineering constantly touch our daily lives. Past and current breakthroughs include the large-scale production of antibiotics; plastics, synthetic rubber, and polymeric fabrics; semiconductors; gasoline and aviation fuel; hydrocarbon-based chemicals from oil, coal, and renewable resources; water and air purification systems; management of hazardous wastes; fertilizers, nutritional synthetic foods, and dietary supplements; dyes, paints, and solvents; kidney dialysis machines and artificial skin; biological production of alcohol or methane gas from controlled microbial digestion of natural and industrial waste materials; and development of bioreactors using enzymes and cells to enhance production of foods, drugs, and specialty chemicals.

The broad education provided by these options and special programs allows students to choose from a wide variety of careers. Many graduates work in large corporations as well as smaller companies as practicing chemical or biochemical engineers. The degree program also prepares qualified students for graduate study leading to the master of science (M.S.) or doctor of philosophy (Ph.D.) degree in chemical and other engineering disciplines, including specialties in biomedical, environmental, polymer, food, energy, and pharmaceutical engineering. In addition, students are prepared to meet the graduate entrance requirements for medical and law schools, business administration, and other professional disciplines.

The curriculum is designed to prepare and train students for entry into the profession equipped with the fundamental knowledge in core sciences required for problem solving and critical thinking. Graduates will have the tools needed to design and analyze complex chemical engineering systems. Training in ethical, health and safety, and societal concerns as they relate to the chemical engineering profession is also provided. Graduates further learn effective communication skills and gain valuable experience working in a team environment. The undergraduate program in Chemical Engineering is accredited by the Engineering Accreditation Commission of ABET, under the commission's General Criteria and Program Criteria for Chemical, Biochemical, Biomolecular Engineering.

Program Educational Objectives

The current educational objectives of the Chemical Engineering program are:

- Graduates will meet the expectations of employers of chemical engineers
- Graduates will pursue advanced study if desired
- Graduates will pursue leadership positions in their profession and/or communities

Four-Year Undergraduate Curriculum

Four-Year Undergraduate Curriculum

Four-Year Curriculum Code 155

The undergraduate program in Chemical Engineering is accredited by the Engineering Accreditation Commission of ABET, under the commission's General Criteria and Program Criteria for Chemical, Biochemical, Biomolecular Engineering.

First Year

See First-Year Program (35)

Sophomore Year

(common to both chemical and biochemical options)

First Semester

01:160:307 Organic Chemistry I (4)1

01:640:251 Multivariable Calculus (4)

01:750:227 Analytical Physics II (3)

01:750:229 Analytical Physics II Laboratory (1)

14:155:201 Chemical Engineering Material and Energy Balances (3)

14:155:298 Professional Skills Development (1)

Second Semester

Chemical Science Elective (4)1,2

14:540:343 Engineering Economics (3)

01:640:244 Differential Equations for Engineering and Physics (4)

14:155:208 Chemical Engineering Thermodynamics I (3)

14:155:210 Biological Foundations of Chemical Engineering (3)

Chemical Option

Junior Year

First Semester

01:160:311 Organic Chemistry Laboratory (2)3

14:155:303 Transport Phenomena in Chemical Engineering I (3)

14:155:307 Computational Methods in Chemical Engineering (3)

14:155:309 Chemical Engineering Thermodynamics II (3)

technical elective (3)

humanities/social sciences elective (3)

Second Semester

14:155:304 Transport Phenomena in Chemical Engineering II (3)

14:155:324 Separation Processes (3)

14:155:341 Chemical Engineering Kinetics (3)

14:635:407 Mechanical Properties of Materials (3)

humanities/social sciences elective (3)

Senior Year

First Semester

14:155:411 Biochemical Engineering (3)

14:155:415 Process Engineering Laboratory I (4)

14:155:422 Process Simulation and Control (3)

technical elective (3)

general elective (3)

Second Semester

14:155:416 Process Engineering Laboratory II (4)

14:155:428 Chemical Engineering Design II (4)

technical elective (3)

general elective (3)

Total Credits = 130.0

Notes
1 01:160:315,316 are accepted in place of 01:160:307,308.

2 Students select one course from the following list: 01:160:308 Organic Chemistry II; 01:160:351 Inorganic Chemistry I; 16:155:541 Pharmaceutical Materials Engineering; 16:155:571 Sustainable, Renewable, Clean Energy; 14:635:205 Crystal Chemistry and Structure of Materials; 14:635:440 Electrochemical Materials and Devices.

3 01:160:309 (2.5 cr) is accepted in place of 01:160:311 (2.0 cr), and may be taken with 01:160:308.

Biochemical Option

Junior Year

First Semester

01:447:390 General Microbiology (4)4

14:155:303 Transport Phenomena in Chemical Engineering I (3)

14:155:307 Computational Methods for Chemical Engineers (3)

14:155:309 Chemical Engineering Thermodynamics II (3)

technical elective (3)

Second Semester

01:694:395 Biochemistry for Life Sciences (3)5

01:694:313 Introductory Biochemistry Laboratory (1)6

14:155:304 Transport Phenomena in Chemical Engineering II (3)

14:155:324 Separation Processes (3)

14:155:341 Chemical Engineering Kinetics (3)

humanities/social sciences elective (3)

Senior Year

First Semester

14:155:411 Biochemical Engineering (3)

14:155:415 Process Engineering Laboratory I (4)

14:155:422 Process Simulation and Control (3)

technical elective (3)

humanities/social sciences elective (3)

Second Semester

14:155:416 Process Engineering Laboratory II (4)

14:155:428 Chemical Engineering Design II (4)

14:635:407 Mechanical Properties of Materials (3)

general elective (3)

Total Credits = 130.0

Notes
4 May complete 01:447:390 or 11:680:390.
5 May complete 01:694:395 or 11:115:301.
6 May complete 01:694:313 or 11:115:313.

Civil Engineering 180 (ENG)

CIVIL ENGINEERING 180

Civil Engineering 180 (ENG)

Field of Study

Field of Study

Civil engineering is one of the broadest of the engineering disciplines, extending across many technical specialties. Civil engineers plan, design, and supervise the construction of facilities essential to modern life. These facilities vary widely in nature, size, and scope and include high-rise buildings, long-span bridges, space launching platforms, offshore structures, retractable roof stadiums, tunnels, highways, transit systems, dams, airports, harbors, water supply and wastewater treatment plants, and other infrastructure facilities. All of the forces of nature, static and dynamic, are included in this field of civil engineering, as are the properties of materials, including the soil and rock mantle of the earth. In addition, civil engineering is concerned with the interlocking influences of structures, systems, forces, and materials on one another and on society. Civil engineers work in many diverse areas, such as structural engineering, geotechnical engineering, water resources engineering, transportation engineering, ocean and coastal engineering, and construction engineering.

Civil engineering activities are intimately involved with the activities of many other professions, such as architecture, planning, education, and health; with agencies of local, state, and federal governments; and with the business community in general.

The undergraduate program in civil engineering provides a broad and thorough education for students in civil engineering fundamentals, applications, and design in order to prepare graduates for the practice of professional engineering. To enable graduates to meet challenges posed by an ever-changing society and advancing technology, the program provides a broad background in many of the different areas of civil engineering and sound exposure to engineering sciences, humanities, and social sciences. The undergraduate curriculum permits students to have an area of concentration in structural engineering, geotechnical engineering, construction engineering, transportation engineering, and water resources. Students have considerable freedom to select a variety of departmental electives, technical electives, and, in the senior year, the students should do a senior design or capstone course in one of the concentration areas of study. The bachelor of science program in civil engineering is accredited by the Engineering Accreditation Commission of ABET.

Civil Engineering 180 (ENG)

Four-Year Undergraduate Curriculum

Four-Year Undergraduate Curriculum

Four-Year Curriculum Code 180

The degree awarded upon completion of this program is the B.S. in civil engineering which is professionally accredited by the Engineering Accreditation Commission of ABET.

First Year

See First-Year Program (35)

Sophomore Year

First Semester

01:355:302 Scientific and Technical Writing (3)

01:640:251 Multivariable Calculus (4)

01:750:227 Analytical Physics IIA (3)

01:750:229 Analytical Physics II Laboratory (1)

14:440:222 Engineering Mechanics: Dynamics (3)

Humanities/social sciences elective (3)

Second Semester

01:640:244 Differential Equations for Engineering and Physics (4)

14:180:216 Introductory Computer-Aided Design and Drafting (3)

14:180:243 Mechanics of Solids (3)

Science elective (3)

Humanities/social sciences elective (3)

Junior Year

First Semester

01:960:379 Basic Probability and Statistics (3)*

14:180:305 Construction Engineering (3)

14:180:318 Elements of Structures (3)

14:180:387 Fluid Mechanics (3)

14:180:389 Fluid Mechanics Laboratory (1)

14:635:407 Mechanical Properties of Materials (3)

Second Semester

14:180:320 Design of Steel Structures (3)

14:180:345 Properties of Materials Laboratory (1)

14:180:364 Transportation Engineering I (3)

14:180:372 Soil Mechanics (3)

14:180:374 Soil Mechanics Laboratory (1)

14:540:343 Engineering Economics (3)

Senior Year

First Semester

14:180:411 Reinforced Concrete (3)

14:180:421 Reinforced Concrete Laboratory (1)

14:180:429 Water and Wastewater Engineering (3)

14:180:430 Introduction to Transportation Planning (3)

14:180:473 Foundation Engineering (3)

Technical Elective or Departmental Elective (3)**

Second Semester

14:180:482 Professional Issues in Civil Engineering (1)

14:180:___ Civil Design Elective (Capstone Design) (4)

14:180:___ Technical Elective and Departmental Elective (3)

Technical Elective (3)

General Elective (3)

Total Credits = 128

1. Departmental courses may be used for technical electives, but technical courses outside the department may not be used as departmental electives. Civil graduate courses maybe used as departmental electives.

2. At least one of the following capstone design courses is required:

14:180:407 Construction Projects (4)

14:180:426 Structural Design (4)

14:180:431 Design of Environmental Engineering Facilities (4)

14:180:438 Transportation Engineering II (4)

14:180:474 Geotechnical Engineering Design (4)

3. With a combination of the required and elective departmental courses and the available general and technical electives, a student may pursue a general program or a program having an area of concentration in structural engineering, geotechnical engineering, construction engineering, transportation engineering, or water resources/ environmental engineering.

*960:401 'Basic Statistics for Research' can be taken instead of 960:379

** Students who to take 180:407 as their Capstone Design should take 180:406 'Construction Eng Management' in the fall semester. 180:406 will also count as a departmental elective.

Electrical and Computer Engineering 332 (ENG)

ELECTRICAL AND COMPUTER ENGINEERING 332

Field of Study

Field of Study

Electrical and computer engineering (ECE) is a rapidly developing and diverse field ranging from integrated circuits and submicron devices to powerful computational systems and wireless communication networks. Over the past two decades, increasing numbers of electrical and computer engineering graduates have been engaged in the development and application of data and information processing, cybersecurity, embedded systems, high performance computer systems, software engineering, and automatic control systems of increasing sophistication.

To prepare its graduates to compete in a fast-changing technical environment, the department depends upon a curriculum with a strong core of required courses in mathematics, physical sciences, and engineering science. In addition, students have considerable freedom to choose electives in these and other areas of study. As a result, electrical and computer engineering undergraduates may structure their programs to accommodate the changes of the electrical and electronic industry and to prepare for graduate study in such diverse areas as control and power systems, communication systems, digital signal processing, computer engineering, solid-state electronics, wireless information networks, human-computer interaction, and others. The wide range of subject matter enhances the student's opportunity for challenging employment and graduate study.

The department offers two curriculum options for undergraduate students: electrical engineering and computer engineering. The electrical engineering option follows a traditional set of required courses with equal emphasis on all main areas of electrical engineering, yet allows a student to favor one area over another by appropriate selection of elective courses. The computer engineering option, while giving a broad background in electrical engineering, prepares students for careers in the area of computer hardware, software engineering, and human-computer interaction. The undergraduate program in Electrical and Computer Engineering is accredited by the Engineering Accreditation Commission of ABET, under the commission's General Criteria and Program Criteria for Electrical, Computer, Communications, Telecommunication(s), and Similarly Named Engineering Programs.

Program Objectives

The current educational objectives of the Electrical and Computer engineering program are that within 3-5 years:

-Expectation: graduates will exceed the expectations of employers of electrical and computer engineers;

-Advanced Study: qualified graduates will pursue advanced study if they so desire; and

-Leadership: graduates will pursue leadership positions in their profession and/or communities.

Four-Year Undergraduate Curriculum

Four-Year Undergraduate Curriculum

Four-Year Curriculum Code 332

The electrical and computer engineering curriculum includes two options: electrical engineering and computer engineering. The degree awarded upon completion of either option is the B.S. in electrical and computer engineering which is accredited by the Engineering Accreditation Commission of ABET, under the commission's General Criteria and Program Criteria for Electrical, Computer, Communications, Telecommunication(s), and Similarly Named Engineering Programs.

First Year

See First-Year Program (32)

Sophomore Year

(common to both options)

First Semester

01:640:251 Multivariable Calculus (4)

01:750:227 Analytical Physics IIA (3)

01:750:229 Analytical Physics II Laboratory (1)

14:332:221 Principles of Electrical Engineering I (3)

14:332:223 Principles of Electrical Engineering I Laboratory (1)

14:332:231 Digital Logic Design (3)

14:332:233 Digital Logic Design Laboratory (1)

Second Semester

01:640:244 Differential Equations for Engineering and Physics (4)

14:332:222 Principles of Electrical Engineering II (3)

14:332:224 Principles of Electrical Engineering II Laboratory (1)

14:332:226 Probability and Random Processes (3)

14:332:252 Programming Methodology I (4)

Electrical Engineering Option

Junior Year

First Semester

14:332:331 Computer Architecture and Assembly Language (3)

14:332:333 Computer Architecture Laboratory (1)

14:332:345 Linear Systems and Signals (3)

14:332:361 Electronic Devices (3)

14:332:363 Electronic Devices Laboratory (1)

humanities/social sciences elective (200+)(3)

14:332:___ Restricted electrical elective (3)

Second Semester

14:332:312 Discrete Mathematics (3)

14:332:346 Digital Signal Processing (3)

14:332:348 Digital Signal Processing Lab (1)

14:332:366 Digital Electronics (3)

14:332:368 Digital Electronics Laboratory (1)

14:332:393 Professionalism/Ethics (1)

14:540:343 Engineering Economics (3)

Senior Year

First Semester

14:332:449 Introduction to Capstone Design (1)

14:332:___ electrical elective (3)

14:332:___ electrical elective (3)

science/math/engineering elective (3)

technical elective (3)

humanities/social sciences elective (200+) (3)

Second Semester

14:332:448 Capstone Design in ECE (3)

14:332:___ electrical elective (3)

technical elective (3)

general elective (3)

Total Credits = 123

Computer Engineering Option

Junior Year

First Semester

14:332:331 Computer Architecture and Assembly Language (3)

14:332:333 Computer Architecture Laboratory (1)

14:332:345 Linear Systems and Signals (3)

14:332:351 Programming Methodology II (3)

14:332:___ Restricted computer elective (3)

humanities/social sciences elective (200+) (3)

Second Semester

14:332:434 Introduction to Computer Systems (3)

14:332:312 Discrete Mathematics (3)

14:540:343 Engineering Economics (3)

14:332:452 Software Engineering (3)

14:332:393 Professionalism/Ethics (1)

technical elective (3)

Senior Year

First Semester

14:332:437 Digital Systems Design (3)

14:332:449 Introduction to Capstone Design (1)

computer elective (3)

computer elective (3)

science/math/engineering elective (3)

humanities/social sciences elective (200+) (3)

Second Semester

14:332:448 Capstone Design in ECE (3)

computer elective (3)

technical elective (3)

general elective (3)

Total Credits = 123

Environmental Engineering 366 (ENG)

ENVIRONMENTAL ENGINEERING 366

Environmental Engineering 366 (ENG)

Field of Study

Field of Study

Environmental engineers utilize engineering principles and physical, chemical, and biological science fundamentals to devise effective solutions for current and emerging environmental problems related to human activities. Environmental engineers practice in many areas: green infrastructure for urban stormwater and flood management; air pollution prevention and control; safe drinking water production and supply; sustainable treatment of wastewater and solid wastes; remediation of contaminated sites; ensuring industry compliance with environmental regulations; environmental health and safety in the workplace; alternative energy technologies; design of green buildings; and analysis and modeling of big data to guide societal responses to global environmental change.

This program prepares students for immediate employment as practicing engineers with engineering consulting firms; green energy and sustainable development companies; drinking water, wastewater, solid waste, and air pollution treatment facilities; manufacturing industries; environmental regulatory and planning agencies; industry and academic research laboratories; international development agencies; and public-interest groups.

The environmental engineering curriculum provides a strong foundation in engineering and the physical, chemical, and biological sciences during the freshman and sophomore years. In the upper-level major courses these fundamentals are applied to multidisciplinary problem solving in various environmental engineering fields. The faculty has extensive experience in teaching, research, and consulting with private firms and government agencies, and close ties to our strong alumni network.

The environmental engineering program is a unique joint program between the School of Engineering (Department of Civil & Environmental Engineering) and the School of Environmental and Biological Sciences (Department of Environmental Sciences). Students matriculate into the environmental engineering program through the School of Engineering. The undergraduate program in Environmental Engineering is accredited by the Engineering

Accreditation Commission of ABET, under the commission's General Criteria and Program Criteria for Environmental Engineering. The program prepares graduates for taking the Fundamentals of Engineering (FE) examination pursuant to becoming a licensed professional engineer (PE).

Environmental Engineering 366 (ENG)

Four-Year Undergraduate Curriculum

Four-Year Undergraduate Curriculum

Four-Year Curriculum Code 366

The undergraduate program in Environmental Engineering is accredited by the Engineering Accreditation Commission of ABET, under the commission's General Criteria and Program Criteria for Environmental Engineering.

First Year

See First-Year Program (35)

Sophomore Year

First Semester

01:119:103 Principles of Biology (4)

01:640:251 Multivariable Calculus (4)

01:750:227 Analytical Physics IIA (3)

01:750:229 Analytical Physics II Laboratory (1)

14:180:215 Engineering Graphics (1)

14:440:222 Engineering Mechanics: Dynamics (3)

Second Semester

01:160:209 Elementary Organic Chemistry (3)

01:640:244 Differential Equations for Engineering and Physics (4)

11:117:333 Environmental Engineering Tools (3)

14:180:243 Mechanics of Solids (3)

General elective (3)

Junior Year

First Semester

01:160:211 Elementary Organic Chemistry Laboratory (1)

11:375:201 Biological Principles of Environmental Sciences (3)

11:375:202 Chemical Principles of Environmental Sciences (3)

11:375:303 Numerical Methods in Environmental Sciences or 300-400 level statistics (3)

14:180:387 Fluid Mechanics (3)

14:180:389 Fluid Mechanics Laboratory (1)

Second Semester

11:117:462 Design of Solid Waste Treatment Systems (3)

11:375:423 Environmental Fate and Transport (3)

14:180:448 Elements of Hydrology (3)

14:540:343 Engineering Economics (3)

14:650:351 Thermodynamics (3)

Humanities/social sciences elective (3)

Senior Year

First Semester

11:117:413 Unit Processes in Environmental Engineering I (3)

11:117:423 Environmental Engineering Unit Processes Laboratory I (1)

11:117:474 Air Pollution Engineering (3)

11:117:488 Environmental Engineering Design I (2)*

11:375:322 Energy Technology and its Environmental Impact (3)

Option elective (3)

Second Semester

11:117:414 Unit Processes in Environmental Engineering II (3)

11:117:424 Environmental Engineering Unit Processes Laboratory II (1)

11:117:489 Environmental Engineering Design II (2) or 14:180:431 Design of Environmental Engineering Facilities (4)*

Humanities/social sciences elective (3)

Option elective (3)

Option elective (3)

Total Credits = 129

Notes

*For the water resources concentration, it is optional to take 14:180:431 instead of 11:117:488/489.

Option electives may be selected for one of four concentrations from the following:

Water Resources: 11:117:494, 11:117:495, 11:117:497, 11:117:498, 11:372:232, 233, 11:375:434, 14:180:372, 374, 14:180:382, 14:180:443; 11:682:451; 11:628:425

Environmental Unit Processes and Remediation: 11:117:468, 11:117:494, 11:117:497, 11:117:498, 11:375:340, 11:375:407, 11:375:411, 11:375:434, 11:375:444, 11:375:453, 11:680:201

Air Quality: 11:117:497, 11:117:498, 11:375:346; 11:375:407, 11:375:424, 11:375:434, 11:670:453, 14:650:461

Sustainable Environmental Systems: 11:117:468, 11:117:497, 11:117:498, 11:375:360; 11:375:430, 11:375:434, 11:375:450, 11:375:474; 11:776:382; 14:332:443; 14:635:405; 14:440:378: 10:971:202: 11:020:340

Industrial Engineering 540 (ENG-IE)

INDUSTRIAL ENGINEERING 540

Industrial Engineering 540 (ENG-IE)

Field of Study

Field of Study

In today's complex and competitive world, industrial engineers are in great demand to design, improve, and operate integrated *systems* of people, materials, equipment, and energy. The industrial and systems engineering (ISE) discipline applies fundamentals from the mathematical, physical, and engineering sciences to efficiently design and analyze large systems that serve industry and government both in manufacturing and service sectors. The bachelor of science program in industrial engineering is accredited by the Engineering Accreditation Commission of ABET. The undergraduate industrial and systems engineering program at Rutgers provides students with a broad engineering education along with specialization in the industrial engineering and manufacturing fields. We believe that a broad education is necessary to understand the impact of engineering solutions in a global/societal context. Academic strength in mathematics, physics, and basic engineering science is required. Specialization is offered in mathematical modeling, quality engineering and statistical techniques, computer-aided design, computer-aided manufacturing, simulation, manufacturing processes, engineering economics, production planning and control, design of engineering systems and information technology. Students have access to state-of-the-art laboratory facilities where hands-on instruction is emphasized in robotics, machine vision, manufacturing, automated material handling, quality engineering, electronic and sensor devices, simulation, and computer information systems.

The undergraduate program focuses on classroom instruction fostered by learning in multidisciplinary project-teams. These teams frequently formulate and find engineering solutions to real-world industry problems. The ability to communicate effectively is emphasized by having students provide both oral and written reports.

ISE graduates work in a number of areas including electronic, pharmaceutical, and other manufacturing; health services, transportation, distribution, and communication; and computers, finance, marketing, and management. Students pursue graduate studies in engineering and in management at leading institutions.

The ISE faculty are dedicated to excellence in teaching, research, and professional service. They bring experience, real-life industrial problems, and enthusiasm to the classroom, setting a standard for students to follow in their professional careers.

Industrial Engineering 540 (ENG-IE)

Four-Year Undergraduate Curriculum

Four-Year Undergraduate Curriculum

Four-Year Curriculum Code 540

The degree awarded upon completion of this program is the B.S. in industrial engineering which is professionally accredited by the Engineering Accreditation Commission of ABET.

First Year

See First-Year Program (35)

Sophomore Year

First Semester

01:640:251 Multivariable Calculus (4)

01:750:227 Analytical Physics IIA (3)

01:750:229 Analytical Physics II Laboratory (1)

14:540:201 Work Design and Ergonomics (3)

14:540:202 Work Design and Ergonomics Laboratory (1)

14:540:213 Industrial Engineering Laboratory (2)

33:010:310 Accounting for Engineers (3)

Second Semester

14:540:343 Engineering Economics (3)

01:640:244 Differential Equations for Engineering and Physics (4)

14:440:222 Engineering Mechanics: Dynamics (3)

14:540:210 Engineering Probability (3)

01:355:302 Scientific and Technology Writing (3)

Junior Year

First Semester

14:540:320 Statistics for Engineers (3)

14:180:215 Engineering Graphics (1)

14:332:221 Principles of Electrical Engineering I (3)

14:540:338 Probability Models in Operations Research (3)

14:540:382 Automation and Systems Design (3)

14:540:383 Automation and Systems Design Laboratory (1)

14:635:407 Mechanical Properties of Materials (3)

Second Semester

14:540:303 Manufacturing Processes (3)

14:540:304 Manufacturing Processes Laboratory (1)

14:540:311 Deterministic Models in Operations Research (3)

14:540:384 Simulation Models in Industrial Engineering (3)

14:540:399 Design of Engineering Systems I (3)

departmental or technical elective (List B)* (3)

Senior Year

First Semester

14:540:400 Design of Engineering Systems II (3)

14:540:433 Quality Engineering (3)

14:540:434 Quality Engineering Laboratory (1)

14:540:453 Production Planning and Control (3)

14:540:487 Energy Systems Modeling and Optimization (3)

Departmental or Technical Elective (List B)* (3)

Second Semester

14:540:462 Facilities Layout and Materials Handling (3)

departmental or technical elective (List A)* (3)

humanities/social sciences elective (3)

humanities/social sciences elective (3)

Total Credits = 129

Notes
*List of electives (List A and List B) are published each year by the department.

Materials Science and Engineering 635 (ENG)

MATERIALS SCIENCE AND ENGINEERING 635

Materials Science and Engineering 635 (ENG)

Field of Study

Field of Study

The Department of Materials Science and Engineering (MSE) has a fascinating history that goes back to 1902 when the School of Ceramics was founded to support the growing ceramics industry in the state. The department provided critical technical support to the U.S. Army during and after World War II, principally in the area of electronic materials. The department expanded into technical engineered ceramics under the leadership of Drs. John Koenig and Malcom G. McLaren in the postwar period. A shift to all types of materials occurred in the 1995-2005 time frame as the department became MSE (officially named in 2007).

Materials engineers and scientists study the synthesis, processing, and characterization of substances within these general classes of materials: polymers, metals, semiconductors, ceramics, glass, and composites. An understanding of the molecular structure and well-designed processing are the keys to engineering materials with outstanding properties. Novel materials are tailored to meet the needs of targeted applications and become the foundation for all engineering disciplines. Such materials enable many new technologies and are found in various forms in electronics, optics, architecture, transportation, biomedicine, aviation and aerospace, pharmaceuticals, energy generation, environmental engineering, and numerous other industrial systems. Our graduates are in high demand by industry and are employed at excellent salaries by prominent companies. Those going on to graduate school are well prepared and are highly recruited by prestigious graduate schools worldwide.

Students in the MSE curriculum study the chemical and physical nature of materials at the macro, micro, and nano scales. Early on, students will take courses in crystal chemistry and physics of materials, followed by more focused study of phase equilibria and the measurement of thermal, electrical, and optical properties. The later stages of the curriculum emphasize the intricate but defining relationships between structure, properties, and processing of engineering materials, with emphasis on applications and materials design. In the junior and senior

year, undergraduates design their capstone course in preparation for graduate studies or an industrial career in the materials industry in a diverse range of categories that include research, development, marketing, process engineering, and technical sales.

The MSE program encourages a student to select an area of focus in one of the following areas: biomaterials, nanomaterials, polymers, electronic and optical materials, and energy conversion and storage. This concentration is accomplished via the selection of technical electives in the targeted area and is determined in consultation with a faculty adviser. The MSE faculty is highly regarded in many materials areas, such as biomaterials, photovoltaics, glass, polymers, structural ceramics, composites, nanomaterials, piezoelectric and ferroelectric ceramics, advanced thin-film engineered materials, fiber optics, microelectronics, packaging materials, battery materials, ceramic and metallic surfaces, and materials theory and computational modeling. The department also maintains some of the most advanced materials characterization facilities in the region.

The undergraduate curriculum leads to a bachelor of science degree in materials science and engineering. The curriculum is designed to allow the student exceptional flexibility in designing a program that fits specific needs, interests, and goals. The curriculum is accredited by the Engineering Accreditation Commission of ABET.

Internship Programs

Students also may participate in a variety of internship programs ranging from a student technician program to the co-op internship. The co-op internship provides the student with the opportunity to practice and/or apply knowledge and skills in various materials engineering professional environments. This internship is intended to provide a real-world experience to the student's undergraduate studies by integrating prior coursework into a working engineering environment.

Educational Mission of the Department

The Mission of the Department of Materials Science and Engineering is to provide qualified students with a relevant education in Materials Science and Engineering preparing them for a productive and rewarding career. While this mission is consistent with the overall mission of the university and the School of Engineering, the department focuses on providing an education that is both learning and practice oriented. With its high faculty-to-student ratio, the department provides unique course options, extensive laboratory experiences, along with research and co-op internships that have adapted to the changing requirement of employers and graduate schools. Through continuous feedback from students, alumni, and employers the department maintains an up-to-date curriculum that emphasizes basic science, engineering, and design. Moreover, the curriculum provides flexibility and diversity in allowing students to select areas of concentration that are in the forefront of technology today.

Educational Objectives

Within the scope of the MSE mission, the objectives of the Materials Science and Engineering program are to produce graduates with an education relevant to current science and engineering and an education that will lead to a productive and rewarding career. Graduates of the program are expected within a few years of graduation to have: used their engineering skills, enhanced through the onset of lifelong learning, to apply innovative solutions to assist in solving critical engineering problems to provide economic, ethical, environmental, and societal value; worked individually or with teams of professionals to provide innovative concepts and technologies that address the scientific or engineering needs of academia, industry, commerce, and society; and demonstrated a track record of professional leadership characterized by scientific or engineering accomplishments and productivity in one or more of the broad industries for which Materials Science and Engineering is the enabling foundation.

Four-Year Undergraduate Curriculum

Four-Year Undergraduate Curriculum

Four-Year Curriculum Code 635

The degree awarded upon completion of this program is the B.S. in materials science and engineering, which is professionally accredited by the Engineering Accreditation Commission of ABET.

First Year

See First-Year Program (35)

Sophomore Year

First Semester

01:640:251 Multivariable Calculus (4)
01:750:227 Analytical Physics IIA (3)
01:750:229 Analytical Physics IIA Lab (1)
01:960:xxx* Statistics (*211, 384, 401, 490) (3)
14:635:203 Introduction to Materials Science Engineering (3)
14:635:205 Crystal Chemistry and Structure of Materials (3)

Second Semester

01:640:244 Differential Equations (4)
14:635:204 Materials Processing (3)
14:635:206 Thermodynamics of Materials (4)
14:635:212 Physics of Materials (3)
14:635:252 Laboratory I (2)

Junior Year

First Semester

14:635:305 Materials Microprocessing (3)
14:635:307 Kinetics of Materials Processing (3)
14:635:309 Characterization of Materials (3)
14:635:314 Strength of Materials (3)
14:635:353 Laboratory II (2)
___:___ elective (Dept/Tech) (3)

Second Semester

14:540:343 Engineering Economics (3)
14:635:316 Electrical, Optical, and Magnetic Properties of Materials (3)
14:635:354 Laboratory III (2)

14:635:401 Senior MSE Lab I (3) OR (only one of 401/411 is required)
14:635:411 MSE Eng Design I (3)
___:___ elective (Dept/Tech) (3)

Senior Year

First Semester

14:635:402 Senior MSE Lab II (3) OR (only one of 402/412 is required)
14:635:412 MSE Eng Design I (3)
14:635:403 MSE Seminar (1)
___:___ elective (Dept/Tech) (3)
___:___ elective (Dept/Tech) (3)
___:___ elective (Dept/Tech) (3)
___:___ humanities/social science elective (300+) (3)

Second Semester

14:635:404 MSE Seminar (1)
___:___ elective (Dept/Tech) (3)
___:___ elective (Dept/Tech) (3)
___:___ humanities/social science elective (300+) (3)
___:___ general elective (3)

Total Credits at Graduation: 128

Electives

Aside from the humanities/social science electives, the materials science and engineering (MSE) program contains eight elective slots (four department, three technical, and one general) that can be used to tailor your degree. You can concentrate in specific areas of MSE, dual major, or prepare for specialized professional training after graduation.

Department Electives

Take a minimum of two department electives from this list (you may take more):
14:635:312 Glass Engineering (3)
14:635:360 Ceramics Engineering (3)
14:635:361 Materials Science and Engineering of Polymers (3)
14:635:362 Physical Metallurgy (3)

Select remaining department elective(s) from this list:
14:635:320 Introduction to Nanomaterials (3)
14:635:321 Structural, Mechanical, and Chemical Applications of Nanostructures and Nanomaterials (3)
14:635:322 Photonic, Electronic, and Magnetic Applications of Nanostructures and Nanomaterials (3)
14:635:405 Solar Cell Design and Processing (3)
14:635:410 Biological Applications of Nanostructures and Nanomaterials (3)
14:635:413 Materials Science and Engineering: Venture Analysis (3)

14:635:416 Physical and Chemical Properties of Glass (3)
14:635:440 Electrochemical Materials and Devices (3)
14:635:505 Advanced Optical Materials (3)

Technical Electives

Three technical electives may be selected from the department electives list or from the list below:
01:119: Biological Sciences: only 119:100-103, 131, 140, and 148
01:146: Cell Biology and Neurosciences: all except 146:302
01:160: Chemistry: all 160:3xx and 4xx
01:198: Computer Sciences: all except 198:105, 107, 110, and 170
01:447: Genetics and Microbiology: all except 447:302
01:460: Geological Sciences: all except 460:206
01:640: Mathematics: 640:250 and all 640:3xx and 4xx except 640:336, 338, 339, and 436
01:694: Molecular Biology and Biochemistry: all
01:750: Physics: 750:228/230 and all 750:3xx and 4xx
01:960: Statistics: all
11:115: Biochemistry: all 115:3xx and 4xx
11:126: Biotechnology: all
11:127: Bioresource Engineering: all
11:375: Environmental Sciences: all
11:400: Food Sciences: only 400:201, 304, 401, and 411
11:628: Marine Sciences: all
11:670: Meteorology: all
14:125: Biomedical Engineering: all 125:2xx and 3xx
14:155: Chemical and Biochemical Engineering: all
14:180: Civil and Environmental Engineering: all
14:332: Electrical and Computer Engineering: all except 301
14:440: Packaging
14:540: Industrial Engineering: 540:201/202 and all 540:3xx and 4xx
14:635: Materials Science and Engineering: all except 407
14:650: Mechanical and Aerospace Engineering: all except 650:351

Statistics

One of the following courses must be taken to satisfy the statistics requirement:
01:960:211 Statistics I (3)
01:960:384 Intermediate Statistical Analysis (3)
01:960:401 Basic Statistics for Research (3)
01:960:490 Introduction to Experimental Design (3)

Options in MSE

The MSE department presently has seven areas of concentration in which you may specialize and receive a certificate upon graduation. These are highly relevant areas in science and engineering that are favored by graduate schools and employers. To receive a certificate in any one of these areas you must take at least three of the courses listed for each concentration for your electives. You may earn multiple certificates.

Biomaterials

Note: One course from each of the two groups marked with ** and # is required.

01:119:101 General Biology I (3)**
01:119:102 General Biology II (3)
01:160:307 Organic Chemistry I (4)**
01:694:214 Introduction to Molecular Biology Research (3)
14:125:404 Introduction to Biomaterials (3)#
14:635:410 Biological Applications of Nanomaterials (3)#

Electronic and Optical

14:635:322 Photonic, Electronic, and Magnetic Applications of Nanostructures and Nanomaterials (3)
14:635:405 Solar Cell Design and Processing (3)
14:635:413 Solar Technology Venture Analysis (3)
14:332:466 Opto-Electronic Devices (3)
14:635:505 Advanced Optical Materials (3)
01:750:305 Modern Optics (3)
01:750:406 Introductory Solid State Physics (3)

Energy Conversion and Storage

11:375:322 (F) Energy Technology and its Environmental Impact (3)
14:635:405 (F) Solar Cell Design and Processing (3)
14:332:402 (S) Sustainable Energy: Choosing among Options (3)
14:635:440 (S) Electrochemical Devices (3)
14:332:361 (S) Electronic Devices (prerequisite: 14:332:222 Principles of Electrical Engineering II) (3)
14:332:460 (S) Power Electronics (prerequisite: 14:332:361 Electronic Devices) (3)

Metallurgy

Note: For this concentration, a student must take all four of the listed courses

14:635:206 Thermodynamics of Materials (3)
14:635:307 Kinetics of Materials Processing (3)
14:635:314 Strength of Materials (3)
14:635:363 Physical Metallurgy (3)

Nanomaterials

14:635:320 Introduction to Nanomaterials (3)
14:635:410 Biological Applications of Nanomaterials (3)
16:635:604 Introduction to Nanoscience and Nanotechnology (3)
16:635:321 Structural, Mechanical, and Chemical Properties of Nanomaterials (3)

Packaging Materials

Note: For this concentration, a student must take at least two of the three 635 courses

14:635:312 Glass Engineering (3)
14:635:361 Polymer Engineering (3)
14:635:362 Physical Metallurgy (3)
14:440:301 Introduction to Packaging Engineering (3)
14:440:302 CAD for Packaging Engineering (3)

Polymers
Note: For this concentration 14:635:361 is required
01:160:307 Organic Chemistry I (4)
14:635:361 Materials Science and Engineering of Polymers (3)
16:155:551 Polymer Science and Engineering I (3)
14:440:301 Introduction to Packaging Engineering (3)

Mechanical Engineering (ENG)

MECHANICAL ENGINEERING

Field of Study

Field of Study

The evolution of our technology into the 21st century has reinforced the importance of the broad technical and professional training of both the mechanical and the aerospace engineer. Each may make his or her professional contribution in many diverse industries, ranging from the automobile and aerospace industries to the manufacture of computers, biomedical devices, and the automation and control of systems. Regardless of the particular product involved, mechanical engineers rely upon knowledge of matter and energy conversions, motions, and forces obtained from computer simulations and experimental investigations of processes and systems. Mechanical engineers are able to design mechanisms, machines, and structures to serve a specific purpose, such as the manufacture of high-tech materials, including ceramics, composites and biomaterials, and high-tech equipment, including spacecraft, robots, and human implants. They also are trained to determine, both experimentally and theoretically, the heat, energy, and mechanical stress that occurs within engineering devices. Examples include internal combustion engines, electronic equipment, robots, solar energy systems, artificial organs, rocket engines, steam and gas turbines, and nuclear reactors. The curriculum in mechanical and aerospace engineering provides these skills and prepares students for graduate study and research.

The undergraduate program in mechanical engineering trains students in a technically sound, challenging, and professional manner, laying the foundation for a productive career and enabling graduates to make positive contributions to their profession and society. This is achieved with a thorough preparation in the humanities, mathematics, and basic sciences as well as up-to-date mechanical and aerospace engineering fundamentals and applications using the most advanced tools and methods available. In the senior year, the capstone design and manufacturing course allows students to solve open-ended, multicriteria engineering problems. Emphasis is placed on teamwork, project management, conceptualization, detailed design, computational analysis, and manufacturing. At the end of the yearlong course, students will have experienced a full product development cycle from concept to construction and testing.

The bachelor of science program in mechanical engineering is accredited by the Engineering Accreditation Commission of ABET.

Four-Year Undergraduate Curriculum

Four-Year Undergraduate Curriculum

Four-Year Curriculum Code 650

The mechanical engineering curriculum includes three options: mechanical, aerospace, and energy. The degree awarded upon completion of any of these options is the B.S. in mechanical engineering which is professionally accredited by the Engineering Accreditation Commission of ABET.

First Year

See First-Year Program (35)

Sophomore Year

First Semester

14:440:222 Engineering Mechanics: Dynamics (3)*

01:640:251 Multivariable Calculus (4)

14:650:388 Computer-Aided Design in Mechanical and Aerospace Engineering (3)*

01:750:227 Analytical Physics IIA (3)

01:750:229 Analytical Physics IIA Laboratory (1)

14:650:289 Professional Development and Leadership in MAE (1)

Second Semester

01:640:244 Differential Equations for Engineering and Physics (4)

14:650:291 Introduction to Mechanics of Materials (3)

14:650:361 Introduction to Mechatronics (4)*

01:750:228 Analytical Physics IIB (3)

01:750:230 Analytical Physics IIB Laboratory (1)

technical elective (3)

Junior Year

First Semester

14:650:351 Thermodynamics (3)*

01:640:421 Advanced Calculus for Engineering (3)*

14:650:312 Fluid Mechanics (3)*

14:650:350 Mechanical Engineering Measurements with Lab (4)*

humanities/social sciences elective (3)

Second Semester

01:540:343 Engineering Economics (3)

14:635:407 Mechanical Properties of Materials (3)*

14:650:342 Design of Mechanical Components (3)*

14:650:439 Multiphysics Simulations (3)*

humanities/social sciences elective (3)*

Senior Year

First Semester

14:650:431 Mechanical and Aerospace Engineering Laboratory I (2)

14:650:467 Design and Manufacturing I (2)

14:650:481 Heat Transfer (3)*

14:650:4__ MAE dept., aerospace, energy electives (3)

14:650:4__ MAE dept., aerospace, energy electives (3)

technical elective (3)

Second Semester

14:650:401 Dynamic Systems and Controls (3)

14:650:432/3/5 ME, Aerospace, Energy Lab (2)

14:650:468 Design and Manufacturing II (2)

14:650:4__ MAE dept., aerospace, energy elective (3)

technical elective (3)

general elective (3)

Total Credits = 131

Notes

*May be taken during the first or second semester, within the listed year. All mechanical and aerospace engineering department electives may count for technical electives.

Department Electives (select three from the lists below; can mix and match)

14:650:443 Vibrations (3)
14:650:451 Vehicle Dynamics (3)
14:650:455 Design of Mechanisms (3)

Energy Electives (select three for energy concentration)

14:650:461 Internal Combustion Engines (3)
14:650:462 Power Plants (3)
14:650:474 Alternative Energy Systems I (3)
14:650:477 Alternative Energy Systems II (3)

Aerospace Electives (select three for aerospace engineering concentration)

14:650:447 Probabilistic Models in Mechanical and Aerospace Engineering Systems (3)
14:650:449 Aerospace Materials (3)
14:650:457 Spacecraft and Mission Design (3)
14:650:458 Aerospace Structures (3)
14:650:459 Aerospace Propulsion (3)
14:650:460 Aerodynamics (3)
14:650:463 Compressible Fluid Dynamics (3)
14:650:465 Orbital Mechanics (3)
14:650:471 Aircraft Flight Dynamics (3)

Other Programs of Study (ENG)

OTHER PROGRAMS OF STUDY

Other Programs of Study (ENG)

Honors College at Engineering

Honors College at Engineering

The Honors College at Engineering is part of the Rutgers-New Brunswick Honors College. It's designed to challenge, inspire, and sustain a select group of highly motivated engineering students who demonstrate remarkable academic ability, enthusiasm, intellectual curiosity, and a clear potential to make a difference as a leader in whatever field of engineering they pursue.

While serving the community, with the goal of propelling students into a purposeful and richly rewarding future, the Honors College offers a unique opportunity for students to reach their full potential inside and outside the classroom. Through selective academic courses and living together in residential halls during a portion of their time as undergraduates, scholars enjoy an environment that facilitates strong intellectual bonds and personal growth. The students are challenged with accelerated courses and have the opportunity to participate in the prestigious

James J. Slade research program which culminates in a final presentation and an honors thesis. With numerous co-curricular programs, the Honors College at Engineering is designed to enrich the educational opportunities for outstanding students.

Please visit Rutgers Honors College and the School of Engineering websites for more information on honors engineering curriculum, honors housing, honors living-learning community, and honor co-curricular programs and activities.

Other Programs of Study (ENG)

Five-Year B.S./B.A. Dual-Degree Program with SAS

Five-Year B.S./B.A. Dual-Degree Program with SAS

The five-year, dual-degree program in engineering and the liberal arts/sciences is offered by the School of Engineering (SoE) in cooperation with the School of Arts and Sciences (SAS). The five-year program leads to a bachelor of science (B.S.) degree in any of the engineering programs and a bachelor of arts (B.A.) or B.S. degree in any major offered by the SAS.

For students interested in the five-year B.S./B.A. program, the best path is to start at the School of Engineering from the first year. Typically, students apply to the SAS during their fourth year to complete the five-year B.S./B.A. program. Some students may be able to complete the B.S./B.A. program in four years, in which case, they will need to apply to the SAS in their third year. Students starting at the SAS can also apply to the B.S./B.A. program, in which case, students must apply for a School-to-School transfer into the SoE during their second year in order to complete the dual-degree program. With this option, admission to the SoE is not guaranteed, and students must meet the School-to-School transfer requirement to join the program.

To qualify for both degrees, students must satisfy all the SoE requirements including humanities/social science, technical, and general electives; SAS major requirements and the Core Curriculum requirements; as well as completing a minor in a humanity/social sciences area if students choose a technical major (such as math or computer science) for the B.A. degree. SoE students who are enrolled jointly with SAS in the B.S./B.A. program must earn 30 degree credits beyond the total degree credits required for the B.S. engineering degree alone. Courses used to satisfy requirements for the liberal arts degree may also be used simultaneously to satisfy SoE humanities/social sciences, technical, and general electives if such courses are acceptable for credit toward the B.S. in engineering degree. There is no limit to the number of credits that may be used to simultaneously satisfy the B.S. and B.A. degree requirements.

The program requires that both degrees must be conferred at the same time even if requirements for one degree are completed before the other. The degrees are conferred before the end of the fifth year or earlier if students can complete the requirement for both degrees in four years. Students who complete the B.S./B.A. program will receive two separate degrees/diplomas, one from each school.

Other Programs of Study (ENG)

Accelerated Bachelor of Science/Master's Programs

Accelerated Bachelor of Science/Master's Programs

Rutgers School of Engineering students are eligible to apply for admission to a variety of accelerated master's programs. Admission to any of these programs typically requires a cumulative grade-point average of at least 3.200 and junior year status. In some cases an aptitude test such as the GRE or GMAT is also required. These prestigious programs allow students to complete a master's degree in one extra year while simultaneously integrating an undergraduate engineering experience with that of a graduate program. With the higher demands of the workplace in today's world, the bachelor of science (B.S.)/master's programs ensure that students remain competitive by mastering new techniques and extending their expertise within their subject area and/or in the related areas of business.

Please visit the website for more information on the accelerated master's programs in engineering, science, education, and business.

Minors and Second Majors

Minors and Second Majors

Students enrolled at the School of Engineering are eligible to earn minors and/or second majors offered by any program at the School of Arts and Sciences (SAS). Students declare the minor or second major at the School of Engineering Office of Academic Services, and are responsible for meeting the requirements set by the departments in SAS. Completion of the minor or second major is certified by the corresponding SAS department in the last semester before graduation, and is recognized by a notation on the student's academic transcript. Students who wish to have the second major associated with a second degree must apply and be accepted by the School of Arts and Sciences for enrollment in the five-year, dual-degree program. (See the SAS section of this catalog for more information.)

Study Abroad

Study Abroad

Engineering students may enroll in programs coordinated by the Rutgers Center for Global Education (here). The assistant dean for transfer services should be contacted for detailed information and advising.

Transfer Programs

Transfer Programs

The School of Engineering admits transfer students from other schools within Rutgers as well as colleges/universities in the United States and around the world.

For more information on transfer requirements and application guidelines, please visit:

Transferring from Outside of Rutgers (U.S. and international)

Transferring from Within Rutgers (school-to-school transfer)

Graduate Programs

Graduate Programs

Extensive engineering programs at the graduate level also are available. The degrees of master of science, master of engineering, and doctor of philosophy are given in a wide range of fields as listed at Rutgers School of Graduate Studies.

Course Listing (ENG)

COURSE LISTING

Explanation of Three-Part Course Numbers

Aerospace Engineering 021

Applied Sciences in Engineering 073

Biomedical Engineering 125

Chemical Engineering 155

Civil Engineering 180

Electrical and Computer Engineering 332

Environmental Engineering 366

General Engineering 440

Industrial Engineering 540

Materials Science and Engineering 635

Explanation of Three-Part Course Numbers (ENG)

EXPLANATION OF THREE-PART COURSE NUMBERS

The number preceding each course title is divided into three parts. The first two digits are the administrative code (standing for a faculty or a school), the next three digits are the subject code, and the final three digits are the course code.

Administrative Code (School Code)

The School of Engineering administrative code is **14**. For a complete list of administrative codes used in this catalog, see the beginning of the Programs, Faculty, and Courses section.

Subject Code

A subject code comprises the third through fifth digits in all course numbers and indicates the subject matter of the course. Courses with the following subject codes are listed in this chapter. For information on engineering majors, please visit Programs of Study. Note that the subject codes may be different from the curriculum codes. For example, 021 Aerospace engineering courses are listed under subject code 650 through the Department of Mechanical and Aerospace Engineering, and 366 Environmental Engineering courses are currently listed under subject code 117.

Applied Sciences in Engineering (including Packaging Engineering Concentration)

Biomedical Engineering

Chemical Engineering

Civil Engineering

Electrical and Computer Engineering

Environmental Engineering

General Engineering

Industrial Engineering

Materials Science and Engineering

Mechanical and Aerospace Engineering

Course Code

The course code comprises the sixth, seventh, and eighth digits in all course numbers. Course codes from 100 to 299 are used for introductory and intermediate undergraduate courses usually offered in the first two years. Codes from 300 to 499 indicate advanced undergraduate courses normally taken in the junior and senior years. Courses coded from 500 to 799 are graduate courses.

Two course numbers separated by a comma indicate that each semester may be taken independently of the other (example: 14:155:491,492). Two course numbers separated by a hyphen indicate that satisfactory completion of the first semester is a prerequisite to the second semester (example: 14:332:221-222); the first semester may be taken for credit without taking the second, except where a statement is added to indicate that both semester courses must be completed in order to receive credit.

Credits awarded for the successful completion of each course are indicated in parentheses following the course title. The notation BA indicates that the number of credits is determined by arrangement with the department offering the course.

Unless otherwise indicated, a course normally meets for a number of lecture hours equal to the number of credits to be earned. Special hours or modes of class, other than lecture, are usually indicated in italics below the course title.

Consult the Undergraduate Schedule of Classes for the name(s) of the faculty member(s) teaching each course.

Aerospace Engineering 021 (ENG)

AEROSPACE ENGINEERING 021

Aerospace Engineering (021) courses are listed under subject code 650 Mechanical and Aerospace Engineering.

Applied Sciences in Engineering 073 Courses (ENG)

APPLIED SCIENCES IN ENGINEERING 073 COURSES

Courses for 073 Applied Sciences in Engineering, Packaging Engineering Concentration are listed using the subject code 440.

14:440:301 ***Introduction to Packaging Engineering (3)***
A required course for all students wishing to pursue a major or certificate in packaging. The course introduces the student to the concept of packaging and provides an overview of the main technologies used to create packages. Technologies include graphic creation, printing and decoration, plastic molding, metal forming, films and foils, and distribution packaging.

14:440:302 ***Computer-Aided Design for Packaging Engineering (3)***
CAD applications of analysis, synthesis, and design for packaging engineering. Automated drafting. Development of general-purpose functions, components. Hands-on experience on CAD workstations.

14:440:371 ***Packaging Evaluation Methods (3)***
Covers materials characteristics of the major materials and the strength assessment of those materials in connection with the packaging applications. The major packaging materials such as paper and paperboards, plastics, steel, and glass are evaluated in terms of strength properties. In evaluation of materials, the fundamental knowledge of those materials in terms of physical, chemical, mechanical, and electrical properties are discussed in relation to the packaging applications.

14:440:373 ***Packaging Manufacturing I (3)***
Covers the basic manufacturing technologies of major packaging materials such as paper and paperboards; conversion of paperboards; plastic containers, including films and bottles; aluminum and steel containers; glass containers; and wooden boxes. Students learn how different kinds of materials are converted into some types of containers and meet all the required packaging conditions and qualities.

14:440:378 ***Sustainable Packaging (3)***
The design and development of sustainable packaging based on quantitative and qualitative metrics. Introduction to Life Cycle Assessment processes and related impacts on packaging development for consumer goods industries.

14:440:403 ***Safety Packaging (3)***
Identification and measurement of hazards in physical distribution. Packaging hazardous materials. Product classes, use of regulations, exceptions, authorized packaging, and the performance testing program.

14:440:406 ***Packaging Printing/Decoration (3)***
Position and importance of package graphics and structure in consumer packaging and marketing. Printing and decoration methods and technologies for paper, plastic, and other materials. Preparation, production, application, and economics of package graphics operations.

14:440:408 ***Pharmaceutical Manufacturing (3)***
The course covers manufacturing and packaging processes and practices in the pharmaceutical industry. The processes include blending, granulation, size reduction, drying, compressing, and coating of tablets, as well as capsule and liquid filling. Packaging discussions start with bottle feeding up to case packing and the operations in between. There is an emphasis on facility layout, safety, and maintenance issues related to cGMP of pharmaceutical manufacturing.

14:440:418 ***Packaging Development Process (3)***
Learn modern package development process through case studies; apply packaging engineering technologies, project management, team interactions, tool development, and commercial start-up technologies to the package development process.

14:440:419 ***Innovation and Design (3)***
A course devoted to the case study of recently launched new consumer packages. Students study the package development process using real commercial packages with mentors from the companies that introduced new packages. The process of innovating the application packaging technologies is included with this study.

14:440:420 ***Senior Project (3)***
Seniors are given the opportunity to conduct individual research on consumer packaging issues. Projects are proposed by students or submitted by partner companies.

14:440:468 ***Packaging Machinery (3)***
This course covers the fundamentals related to packing and packaging of all forms of products including such materials as gases, liquids, and solids. Emphasis placed on the characteristics of the products, the packaging materials and forms, the selections of packaging machines regarding the compatibilities with the contents and packaging materials, and packaging economy. Also emphasized are the functions of important parts involved with a specific packaging machine and a line of packaging system as a whole.

14:440:470 ***Packaging Lab I (2)***
Covers physical and mechanical tests of all major packaging materials including paper, paperboards, corrugated fibreboards, plastic films and bottles, metal containers, and glass containers using ASTM and TAPPI test methods. Packaging students learn how to operate moisture vapour and oxygen gas transmission rate testers and learn how to use the data to determine the materials' constants in terms of transmission rates of plastic materials. Students learn how to figure out the shelf-life of flexible and rigid plastic containers through permeation tests.

14:440:471 ***Distribution Packaging (3)***
Covers the right selection of containers to ship diversified articles in different material characteristics, shapes, and sizes and different fragility levels. All-weather protection of the packaging and packaged products from the distribution environment is the goal of this course. The study of the distribution environment for various packaged products in the world is an important part of this course.

14:440:473 ***Packaging Lab II (2)***
Covers the heavy and bulky packaging tests including major national and international test procedures, ASTM, TAPPI, and other packaging test procedures authorized by the government. Packaging students learn how to determine the fragility factors of articles, how to evaluate the protective materials for cushioning capability, and how to use the cushioning data to make a protective design.

14:440:477 ***Packaging Manufacturing II (3)***
Review of packaging materials and processes from a packaging manufacturing perspective.

14:440:489 ***Special Problems in Packaging (Fall 1-3)***
Presentations of detailed studies on specialized aspects of packaging.

14:440:490 ***Special Problems in Packaging (Spring 1-3)***
Selected topics of interest to graduate packaging students.

14:440:498 ***Packaging Engineering Co-op Internship (Spring 3-6)***
Supervised professional experience in the field of packaging offered through corporations and other businesses throughout the United States.

14:440:499 ***Packaging Engineering Co-op Internship (Fall 3-6)***
Supervised professional experience in the field of packaging offered through corporations and other businesses throughout the United States.

Biomedical Engineering 125 Courses (ENG)

BIOMEDICAL ENGINEERING 125 COURSES

14:125:201 ***Introduction to Biomedical Engineering (3)***
Overview of applications of engineering in medicine and health care. Introduction to biological and biomedical problems using fundamental concepts and tools from electrical, mechanical, and chemical engineering.

14:125:255 ***BME System Physiology (3)***
Introduction to quantitative modeling of physiological systems geared toward the biomedical engineering student. Covers fundamental topics in physiology ranging from cell membrane models and chemical messengers to neuronal signaling and control of body movement. Specific physiological systems are discussed in detail, including the cardiovascular, pulmonary, and visual systems. Furthermore, pharmacokinetic models provide quantitative assessment of the dynamics of drug distribution and compartmental interactions.

14:125:303 ***Biomedical Transport Phenomena (3)***
Biomedical mass transport processes involving diffusion, diffusion-convection, and diffusion-reaction schemes; introduction to biofluid dynamics; transport processes in the cardiovascular system, hemorheology, extracorporeal mass transport devices, and tissue engineering.

14:125:304 ***Introduction to Biomaterials (3)***
Introduction to material properties, testing, biomaterial requirements, and device design. The main objective is to convey basic knowledge of this large volume of information and to provide an elementary understanding of the terminology used in academic and commercial settings as preparation for future study or work.

14:125:305 ***Numerical Modeling in Biomedical Systems (3)***
Introduction to modeling and simulation techniques in the analysis of biomedical systems. Application of numerical methods for the solution of complex biomedical process problems. Development and use of PC software for the analysis and solution of engineering problems.

14:125:306 ***Kinetics and Thermodynamics of Biological Systems (3)***
Fundamentals of thermodynamics and kinetic analysis as applied to biomedical systems and technologies. Essential principles in thermodynamics introduced, including First Law, Second Law, and interrelationships among thermodynamic variables. Fundamental tools in kinetic analysis are also covered, including interpretation of rate data, enzyme kinetics, and pharmacokinetics. Application to biological systems and biomedical technologies are provided.

14:125:308 ***Introduction to Biomechanics (3)***
Relationship between applied and resultant forces and stresses acting on the musculoskeletal system. Basic concepts of vectors, internal and external forces, functional anatomy, trusses and equilibria of spatial force systems, moments, and work and energy concepts. Stress and strain tensors, principal forces, viscoelasticity, and failure analysis from classical mechanics.

14:125:309 ***Biomedical Devices and Systems (3)***
Time and frequency domain analysis of electrical networks; hydrodynamic, mechanical, and thermal analogs; basic medical electronics; and energy conversion systems. Design of biological sensors.

14:125:310 ***Biomedical Devices and Systems Laboratory (1)***
Experiments and demonstrations dealing with basic medical electronics and signal analysis. Provides an overview of current biomedical technology and its uses.

14:125:315 ***BME Measurement and Analysis Laboratory (2)***
Experiments and demonstrations dealing with the measurement and analysis of various physiological quantities of cardiovascular and respiratory systems, and the measurement of cellular viability, metabolism, morphogenesis, and protein and nucleic acid composition.

14:125:401,402,421,422 ***Biomedical Engineering Senior Design I, II Projects (1,1,2,2)***
Students gain design experience in the biomedical engineering field by completing a design project under the supervision of a faculty member. Project typically involves experimental or computational study of a design-oriented problem in biomedical engineering.

14:125:403 ***Cardiovascular Engineering (3)***
Introduction to modeling and measurement methods for the cardiovascular system, analysis of blood-flow dynamics, the function of the heart, and noninvasive approaches. Applications to cardiovascular instrumentation, basic cardiovascular system research, assist devices, and disease processes.

14:125:409 ***Introduction to Prosthetic and Orthotic Devices (3)***
Introduces the application of mechanical engineering principles to the design of artificial limbs and braces. Teaching includes basic anatomy and physiology of limb defects, biomechanics, motion analysis, and current device designs. Design and visualization tools will include MatLab and other application software.

14:125:411 ***Bioelectric Systems (3)***
Introduction to the understanding of bioelectric phenomena that occur in physiological systems. This includes the origin of biopotentials; the use of biopotential electrodes in their measurements and subsequent amplification; signal processing; and analysis of their physiological relevance. Applications of physical principles and basic electric engineering techniques are emphasized.

14:125:417 ***Introduction to Musculoskeletal Mechanics (3)***
Introduction to motion-actuating, force-generating, and load-supporting mechanisms in the musculoskeletal system, as explained from basic engineering principles. Elucidation of function-structure relationships from both ultrastructural and mechanical analyses. Experimental and analytical approaches to solve realistic orthopedic and recreational problems.

14:125:424 ***Biomedical Instrumentation Laboratory (3)***
Practical hands-on designs of biomedical instrumentation including biopotential and physiological signal processing amplifiers; electrodes; biosensors and transducers; and electro-optical, acoustic, and ultrasonic devices.

14:125:431 ***Introduction to Optical Imaging (3)***
Introductory overview of optical phenomena and the optical properties of biological tissue. The course is specifically focused on optical imaging applications in biology and medicine. Topics will include reflection, refraction, interference, diffraction, polarization, light scattering, fluorescence and Raman techniques, and their application in biomedical imaging and microscopy.

14:125:432 ***Cytomechanics (3)***
Structural and mechanical components of cells, with emphasis on the regulatory roles of physical forces in cell function. Emphasis on processes that drive tissue growth, signaling and metabolism, gene expression, and biomechanical properties of cells and their components.

14:125:433 ***Fundamentals and Tools of Tissue Engineering (3)***
Fundamentals of polymer scaffolds and their use in artificial tissues. Regulation of cell responses in the rational design and development of engineered replacement tissue. Understanding the biological, chemical, and mechanical components of intra- and intercellular communication. Preliminary discussions on real-life clinical experiences.

14:125:434 ***Tissue Engineering II: Biomedical and Biotechnological Applications (3)***
Applications of tissue engineering; builds upon the prior course fundamentals and tools. Emphasis is placed on applying the fundamental principles and concepts to problems in clinical medicine and large-scale industrial manufacturing. Topics include skin replacement, cartilage tissue repair, bone tissue engineering, nerve regeneration, corneal and retinal transplants, ligaments and tendons, blood substitutes, artificial pancreas, artificial liver, tissue integration with prosthetics, vascular grafts, cell encapsulation, and angiogenesis.

14:125:437 ***Computational Systems Biology (3)***
Introductory overview of some key issues in computational systems biology. Defines systems and biological components independently to provide an appreciation of the special features of both elements. Introduction of medical informatics concepts.

14:125:445 ***Principles of Drug Delivery (3)***
Fundamental concepts in drug delivery from an engineering perspective. Biological organisms are viewed as highly interconnected networks where the surfaces/interfaces can be activated or altered chemically and physically/mechanically. The importance of intermolecular and interfacial interactions on drug delivery carriers is the focal point of this course. Topics include: drug delivery mechanisms (passive, targeted); therapeutic modalities and mechanisms of action; engineering principles of controlled release and quantitative understanding of drug transport (diffusion, convection); effects of electrostatics, macromolecular conformation, and molecular dynamics on interfacial interactions; thermodynamic principles of self-assembly; chemical and physical characteristics of delivery molecules and assemblies (polymer based, lipid based); significance of biodistributions and pharmacokinetic models; and toxicity issues and immune responses.

14:125:455 ***BME Global Health (3)***
Overview of how biomedical technologies are developed and translated into clinical practice. Major diseases facing industrialized and developing countries and technological advances that can be used to solve these problems. Economic, ethical, social, and regulatory constraints on these new technologies will be examined.

14:125:465 ***BME Microfluidics (3)***
Understanding of fluid mechanics at small-length scales. Low Reynolds number flow, electrokinetic flows, and bioseparations in microfluidic devices.

14:125:470 ***Advanced Biomedical Devices Laboratory (3)***
Applies the background obtained from the Biomedical Devices and Systems lecture and laboratory courses (125:309 and 310) that are restricted to linear systems and devices. Introduces advanced nonlinear electronics and devices. The Advanced Biomedical Devices lab will also cover: device standards and precision laboratory test

methods; introduction to medical device interface systems; biomedical device power sources; wireless data transmission; basic radio systems; the blue tooth standard. Students will learn how to apply nonlinear data reduction methods to process long duration wireless data records that they will obtain during lab exercises.

14:125:489 or 490 ***Advanced Research in Biomedical Engineering (3) **Junior Year***
Advanced research immersion activity and the supporting educational tools for members of the Biomedical Engineering Honors Academy who participate within a formalized two-year research experience. Students work independently with faculty members on a research project of relevance to biomedical engineering. In addition, students meet monthly for roundtable discussions of a wide range of scientific, ethical, and professional issues.

14:125:491,492 ***Special Problems in Biomedical Engineering (3,3)***
Independent study under the guidance of a faculty member in specific areas of interest in biomedical engineering.

14:125:493,494 ***Advanced Research in Biomedical Engineering (3,3) **Senior Year***
Advanced research immersion activity and the supporting educational tools for members of the Biomedical Engineering Honors Academy who participate within a formalized two-year research experience. Students work independently with faculty members on a research project of relevance to biomedical engineering. In addition, students meet monthly for roundtable discussions of a wide range of scientific, ethical, and professional issues.

14:125:496,497 ***Co-op Program in Biomedical Engineering (3,3)***
Provides the student with the opportunity to practice and apply knowledge and skills in various biomedical engineering environments. Provides a capstone experience to the undergraduate experience by integrating prior coursework into a working engineering environment.

Course Note

Please check Student Handbook online for updated prerequisites. The handbook explains what the biomedical engineering program offers.

Chemical Engineering 155 Courses (ENG)

CHEMICAL ENGINEERING 155 COURSES

14:155:201 ***Chemical Engineering Material and Energy Balances (3)***
Introduction to the major. Conservation of mass and energy, and application to chemical engineering systems. Solution of material and energy balance problems for complex processes. Focus on open systems at steady-state.
Prerequisites: 01:160:160, 01:640:152.

14:155:208 ***Chemical Engineering Thermodynamics I (3)***
Thermodynamics from a chemical engineering viewpoint. First Law as it applies to nonflow and steady-flow processes, pressure-volume-temperature behavior of fluids and heat effects, the Second Law and its applications, thermodynamic properties of pure fluids and fluid mixtures, phase equilibria, and chemical reaction equilibria. Thermodynamics of polymers and biosystems.
Prerequisite: 14:155:201.

14:155:210 ***Biological Foundations of Chemical Engineering (3)***
Biochemistry and biophysics of proteins and nucleic acids; cellular composition and metabolism; tools for manipulating cells; introduction to biological products and processes.
Prerequisites: 01:640:152, 01:160:307.

14:155:291,292 ***Undergraduate Research for Sophomores (BA,BA)***
Individual research project under the guidance of a faculty adviser in a specific area of chemical or biochemical engineering. Interdisciplinary cooperation encouraged where applicable. Projects may be one or two semesters in length. No more than 3 credits are awarded per semester.
Prerequisite: Permission of department.

14:155:298 ***Professional Skills Development (1)***
Seminar on career topics and skills to aid students in finding jobs and succeeding as professionals.
Corequisite: 14:155:201. Graded pass/no credit.

14:155:303 ***Transport Phenomena in Chemical Engineering I (3)***
Introduction to fluid dynamics of chemical systems. Application of basic equations to steady-state and unsteady-state flow processes. Description of laminar and turbulent-flow regimes leading to the determination of velocity distributions and friction factors. Design equations for flowing fluids, with computer applications.
Prerequisites: 14:155:208, 01:640:244.

14:155:304 ***Transport Phenomena in Chemical Engineering II (3)***
Heat and mass transfer in chemical engineering processes, with computer applications. Steady-state and unsteady-state heat conduction and molecular diffusion. Energy and mass transfer in fluids undergoing flow, phase change, and/or chemical reaction. Radiant heat transfer. Heat exchangers and mass transfer equipment.
Prerequisites: 14:155:303, 309.

14:155:307 ***Computational Methods in Chemical Engineering (3)***
Introduction to modeling and simulation techniques in the analysis of chemical and biochemical engineering systems. Application of numerical methods for the solution of complex chemical process problems. Development and use of PC software for the analysis and solution of engineering problems.
Prerequisites: 14:155:201, 14:440:102 OR 14:440:127, 01:640:244.

14:155:309 ***Chemical Engineering Thermodynamics II (3)***
Thermodynamic properties of mixtures. Ideal gas and ideal solution models. Partial fugacity of gaseous and liquid phases. Properties change of mixing and partial molar properties. Excess functions and activity coefficients for nonideal solutions. Phase equilibrium and phase diagrams. Phase equilibrium calculations. Colligative properties. Chemical reaction equilibrium.
Prerequisite: 14:155:208.

14:155:324 ***Separation Processes (3)***
Application of mass transfer theory to the design and analysis of chemical engineering separation processes. Distillation, liquid extraction, gas absorption, and other separation processes. Computer software for the design and analysis of various separation processes.
Prerequisites: 14:155:303, 307, 309.

14:155:341 ***Chemical Engineering Kinetics (3)***
Fundamental theories of kinetics. Ideal reactor analysis; single reactions; parallel and series reactions. Consideration of real reactors and reactor design. Principles of heterogeneous catalysis, combined mass transfer/ kinetic phenomena, and approaches to catalytic reactor design using computer methods.
Prerequisites: 14:155:303, 307.

14:155:391,392 ***Undergraduate Research for Juniors (BA,BA)***
Individual research project under the guidance of a faculty adviser in a specific area of chemical or biochemical engineering. Interdisciplinary cooperation encouraged where applicable. Projects may be one or two semesters in length. No more than 3 credits are awarded per semester.
Prerequisite: Permission of department.

14:155:407 ***Processing and Properties of Materials (3)***
Atomic/molecular-level structure of fundamental materials, including metals, ceramics, polymers, and composites. Properties, such as mechanical properties, are understood in terms of the microstructure of materials. Focus is placed on the relationship between the structure and the properties of materials.
Prerequisites: 01:160:159, 01:750:123, 14:440:221.

14:155:411 ***Biochemical Engineering (3)***
Integration of the principles of chemical engineering, food science, biochemistry, cell and molecular biology, and microbiology with applications to the analysis, control, and development of industrial, biochemical, and biological processes. Quantitative, problem-solving methods emphasized.
Prerequisites: 14:155:210, 303, 307, 309.

14:155:415 ***Process Engineering Laboratory I (4)***
Original experiments developed using existing pilot-scale or bench-scale equipment. Working independently under faculty supervision, students use modern instruments, operate equipment under various open- and closed-loop control conditions, perform experiments, take data and assay samples, and write reports of professional quality. OSHA-type laboratory safety and health practices taught and utilized.
Lec. 1 hr., lab. 9 hrs. Prerequisites: 14:155:304, 324, 341.

14:155:416 ***Process Engineering Laboratory II (4)***
Projects differ in type and scale from those of the first semester. Emphasis on professional-quality data and individual contributions, particularly process evaluation, scale-up, and design criteria. Also, orientation on careers, job opportunities, professional societies, licensing, rights and responsibilities of licensed engineers, and safety-risk management.
Lec. 1 hr., lab. 9 hrs. Prerequisites: 14:155:415, 341.

14:155:422 ***Process Simulation and Control (3)***
Modern simulation techniques and automatic control theory as applied to process dynamics of chemical and biochemical engineering systems. Use of analytical methods and computer software for solving complex problems. Structure and design of closed-loop, computer-controlled processes. Discussion of safety engineering in the final process of control design.
Prerequisites: 14:155:307, 324, 341.

14:155:427 ***Chemical Engineering Design I (3)***
First course in a two-semester, capstone design sequence (155:427,428) that covers the principles of product design, process design, and economic considerations for building and operating chemical or biochemical plants. Reflecting recent advances in chemical engineering education, we are integrating product design and process design in this sequence. Specifically, starting from the identification of marketable products, we proceed to develop ideas for making the products, select workable methods, and then design the best processes for both upstream (reactor design and batch, semibatch, or continuous operation) and downstream processing (separations and purifications) to produce the said product profitably. In the fall semester, rate-based separations and batch-process design for the production of biochemicals and specialty chemicals will be covered.
Prerequisites: 01:160:308; 14:155:304, 324, 341.

14:155:428 ***Chemical Engineering Design II (4)***
The capstone design course covers the principles of product design, process design, and economic considerations for building and operating chemical or biochemical plants. Reflecting recent advances in chemical engineering education, we are integrating product design and process design in this sequence. Specifically, starting from the identification of marketable products, we proceed to develop ideas for making the products, select workable methods, and then design the best processes for both upstream (reactor design and batch, semibatch, or continuous operation) and downstream processing (separations and purifications) to produce the said product profitably. The design details and economic considerations involved in the design, construction, and operation of chemical plants using basic principles and modern computer software. Engineering ethics, plant safety practices, and OSHA concerns.
Prerequisite: 14:155:415.

14:155:491,492 ***Undergraduate Research for Seniors (BA,BA)***
Individual research project under the guidance of a faculty adviser in a specific area of chemical or biochemical engineering. Interdisciplinary cooperation encouraged where applicable. Projects may be one or two semesters in length. No more than 3 credits are awarded per semester.
Prerequisite: Permission of department.

14:155:495 ***Internship in Chemical and Biochemical Engineering (BA)***
Provides students with the opportunity to practice and/or apply knowledge and skills in various chemical or biochemical engineering professional environments.
Prerequisite: Permission of department. Graded pass/no credit.

14:155:496,497 ***Co-op in Chemical and Biochemical Engineering (3,3)***
Provides a capstone experience to the student's undergraduate studies by integrating prior coursework into a working chemical or biochemical engineering professional environment. Credits earned for the educational benefits of the experience and granted only for a continuous, six-month, full-time assignment.
Prerequisites: Permission of department. Graded pass/no credit.

Civil Engineering 180 Courses (ENG)

CIVIL ENGINEERING 180

14:180:215 ***Engineering Graphics (1)***
Principles of computer-aided design and drafting (CADD): graphic entities, hatch patterns, layering, part file creation, and information extraction. Two-dimensional drafting and pictorial drawings using a CADD system. Introduction to three-dimensional modeling and surface revolution.
Lab. 3 hrs. Not for civil engineering major.

14:180:216 ***Introductory Computer-Aided Design and Drafting (3)***
Principles of computer-aided design and drafting (CADD): graphic entities, hatch patterns, layering, part file creation, and information extraction. Two-dimensional drafting and pictorial drawings using a CADD system. Introduction to three-dimensional modeling and surface revolution. Descriptive geometry. CADD applications in civil engineering.
Lec. 1 hr., lab. 3 hrs., rec. 1 hr.

14:180:243 ***Mechanics of Solids (3)***
Axial force, shear, moment, and torque in structural members; stress, strain, and stress-strain relations; principal stresses and strains; torsion of circular shafts; bending of singly symmetric beams; compound loading; buckling of columns; statically indeterminate systems.
Prerequisites: (14:440:221 or 14:440:291) and (01:640:152 or 01:640:192 or 21:640:235 or 50:640:221). Corequisite: 01:640:244.

14:180:305 ***Construction Engineering (3)***
An introduction to construction and the construction industry. Topics include construction contracts, scheduling, estimating, and cost control.
Prerequisite: 14:180:243.

14:180:318 ***Elements of Structures (3)***
Structural analysis of statically determinate trusses, frames, cables, and arches. Computation of deflections in trusses and plane frames. Influence lines for beams and trusses. Introduction to indeterminate structures.
Prerequisites: 14:180:243, 14:440:222.

14:180:320 ***Design of Steel Structures (3)***
Design of bolted and welded connections; design of components of structural systems in tension, compression, bending, and combined axial and bending loads. Use of computers for design and detailing.
Lec. 2 hrs., rec. 1 hr. Prerequisites: 14:180:243, 318; 14:440:222.

14:180:331 ***Elements of Environmental Engineering (3)***
Engineering management of the environment with particular emphasis on chemical contaminants in water, wastewater, and air. Effects of energy-related pollutants and industrial emissions on environmental systems. Federal regulation and management of chemical contaminants.

14:180:345 ***Properties of Materials Laboratory (1)***
Mechanical properties and behavior of structural elements under a variety of load conditions.
Prerequisite: 14:180:243.

14:180:364 ***Transportation Engineering I (3)***
Principles of transportation engineering with application to various modes; planning, selection, formulation, and administration of transportation systems. Economic, environmental, and political constraints; land-use studies; applications.
Prerequisite: 14:180:243.

14:180:372 ***Soil Mechanics (3)***
Elements of engineering geology; mechanical and hydraulic properties of soils; soil-water systems and fluid flow; stresses in soils; compressibility, consolidation, and settlement; shearing resistance; lateral earth-pressures; slope stability; bearing capacity; numerical methods and computer applications.
Prerequisites: 14:180:243, 387.

14:180:374 ***Soil Mechanics Laboratory (1)***
Engineering classification of soils and rocks. Laboratory studies of physical properties and shear strength of soils such as Atterberg limits, compaction, permeability, unconfined compression, and direct shear tests.
Lab. 3 hrs. Corequisite: 14:180:372.

14:180:382 ***Hydraulic and Environmental Engineering (3)***
Basic concepts of viscous flows; conservation laws (mass, momentum, and energy); pipe flows and open-channel flows; water distribution systems; hydraulic modeling (stream and marine pollution); air, stream, and marine pollution problems. Computer applications.
Prerequisite: 14:180:387.

14:180:387 ***Fluid Mechanics (3)***
Fluid properties, statics and kinematics; concepts of system and control volume; mass, momentum, and energy conservation principles; laminar and turbulent flows in conduits and channels; boundary layer theory; drag and lift; ideal fluid flow.
Prerequisites: 14:440:222, 01:640:244.

14:180:389 ***Fluid Mechanics Laboratory (1)***
Experimental applications and demonstrations; measurement of fluid properties; applications of mass, energy, and momentum principles; energy losses; forces on immersed bodies; flow measurement devices.
Corequisite: 14:180:387.

14:180:402 ***Finite Element Methods in Civil Engineering (3)***
Finite element method of analysis for problems in structures and solid, fluid, and soil mechanics. Fundamentals of the finite element method. Variational formulation of boundary value problems, Galerkin approximations, matrix equations, finite element interpolation, error estimates, computer program algorithms and codes.
Prerequisites: 14:180:243, and 01:960:379 or equivalent.

14:180:406 ***Construction Engineering Management (3)***
Construction planning, scheduling, and control. Use of computer-based information systems for project management. Value engineering. Critical path method and PERT scheduling techniques. Computer-drawn

scheduling networks. Schedule compression. Resource allocation leveling and optimization. Project organization and financial control. Decision-making.
Prerequisites:14:180:305, 01:960:379.

14:180:407 ***Construction Projects (4)***
Application of skills and theories of construction engineering management to actual projects. Students are assigned to a project and work with managers to budget, schedule, and control operations. Topics include utilization of heavy construction equipment, computer simulation of construction, and information technology in construction.
Prerequisites: 14:180:305, 406.

14:180:411 ***Reinforced Concrete (3)***
Strength theories for the analysis and design of beams, slabs, columns, and floor systems in flexure, diagonal tension, torsion, serviceability, and load factors, including computer applications.
Prerequisites: 14:180:318, 320.

14:180:412 ***Behavior of Concrete Materials and Systems (3)***
Material behavior under uniaxial, multiaxial, and time-dependent loading. Various methods of testing and computer aids for quality control. Analysis of structural members. Recent developments in cementitious composites.
Prerequisite: 14:180:411.

14:180:413 ***Theory of Indeterminate Structures (3)***
Force method for solving simple indeterminate structures. Classical methods of slope-deflection and moment distribution. Formulation and algorithms for matrix method. Application of computers for analyzing indeterminate trusses and frames.
Prerequisite: 14:180:318.

14:180:417 ***Masonry and Wood Design (3)***
Introduction to masonry and wood terminology and materials as well as ASTM-related specifications. ASD and LRFD design of structural elements such as masonry and wood beams, lintels, and columns. Reinforced and unreinforced masonry design. Masonry and wood shear wall design. Introduction to prestressed masonry. Connection design. Sustainability and energy efficiency, fire rating, and cost analysis.
Prerequisite: Open to senior civil engineering majors only.

14:180:421 ***Reinforced Concrete Laboratory (1)***
Experimental stress analysis of concrete structures, including test to failure of beams, plates, and prestressed elements; control testing and design of concrete mixtures.
Lab. 3 hrs. Corequisite: 14:180:411.

14:180:426 ***Structural Design (4)***
Design of steel or concrete structures; prestressed concrete design of beams and slabs. Design project with working drawings for a bridge or high-rise building. Economic and ethical considerations. Comprehensive report.
Lec. 3 hrs., lab. 3 hrs. Prerequisites: 14:180:318, 320, 411, 421.

14:180:429 ***Water and Wastewater Engineering (3)***
Design principles for water and wastewater engineering systems, water supply and distribution, wastewater collection and disposal, water treatment, and wastewater treatment.
Prerequisites: 14:180:387, 389.

14:180:430 ***Introduction to Transportation Planning (3)***
Discusses the various aspects of transportation demand forecasting problems. Introduces the classic four-step modeling process and the new activity-based modeling approach. Students will have the chance to use some of the state-of-the-art transportation planning software packages, such as Cube, VISUM, and TRANSCAD to conduct case studies of transportation planning problems during labs.
Prerequisites: 14:180:364 and (01:960:379 or 01:960:401).

14:180:431 ***Design of Environmental Engineering Facilities (4)***
Analysis and design considerations for environmental engineering facilities, such as water supply and wastewater treatment plants; physical engineering management of solid and hazardous wastes; resource recovery; economic and ethical considerations. Comprehensive report.
Prerequisites: 14:180:387, 389, 429.

14:180:434 ***Land Development - Elements of Urban Infrastructure (3)***
Introduction to urban infrastructure; introduction to civil design plans then a review of the function, alternatives, design, and construction of civil infrastructure elements such as grading, hydrology, storm water management, grading and earthwork, erosion and sediment control, storm and sanitary sewer systems, dry utilities, curb and flexible pavements, improvements to existing infrastructure.
Prerequisites: 14:180:372, 387.

14:180:438 ***Transportation Engineering II (4)***
Training in state-of-the-art transportation planning and operations software such as HCS, Synchro, VISSIM, and CUBE. Students will work in teams to conduct traffic studies at given sites/corridors. Traffic improvement alternatives will be used to address the identified transportation problems. Such alternatives to study may include redesigning geometric layout, signal optimization, adding traffic signs and control, and ITS (intelligent transportation) equipment and systems.
Lec. 3 hrs., lab. 3 hrs. Prerequisite: 14:180:364.

14:180:443 ***Advanced Hydraulics (3)***
Hydraulic engineering fundamentals: boundary layer, surface roughness, resistance in viscous flows; design of erodible and nonerodible canals; gradually varied flow, backwater analysis in rivers; computational methods; hydraulic jump; hydraulic applications in channel transitions and controls; flow over spillways; pollution problems in rivers and streams.
Prerequisite: 14:180:387.

14:180:448 ***Elements of Hydrology (3)***
Hydrologic cycle; weather and hydrology; precipitation; evaporation and transpiration; stream flow and subsurface hydrology; stream flow hydrographs; unit hydrograph theory; stream flow routing; computer simulation of hydrologic processes; probability concepts in hydrology; models for frequency distribution of floods; time series analysis.
Prerequisite: 14:180:387.

14:180:471 ***Elements of Environmental Geotechnology (3)***
Geotechnical aspects of analysis design and construction of waste containment systems.
Prerequisite: 14:180:372.

14:180:473 ***Foundation Engineering (3)***
Subsurface exploration; bearing capacity, settlement, and design of shallow foundations; design of rigid and flexible retaining structures; bearing capacity, settlement, and design of deep foundations.
Lec. 2 hrs., rec. 1 hr. Prerequisites: 14:180:372, 374.

14:180:474 ***Geotechnical Engineering Design (4)***
Subsurface investigation; construction dewatering; design concepts and procedures for shallow and deep foundations; application of numerical methods; safety and economy. Comprehensive report.
Prerequisites: 14:180:372, 374, 473.

14:180:482 ***Professional Issues in Civil Engineering (1)***
Principles of design of civil engineering projects from the viewpoint of the whole; interactions between individual parts (subsystems) and the effect of each on the overall system; overview of design process, quality of design, risk and liability, ethics, and economic considerations; report writing.
Prerequisite: Completion of all required courses through fall semester of senior year.

14:180:491,492 ***Special Problems in Civil Engineering (BA,BA)***
Individual investigation in a branch of civil engineering of particular interest to the student.
Prerequisite: Open only to seniors with departmental permission.

14:180:493,494 ***Special Problems in Environmental Engineering (BA,BA)***
Individual investigation in a branch of environmental engineering of particular interest to the student.
Prerequisite: Open only to seniors with departmental permission.

14:180:496,497 ***Co-op Internship in Civil and Environmental Engineering (3,3)***
Provides a capstone experience to the student's undergraduate studies by integrating prior coursework into a working civil and environmental engineering professional environment. Credits earned for the educational benefits of the experience and granted only for a continuous, six-month, full-time assignment.
Prerequisite: Permission of department. Graded pass/no credit.

Electrical and Computer Engineering 332 Courses (ENG)

ELECTRICAL AND COMPUTER ENGINEERING 332 COURSES

14:332:221 ***Principles of Electrical Engineering I (3)***
Circuit elements, independent sources, dependent sources, circuit analysis in DC and AC steady state, network theorems, operational amplifiers, power computations.
Prerequisites: [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:124)] or [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:116)] or [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:201)] or [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:203)] or [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:271)] Corequisites:14:332:223.

14:332:222 ***Principles of Electrical Engineering II (3)***
Passive and active filter circuit design, Butterworth filter design, transient analysis by classical methods and by Laplace transform analysis, step and impulse response, two-port networks, introduction to Fourier series, three phase circuits.
Prerequisites: [(14:332:221 or 50:750:234) and (01:640:251)] or [(50:640:221 or 21:640:235) and (14:332:221)] or [(01:640:291 or 21:640:235) and (14:332:221)] Corequisites:14:332:224.

14:332:223 ***Principles of Electrical Engineering I Laboratory (1)***
Experimental exercises in use of laboratory instruments. Voltage, current, impedance, frequency, and waveform measurements. Rudiments of circuit modeling and design.
Prerequisites: [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:124)] or [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:116)] or [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:201)] or [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:203)] or [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:271)] Corequisite: 14:332:221.

14:332:224 ***Principles of Electrical Engineering II Laboratory (1)***
Experimental exercises in use of laboratory instruments; Filter design, construction, and simulation; Measuring Fourier components of a periodic signal
Prerequisites: 14:332:221, 14:332:223 Corequisites: 14:332:222.

14:332:226 ***Probability and Random Processes (3)***
Probability and its axioms, conditional probability, independence, counting, random variables and distributions, functions of random variables, expectations, order statistics, central limit theorem, confidence intervals, hypothesis testing, estimation of random variables, random processes and their characterization, autocorrelation function.
Prerequisite: 01:640:251 or 01:640:291

14:332:231 ***Digital Logic Design (3)***
Binary arithmetic, Boolean algebra, K-maps. Combinational circuit synthesis, combinational MSI circuits. Sequential logic. Synchronous-state machine design. Sequential MSI circuits.
Prerequisites: [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:123)] or [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:116)] or [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:201)] or [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:203)] or [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:271)] Corequisite: 14:332:233.

14:332:233 ***Digital Logic Design Laboratory (1)***
Hands-on experiments with digital circuits of increasing complexity from simple gates to state machines.
Prerequisite: 1 [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:123)] or [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:116)] or [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:201)] or [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:203)] or [(01:640:152 or 01:640:154 or 01:640:192) and (01:750:271)] Corequisite: 14:332:231.

14:332:252 ***Programming Methodology I (3)***
Basics of programming and data structures in C++, basic data types, loops, arrays recursion, and pointers. Object-oriented design: classes, inheritance, overloading, and polymorphism. Abstract data types: lists, linked lists, stacks, and queues. Introduction to algorithm analysis: O notation, searching, and sorting. Introduction to Large Language Models like ChatGPT for programmers.
Prerequisite: 14:440:127.

14:332:301 ***Forces and Strategies That Shaped the Wireless Revolution (3)***
A broad view of how business strategies are created based on examples from cellular and other wireless systems. Historical overview of communications and communication systems, basics of wireless technology, technology and politics of cellular, basics of corporate finance, economics of cellular systems and spectrum auctions, case studies in wireless business strategy, the strategic implications of unregulated spectrum, a comparison of 3G and WiFi, sensor networks and the wireless future.

14:332:312 ***Discrete Mathematics (3)***
An application-driven course based upon the study of events that occur in small, or discrete, segments in business, industry, government, and the digital world. The student will be introduced to the mathematical tools of logic and set theory, combinatorics, number theory, and graph theory. Practical applications will be introduced throughout the course.
Prerequisites: 01:640:251 or 01:640:291

14:332:322 ***Principles of Communications Systems (3)***
Analog communication; random processes and noise; quantization; digital communication.
Prerequisites: (14:332:226 or 01:198:206 or 01:640:477) and 14:332:345

14:332:331 ***Computer Architecture and Assembly Language (3)***
History and principles of computer architecture. Computer organization, assembly language and machine code, computer arithmetic, ALU design, computer performance, data path and control, pipelining, memory hierarchy, I/O devices, multi-core architectures, multi-processor and distributed architectures, mobile and graphics processors.
Prerequisites: 14:332:231 and 233. Corequisite: 14:332:333.

14:332:333 ***Computer Architecture Laboratory (1)***
Assembly language programming for one of the standard commercial RISC-V microprocessors. Design and implementation of a simple microprocessor-based, single-user computer.
Prerequisites: 14:332:231 and 233. Corequisite: 14:332:331.

14:332:345 ***Linear Systems and Signals (3)***
Introduction to continuous- and discrete-time systems and signals, linear time-invariant (LTI) systems, analysis of signals and systems using Laplace and Z-transforms, frequency-domain representations using Fourier transforms, and applications in communications, control, and signal processing.
Prerequisites: 14:332:222, 14:332:224, (01:640:244 or 01:640:252 or 01:640:292 or 21:640:314 or 50:640:314)

14:332:346 ***Digital Signal Processing (3)***
Introduction to digital signal processing, sampling and quantization, A/D and D/A converters, discrete time systems, convolution, z-transforms, transfer functions, digital filter realizations, fast Fourier transforms, analog & digital filter design, digital audio applications
Prerequisites: 14:332:345, 14:440:127. Corequisite: 14:332:348.

14:332:348 ***Digital Signal Processing Laboratory (1)***
The objective of this course is to provide a basic understanding of digital signal processing (DSP) via hands-on implementation. This course extends Fourier and Laplace transforms and concepts to the field of discrete-time systems. Major parts of the course will concentrate on signal analysis using Fourier transforms, linear system analysis, Filter design and a few more advanced topics.
Prerequisites: 14:332:345, 14:440:127. Corequisite: 14:332:346.

14:332:351 ***Programming Methodology II (3)***
In-depth analysis of algorithms using object-oriented techniques. Comparative algorithm analysis, in-depth sorting algorithms, graphs, NP Completeness, object-oriented design. Emphasis is on programming and practical applications in Electrical and Computer Engineering. Students are assumed to know how to write basic programs in C/C++.
Prerequisites: 14:332:252 or 01:198:111

14:332:361 ***Electronic Devices (3)***
Fundamentals of semiconductor devices and microelectronic circuits, terminal characteristics of p-n and Zener diodes, diode circuits, principles of MOSFET and BJT operation, biasing technology, single stage transistor circuit analysis at mid band frequencies.
Prerequisites: 14:332:222 and 14:332:224 Corequisite: 14:332:363.

14:332:363 ***Electronic Devices Laboratory (1)***
Laboratory experiments in microelectronic circuits using semiconductor devices, including diodes, MOSFETs and BJTs. Employing a learn-by-doing approach, emphasizing the hands-on-experimental experiences and computer simulation.
Prerequisites: 14:332:222 and 224. Corequisite: 14:332:361.

14:332:366 ***Digital Electronics (3)***
Principles of digital electronics, implementation of logic gates with MOSFETs and BJTs. Understanding and analysis of different logic families including NMOS CMOS, TTL and ECL. Fundamentals of digital memory circuits.
Prerequisites: 14:332:361 and 363. Corequisite: 14:332:368.

14:332:368 ***Digital Electronics Laboratory (1)***
Laboratory experiments in transistor-level realization of CMOS, BiCMOS, TTL and ECL logic gates. Employing a learn-by-doing approach, emphasizing the hands-on-experimental experiences and computer simulation.
Prerequisites: 14:332:361 and 363. Corequisite: 14:332:366.

14:332:376 ***Virtual Reality (3)***
Introduction to virtual reality (VR), input/output devices, haptic interfaces, dedicated hardware, VR modeling, VR programming, human factors in VR simulations, applications, the future of VR.
Prerequisite: (14:332:331 or 01:198:211) Corequisite: 14:332:378.

14:332:378 ***Virtual Reality Laboratory (3)***
Introduction to Unity 3D, stereoscopic display programming, scene graphs and hierarchical models, game 3D controllers, force feedback interfaces, 3D sound and interaction techniques, term project.
Prerequisite: (14:332:331 or 14:125:309 or 01:198:211) Corequisite: 14:332:376.

14:332:382 ***Electromagnetic Fields (3)***
Field theory of static, stationary, and moving charges explored. Basic laws of Coulomb, Gauss, Faraday, and Ampere discussed in the context of engineering applications. Knowledge of vector analysis assumed.
Prerequisites: (01:640:152 or 01:640:154 or 01:640:192; 01:750:227; 14:332:222)

14:332:393 ***Professionalism/Ethics (1)***
An undergraduate seminar on the topics of entrepreneurship, ethics, and professionalism. The emphasis is on social, ethical and economic factors that go hand-in-hand with the practice of engineering.
Prerequisite: Junior standing

14:332:402 ***Sustainable Energy: Choosing among Options (3)***
The course is comprised of three parts: an introductory part that provides just-in-time analysis tools from engineering economics, thermodynamics, and sociopolitical analysis; a part dealing with all the major nonrenewable energy sources and technologies; and a part analyzing all major renewable energy sources and technologies.
Prerequisite: Junior Standing

14:332:411 ***Electrical Energy Conversion (3)***
Principles of magnetic circuit concepts, transformers, DC machines, synchronous machines, induction machines, special purpose machines.
Prerequisite: 14:332:222 or 50:750:234

14:332:415 ***Introduction to Automatic Control Theory (3)***
The theory of automatically controlled systems and their dynamic behavior.
Prerequisite: 14:332:345.

14:332:417 ***Control Systems Design (3)***
This course presents the theory of feedback control systems, with a focus in linear control theory and applications to electrical systems. Topics include stability concepts, Routh-Hurwitz and Nyquist stability criteria, PID controllers, state space representation and control design, state feedback and state observers, optimal control, and Kalman filter.
Prerequisite: 14:332:345.

14:332:421 ***Wireless Communications (3)***
This course provides an introduction to the basic principles and applications of wireless communications. It covers the following topics: The wireless channel; Cellular systems from 1G to 5G: multiple access and interference management; Point-to-point communication (Free space loss): Over-the-air signal detection, diversity schemes and channel uncertainty; Capacity of wireless channels; Multiuser capacity and opportunistic communication; MIMO I: spatial multiplexing and channel modeling. MIMO III Diversity multiplexing tradeoff, Universal space time codes.
Prerequisite: 14:332:345

14:332:423 ***Computer and Communication Networks (3)***
Network protocol design principles, reliable transport protocols, routing, quality of service, multimedia networking, internet telephony, and wireless networks.
Pre-Requisite: (14:332:226 or 01:198:206 or 01:640:477)

14:332:424 ***Introduction to Information and Network Security (3)***
Classical cryptosystems, modular arithmetic, modular exponentiation, Fermat and Euler theorem, DES, modes of operation for block ciphers, breaking DES, Rijndael, public key cryptography, primality and prime testing, secret-sharing schemes, Needham-Schroeder, Kerberos, public key infrastructure, password systems, and information theoretic security and applications to network security.
Prerequisites: (14:332:226 and 14:332:312)

14:332:427 ***Communication Systems Design (3)***
Methods and laboratory experiments dealing with practical aspects of analog and digital communications schemes. Experiments involve component level circuit construction, interconnection of modular subsystems, and use of interactive, graphics-based, system simulation software packages.
Prerequisite: 14:332:322.

14:332:434 ***Introduction to Computer Systems (3)***
Multi-processing systems, Parent and Children processes interacting with system calls, Interprocess Communications (IPCs) using: pipes, shared memory, signals, properties of signals, threads and multi-threaded processes, signals on threads, synchronization primitives on threads, physical and virtual memory, multicore architecture, multicore CPU management, multicore job scheduling, thread synchronization, cache, coherency, multicore memory management, multicore file system, I/O.
Prerequisites: [(01:198:112 or 01:198:112 or 14:332:351) and (14:332:331)]

14:332:435-436 ***Topics in Electrical and Computer Engineering (3,3)***
Topics of current interest and importance in electrical and computer engineering. Typically one topic per semester is studied intensively.

14:332:437 ***Digital Systems Design (3)***
Hardware description, simulation, and synthesis using the Verilog language. Design methodologies for combinational and sequential logic circuits and systems. Characteristics of microprocessor.
Prerequisites: [(14:332:331 or 01:198:211) and (14:332:351)] or [(14:332:331 or 01:198:211) and (01:198:112)]

14:332:443 ***Machine Learning for Engineers***
This course, which is open to all engineering and non-engineering majors, introduces students to the fundamentals of machine learning through a blend of mathematical and statistical descriptions, hands-on programming exercises, and real-world engineering problems. Additional emphasis is placed on discussing various practical aspects of machine learning systems that include ethics and bias.
Prerequisite: Prerequisites for this course include undergraduate-level probability theory and linear algebra courses. For probability: 14:332:226 or 14:540:210, or 01:960:211 or 01:960:401 or 01:640:477 or 01:198:206. For linear algebra: 01:640:250.

14:332:445-446 ***Topics in Electrical and Computer Engineering (3,3)***
Topics of current interest and importance in electrical and computer engineering. Typically one topic per semester is studied intensively.

14:332:447 ***Digital Signal Processing Design (3)***
Applications of DSP algorithms in the areas of speech processing, image processing, radar, pattern recognition, and adaptive filtering using software implementations applied to realistic signals.
Prerequisite: 14:332:346.

14:332:449 ***Introduction to Capstone Design in ECE***
This course focuses on the basics of project design and development of team-oriented projects involving one discipline or another or interweaving of multiple areas in electrical and computer engineering. The course will focus on project development under realistic constraints such as economic, environmental, social, political, ethical, health

and safety, manufacturability, and sustainability. In addition, project management and team building skills will be developed to expand already amassed theoretical knowledge.
Class level: Senior

14:332:448 ***Capstone Design in ECE (3)***
This course focuses on gaining design experience in team-oriented projects involving one discipline or another or interweaving of multiple areas in electrical and computer engineering. In addition to already amassed theoretical knowledge, projects require application of standards and realistic engineering constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
Prerequisite: 14:332:345 and 14:332:449.

14:332:451 ***Introduction to Parallel and Distributed Programming (3)***
Parallel and distributed architectures, fundamentals of parallel/distributed data structures, algorithms, programming paradigms, introduction to parallel/distributed application development using current technologies.
Prerequisites: (14:332:331 and 14:332:351) or (1:198:211 and 14:332:351)

14:332:452 ***Software Engineering (3)***
Software development life cycle, object-oriented software engineering, system specification, software measurement and estimation, and software design patterns.
Prerequisite: 14:332:351 or 01:198:112

14:332:453 ***Mobile App Engineering and User Experience (3)***
Essential principles, techniques, tools, and methods for designing and implementing robust mobile applications and user experiences. Covers the basics of programming on a specific mobile platform, cell phone localization, energy efficiency, prototyping, security, user-centered design, and usability testing.
Prerequisite: 14:332:351.

14:332:456 ***Network-Centric Programming (3)***
Advanced programming with a focus on developing software for networked systems using Linux as a reference platform. Topics include: programming tools, software design, programming techniques, environment of a UNIX process, memory allocation, garbage collection, process control, process relationships, signals, reliable signals, threads, I/O multiplexing, datagram and stream sockets, multicasting, device driver and kernel programming, secure programming.
Prerequisite: 14:332:351 or 01:198:112

14:332:460 ***Power Electronics (3)***
Principles of power electronics including understanding of power semiconductor devices, passive components, basic switching circuits, AC/DC, DC/DC, DC/AC converters and their applications.
Prerequisite: 14:332:361.

14:332:463 ***Analog Electronics (3)***
The objective of this course is to present the concepts of design and analysis of single and multistage BJT/FET amplifiers, biasing circuits, frequency response, negative feedback and stability. By the end of semester, students well develop skills in designing and analyzing multistage operational amplifiers.
Prerequisite: 14:332:361.

14:332:464 ***RF Integrated Circuit Design (3)***
Basic concepts in RF design. Analysis and design of RF circuits used in modern wireless systems.
Prerequisites: 14:332:361 and 463.

14:332:465 ***Physical Electronics (3)***
Semiconductor fundamentals, p-n diodes, bipolar transistors, Schottky diodes, JFETs, MESFETs, and MOSFETs.
Prerequisite: 14:332:361.

14:332:466 ***Optoelectronic Devices (3)***
Overview of design and applications of optoelectronic devices, relationship between human vision and the design of optoelectronic displays, e.g., cathode-ray tubes, light-emitting diodes, liquid crystal displays, and plasma displays; concepts of laser physics with emphasis on semiconductor lasers; and fiber-optic waveguides and their coupling to various sources and detectors.
Prerequisites: 14:332:361 and 382.

14:332:467 ***Microelectronic Processing (3)***
Overview of microelectronic processing technology, lithography, etching, oxidation, diffusion, implantation and annealing, film deposition, epitaxy growth, metallization, process integration, and simulation.
Prerequisite: 14:332:361.

14:332:472 ***Robotics and Computer Vision (3)***
This course provides a comprehensive exploration of computational methods in robot vision, emphasizing both classical and modern techniques. Students will learn to apply linear algebra and 3D reconstruction methods, as well as design and evaluate deep learning models for image classification, object detection, and semantic segmentation. Advanced topics include deep reinforcement learning, preparing students for cutting-edge research and applications in robotic vision systems.
Prerequisites: 14:332:345 and 14:332:346

14:332:474 ***Introduction to Computer Graphics (3)***
Computer display systems, algorithms, and languages for interactive computer graphics. Vector, curve, and surface generation. Hidden line and surface algorithms.
Prerequisite: 14:332:252.

14:332:479 ***VLSI Design (3)***
This course introduces the fabrication and layout techniques necessary to design Very Large Scale Integrated circuit (VLSI) systems. Specific topics include: CMOS digital logic, fabrication process technology, MOSFET theory, layout design rules including all the factors required for an effective circuit design, and case study of IC chips and microprocessors.
Prerequisites: 14:332:252, 14:332:331, 14:332:366

14:332:481 ***Electromagnetic Waves (3)***
Beginning with Maxwell's equations and the constitutive relations, the interaction of electromagnetic waves in various media will be presented. Practical applications in optoelectronics, fiber optics, and communications presented throughout the course.
Prerequisite: 14:332:382.

14:332:482 ***Deep Submicron VLSI Design for ECE (3)***
Advanced topics in deep submicron and nanotechnology VLSI design and fabrication. Logic and state machine design for high performance and low power. Tree adders and Booth multipliers. Memory design. Timing testing for crosstalk faults. Design economics. Emerging nanotechnology devices.
Prerequisite: 14:332:479.

14:332:491,492 ***Special Problems: Independent Study (3,3)***
Individual investigation in some branch of electrical and computer engineering of particular interest to the student. Topic selected for study must be approved and directed by a faculty member.
Prerequisite: Permission of department.

14:332:493,494 ***Topics in Electrical and Computer Engineering (3,3)***
Topics of current interest and importance in electrical and computer engineering. Typically one topic per semester is studied intensively.

14:332:495 ***Internship in Electrical and Computer Engineering (3)***
Intended to provide a practical experience to the student's undergraduate studies by integrating prior coursework into a working electrical and computer engineering professional environment. Credits granted only for a three-month assignment totaling approximately 180 hours.
Prerequisite: Permission of department. Graded pass/no credit.

14:332:496,497 ***Co-Op Internship in Electrical and Computer Engineering (3,3)***
Intended to provide a practical experience to the student's undergraduate studies by integrating prior coursework into a working electrical and computer engineering professional environment. Credits granted only for a continuous, six-month, full-time assignment.
Prerequisite: Permission of department. Graded pass/no credit.

Environmental Engineering 366 Courses (ENG)

ENVIRONMENTAL ENGINEERING 366 COURSES

The courses in Environmental Engineering (366) are currently listed under the subject code 117.

11:117:323 ***Environmental Fate and Transport for Engineers (3)***
Fundamental principles of physical and chemical processes including mass and energy balance approaches, phase partitioning, reaction kinetics, mass transfer, advection and dispersion. Topics include: (1) toxicity and risk assessment; (2) systems and processes characterization; (3) chemical thermodynamics and kinetics; (4) diffusion and mass transfer; (5) continuity equations; (6) transport in surface water and groundwater systems. It emphasizes how to simplify extremely complex systems so that solutions and conceptual design can be obtained.
Prerequisites: 01:640:251; 01:750:227; 11:375:202; or permission by instructor.

11:117:333 ***Environmental Engineering Analysis Tools (3)***
This course applies state-of-the-art environmental engineering tools in analyzing problems and creating solutions and designs. Tools include, as examples, measurement tools and techniques, programming languages and software for graphics, statistical analysis, and modeling. Tools may vary with current engineering practice.
Prerequisites: 14:440:127 or 14:440:102 and 14:180:215 or 14:180:216.

11:117:413 ***Unit Processes in Environmental Engineering I (3)***
Physical and chemical processes and operations commonly applied for water and wastewater treatment, including coagulation, flocculation, sedimentation, filtration, adsorption, ion exchange, membrane separation, precipitation, oxidation, and disinfection; principles of chemical reaction kinetics; modeling of ideal and non-ideal batch and flow-through reactors.
Prerequisites: 01:640:244; 11:117:323 (or 11:375:203).

11:117:414 ***Unit Processes in Environmental Engineering II (3)***
Biological principles and operations for wastewater treatment, bioremediation, and energy production including: microbial ecology; energetics, stoichiometry, and kinetics of microbial growth; kinetics of pollution degradation; modeling of ideal bioreactors; design criteria for specific wastewater treatment processes; and new developments in use of microorganisms in environmental engineering.
Prerequisite: 11:375:201 and 11:117:413 (or permission by instructor).

11:117:423 ***Environmental Engineering Unit Processes Laboratory I (1)***
Demonstration of physicochemical operations used in drinking water and wastewater treatment, including reactor design and residence time distribution, coagulation, flocculation, sedimentation, filtration, carbon adsorption, chemical oxidation, and oxygen transfer.
Prerequisite: 11:117:323 Corequisite: 11:117:413.

11:117:424 ***Unit Processes in Environmental Engineering Laboratory II (1)***
Demonstration and investigation of biological processes used in the treatment of wastewater, including: natural biological processes in biotreatment ponds; biodegradability and biodegradation kinetics; activated sludge reactors; anaerobic digestion for bioenergy production; use of laboratory methods and analytical equipment to assess biological processes; and introduction to activated sludge simulation software.
Prerequisites: 01:117:423 and 01:160:211. Corequisite: 11:117:414.

11:117:450 ***Applied Instrumentation and Control (4)***
This class will develop an understanding of how to conduct experiments involving the collection of field data and the various tools and techniques required to do so.
Prerequisite: 11:375:203.

11:117:462 ***Design of Solid Waste Treatment Systems (3)***
Analysis and design of integrated solid waste management systems, including waste minimization, quantity estimates, waste characteristics, life-cycle thinking in waste management, collection, composting and anaerobic digestion, materials recovery, recycling, waste-to-energy, and landfilling.
Prerequisites: 11:375:201 and 01:640:152 and 14:180:215.

11:117:468 ***Hazardous Waste Treatment Engineering (3)***
Engineering and process design aspects of hazardous waste management. Waste reduction and recovery, waste treatment, and site remediation. Case studies and engineering solutions to model hazardous waste problems.
Prerequisite: 11:117:413 or permission by instructor.

11:117:474 ***Air Pollution Engineering (3)***
Engineering design techniques for air quality control. Control of particulate and gas emissions from stationary sources. Control of mobile source emissions. Design for indoor air quality and regional air quality control.
Prerequisite: 14:180:387 or 14:650:312.

11:117:488 ***Environmental Engineering Capstone Design I (2)***
Design morphology. Case studies and special design problems. Solutions developed using creative design processes that include analysis, synthesis, and iterative decision making. Safety and professional ethics.
Open only to seniors in environmental engineering. Prerequisite: 11:117:423.

11:117:489 ***Environmental Engineering Capstone Design II (2)***
Completion of bioenvironmental engineering senior design project. Evaluation. Presentation of final report.
Prerequisite: 11:117:488. Only open to seniors in Environmental engineering.

11:117:494 ***Contaminant Hydrogeology Engineering (3)***
Principles of groundwater hydrology and pollution. Development of mathematical formulations for describing pollutant movement in groundwater systems. Examination of control measures. Discussion of case studies. Introduction to and application of MODFLOW.
Prerequisite: 11:375:423.

11:117:495 ***Surface Water Quality Modeling (3)***
Formulation and solution of mathematical models as applied to surface water quality systems. Techniques of simulation and validation using case studies.
Prerequisite: 11:375:423.

11:117:497,498 ***Special Problems in Environmental Engineering (BA,BA)***
Studies of special interest in some selected area of environmental engineering.
Prerequisite: Permission of department.

General Engineering 440 (ENG)

GENERAL ENGINEERING 440

14:440:101/102 ID3EA I/II - ***Introduction to Data-Driven Design for Engineering Applications (2, 2)***
Introduces students to the specific fields of engineering offered at Rutgers through hands-on, interdisciplinary design projects and active learning exercises. Students will learn to identify engineering opportunities, create solutions, develop their use of mathematical and computational tools, and promote progress in their teamwork and communication skills. Students will also be introduced to resources available and the success strategies to support their transition to Rutgers and the School of Engineering.

14:440:107 ***Methods of Inquiry for Engineers (1)***
Study skills. A system of thinking strategies and critical and analytical thinking skills applicable across the engineering curriculum.

14:440:127 ***Introduction to Computers for Engineers (3)***
Introduction to MATLAB, a powerful programming package for engineers and scientists. Students will learn the fundamentals of MATLAB, how to write programs in MATLAB, and how to solve engineering problems using MATLAB. Emphasis on problem-solving skills and mathematical tools of importance in engineering.
Prerequisite: Some prior programming experience is preferred.

14:440:221 ***Engineering Mechanics: Statics (3)***
Classification of systems of forces and their resultants; geometrical and analytical conditions for the equilibrium of force systems; frames and trusses; friction; parabolic and catenary cables; centers of gravity.
Prerequisites: 01:640:151 and 01:750:123.

14:440:222 ***Engineering Mechanics: Dynamics (3)***
Kinematics of particles and rigid bodies; rectangular, path, and polar descriptions. Relative motion. Kinetics of particles, particle systems, and rigid bodies; equations of motion, principles of work and energy, linear and angular impulse and momentum. Impact.
Prerequisites: 01:640:152 and (14:440:221 or 14:440:291).

14:440:291 ***Honors Engineering Mechanics: Statics (3)***
Covers the same material as 14:440:221 but in a more thorough and demanding fashion.
Open only to Engineering students in the Honors College.

14:440:292 ***Honors Engineering Mechanics: Dynamics (3)***
Covers the same material as 14:440:222 but in a more thorough and demanding fashion.
Open only to Engineering students in the Honors College.

14:440:294 ***Honors Engineering Design and Development I (1)***
This course is offered in the spring semester of the Engineering Honors Academy second year. The class is made to enhance professional and technical skills by practicing human-centered design and continuing the growth of leadership and presentation abilities while fostering community between the sophomores and juniors in the Honors Academy. The course will culminate in an oral presentation and poster session. The learning objectives are to continue to develop engineering, technical, and public speaking skills from Honors ID3EA I/II (14:440:101/102); to continue to build a sense of community between the different classes that compose the Honors Academy students; to assist in preparing students for industry, research, and senior design; to develop group skills while immersing students in multidisciplinary engineering; and to build creative problem-solving skills in realistic scenarios.
Prerequisite: 14:440:102. Open only to sophomore Engineering students in the Honors College.

14:440:298 ***Professional Skills to Succeed in Engineering (1)***
This course consists of a series of seminars that provide students with exposure to some of the professional skills and competencies associated with the practice of engineering. Topics include professional ethics and conduct, contemporary issues, written and oral communication, evaluation of career options, interviewing skills, and other career-related topics. Material and activities include guest lectures, case studies, and interactive small-group discussions.

14:440:391-392 ***Undergraduate Research in Engineering***
Interdisciplinary undergraduate research under the guidance of a faculty member in the areas of math, science, and engineering.
Permission by the Instructor.

14:440:396 ***Honors Engineering Design and Development II (1)***
This course is offered in the spring semester of the Engineering Honors Academy third year. The class is made to enhance professional and technical skills by practicing human-centered design and continuing the growth of leadership and presentation abilities while fostering community between the sophomores and juniors in the Honors Academy. The course will culminate in an oral presentation and poster session. The learning objectives are to

continue to develop engineering, technical, and public speaking skills from Honors ID3EA I/II (14:440:101/102) and the Honors Design and Development I (14:440:294); to continue to build a sense of community between the different classes that compose the Honors Academy students; to assist in preparing students for industry, research, and senior design; to develop group skills while immersing students in multidisciplinary engineering; and to build creative problem-solving skills in realistic scenarios.
Prerequisites: 14:440:294. Open only to junior Engineering students in the Honors College.

14:440:496-497 ***Co-op Internship in Engineering (3,3)***
Provides students with the opportunity to practice and/or apply knowledge and skills in various industrial settings in the engineering fields. Credits earned for the educational benefits of the experience and granted only for a continuous, six-month, full-time assignment.
Permission by the Instructor. Graded pass/no credit.

Industrial Engineering 540 Courses (ENG-IE)

INDUSTRIAL ENGINEERING 540 COURSES

14:540:201 ***Work Design and Ergonomics (3)***
Man-machine analysis, motion economy, time study, predetermined time systems, work sampling; introduction to robotics, facilities layout, material handling; introduction to ergonomics and anthropometric, biomechanical, and human-machine interface models.
Prerequisite: 01:640:151 or 21:640:135 or 50:640:121 or 01:640:191. Corequisite: 14:540:202.

14:540:202 ***Work Design and Ergonomics Laboratory (1)***
Experiments in robotics, time study, work measurement, workplace design and the human-machine interface, facilities layout.
Prerequisite: 01:640:151 or 21:640:135 or 50:640:121 or 01:640:191. Corequisite: 14:540:201.

14:540:210 ***Engineering Probability (3)***
Probability problems in engineering, conditional probability, discrete and continuous distributions, functions of random variables, interval estimates.
Prerequisite: 01:640:144 or 151 or 152 or 154 or 191 or 192 or 21:640:135 or 136 or 50:640:121 or 122. Open to School 14 (School of Engineering) ONLY.

14:540:213 ***Industrial Engineering Laboratory (2)***
Introduction to programming, fundamental data types, flow control, and functions; arrays, pointers, and do loops; algorithms and flow charts; GUI concepts.
Prerequisite: 01:640:151 or 21:640:135 or 50:640:121 or 01:640:191.

14:540:220 ***Applied Algorithms in Industrial Engineering (3)***
Applied linear models, linear algebra, algorithms, pseudo coding and programming for industrial engineering applications.
Prerequisite: 14:440:102.

14:540:293/294 *Undergraduate Research for Sophomores* *(BA)*
Individual research project under the guidance of a faculty adviser in a specific area of industrial engineering. No more than 3 credits are awarded per semester.
Prerequisite: Permission of the department.

14:540:303 *Manufacturing Processes (3)*
Properties of engineering materials; metals, polymers, ceramics and composites, bulk and sheet forming, traditional and nontraditional material removal processes, polymer processing, laser and energy-beam processes, additive layered manufacturing processes, and micro- and nanofabrication processes. Basic and computerized machine tools. Process chains, planning and process optimization. Engineering metrology and product quality.
Prerequisites: 14:440:221, 14:635:407. Corequisite: 14:540:304.

14:540:304 *Manufacturing Processes Laboratory (1)*
Experiments on machine tools: lathes, drilling machines, milling machines, and CNC milling machines; robot workplace design and computer control of machine tools.
Corequisite: 14:540:303.

14:540:305, 306 *Honors Candidacy Problems (0,0)*
Extensive reading and study in a particular problem area of industrial engineering under the guidance of a faculty member.
Prerequisite: Permission of department chair. Prerequisite for industrial engineering students who wish to be James J. Slade Scholars.

14:540:311 *Deterministic Models in Operations Research (3)*
Elements of modeling and problem solving. Use of a software package like LINDO or EXCEL to solve real-life industrial engineering problems. Linear programming, duality, sensitivity analysis, integer programming, transportation, and assignment problems.
Prerequisite: 01:640:244 or 21:640:314 or 50:640:314.

14:540:320 *Statistics for Engineers (3)*
Statistical estimation; confidence interval; testing hypothesis; engineering applications throughout the course.
Prerequisite: 14:540:210

14:540:330 Industrial Informatics *(3)*
Organizing, modeling and analysis of raw date to extract pertinent information and actional insights for industrial engineering systems.
Prerequisites: 14:540:320

14:540:338 *Probability Models in Operations Research (3)*
Modeling and decision making under uncertainty, Markov chains, poisson processes, inventory models, and queuing systems.
Prerequisites: 14:540:210

14:540:343 ***Engineering Economics (3)***
Economic decisions involving engineering alternatives; annual cost, present worth, rate of return, and benefit-to-cost; before- and after-tax replacement economy; organizational financing; break-even charts; unit and minimum-cost public sector studies.
Prerequisite: Any Course EQUAL or GREATER Than: (01:640:026 INTERMEDIATE ALGEBRA)

14:540:382 ***Automation and Systems Design(3)***
Programmable automation applied to manufacturing. Computer architecture, sensors and automatic data acquisition, computer control of actuators, continuous and discrete control of processes, computer integration, and local area networks.
Prerequisite: 01:750:227 Corequisite: 14:540:383.

14:540:383 ***Automation and Systems Design Laboratory (1)***
Use of microcomputers and industrial controllers in controlling machines and processes. Assembly language programming, ladder logic programming, and interfacing controllers to sensors and actuators. Experiments in manufacturing applications.
Corequisite: 14:540:382.

14:540:384 ***Simulation Models in Industrial Engineering (3)***
Modeling and analysis of industrial and service systems using ARENA, simulation modeling perspectives, discrete event and continuous simulation, simulation languages, and statistical aspects of simulation.
Prerequisites: 14:540:338.

14:540:393/394 ***(3) Undergraduate Research for Juniors (BA)***
Individual research project under the guidance of a faculty advisor in a specific area of industrial engineering. No more than 3 credits are awarded per semester.
Prerequisites: Permission of the department.

14:540:399 ***Design of Engineering Systems I (3)***
Design principles, material selection, design for assembly, design for manufacturing, and effect of environmental issues on product design.
Prerequisites: 14:540:338, 382. Open to industrial and systems engineering students only. Corequisite: 14:540:303, 384

14:540:400 ***Design of Engineering Systems II (3)***
A team approach to the redesign of a real-life product. Alternative engineering plans for improved designs will be developed and implemented. Both written and oral reports will be completed.
Prerequisites: 14:540:384, 399. Open to industrial and systems engineering students only.

14:540:433 ***Quality Engineering (3)***
Statistical methods for monitoring and improving product quality and decreasing variation. Factorial experiments, variables and attribute control charts, acceptance sampling, on- and off-line process controls.
Prerequisite: 14:540:320. Corequisite: 14:540:434.

14:540:434 ***Quality Engineering Laboratory (1)***
Practical application of quality engineering methodologies, statistical software, gage studies, online process control, design of experiments to improve product design, industrial manufacturing processes, and system design.
Corequisite: 14:540:433.

14:540:453 ***Production Planning and Control (3)***
Coordination of activities of both manufacturing and service systems. Systems design; input and output; planning and scheduling. Decision-making problems employing mathematical techniques of linear programming. Sequencing jobs on machines and line-balancing techniques.
Prerequisites: 14:540:311, 338.

14:540:461 ***Engineering Law (3)***
Legal and ethical aspects of engineering; bids, awards, and negotiated contracts. Liabilities to the public and to employees, contract labor law. Contracts, patents, copyrights, trademarks, and engineering specifications.
Prerequisite: Permission of department. Open only to seniors and graduate students in engineering.

14:540:462 ***Facilities Layout and Materials Handling (3)***
Fundamentals of the design, layout, and location of industrial and nonmanufacturing facilities. Selection of machines and material handling equipment and their efficient arrangement. Emphasis on quantitative methods. Warehouse layout. Facility location theory.
Prerequisites: 14:540:201, 303.

14:540:485 ***Industrial Information Systems (3)***
The course focuses on acquiring hands-on experience in the organization, modeling, and analysis of raw data to extract pertinent information and actionable insights for industrial and engineering systems. Covered topics include database management using structured query language programming software, as well as the design and implementation of data science solutions and forecasting methods through project-based learning and case studies from manufacturing, materials engineering, and energy systems.
Prerequisite: 14:540:320

14:540:487 ***Energy Systems Modeling and Optimization (3)***
Addresses the design, analysis, modeling, and optimization of selected energy systems (including conventional fossil fuels and renewable wind and solar). This course will provide the basis for applying mathematical modeling and optimization techniques in energy systems. A set of projects and case studies focused on modeling and optimization of a variety of energy systems will be assigned to students and discussed in detail. The course will have hands-on experience with data collection, experimentation, simulation, and optimization tools as they apply to energy systems.
Prerequisites: 14:540:311

14:540:488 ***Artificial Intelligence in Decision Making (3)***
This course provides students with quantitative and hands-on training in AI and ML techniques in various decision-making problems that arise in industrial systems applications.
Prerequisites: 14:540:330

14:540:490 ***Introduction to Reliability Engineering (3)***
Fundamentals of reliability engineering, system reliability modeling and estimation and reliability testing. System availability and maintainability and design for resilience. Laboratory and hands-on experience in reliability testing, data acquisition, monitoring and modeling.
Prerequisites: 14:540:210

14:540:491,492 ***Special Problems (3,3)***
Studies in phases of industrial and systems engineering of special interest.

14:540:493/494 ***(3) Undergraduate Research for Seniors (BA)***
Individual research project under the guidance of a faculty advisor in a specific area of industrial engineering. No more than 3 credits are awarded per semester.
Prerequisites: Permission of the department.

14:540:496,497 ***Co-op Internship in Industrial and Systems Engineering (3,3)***
Intended to provide a capstone experience to the student's undergraduate studies by integrating prior coursework into a working industrial engineering professional environment. Credits earned for the educational benefits of the experience and granted only for a continuous, six-month, full-time assignment.
Prerequisite: Permission of department. Graded pass/no credit.

Materials Science and Engineering 635 Courses (ENG)

MATERIALS SCIENCE AND ENGINEERING 635 COURSES

14:635:203 ***Introduction to Materials Science and Engineering (3)***
General field of materials, including its development and present scope, the classification of the industry by major divisions, and discussion of the technology of these industries. The broad principles of materials based on an approach from crystal physics and unit processes.
Prerequisite: 01:160:160 or 162.

14:635:204 ***Materials Processing (3)***
Investigation of the methods and techniques of producing materials from all categories, ranging from polymers and metals to semiconductors and advanced ceramics. The course will provide an introduction to synthesis, properties, and processing of technologically important materials.
Prerequisite: 14:635:203.

14:635:205 ***Crystal Chemistry and Structure of Materials (3)***
Introduction of concepts of crystal chemistry applied to ceramics, oxides, and nonoxides. Theories of bonding, the unit cell, crystallography, and symmetry as a basis for structure-property relationships.
Prerequisite: 01:160:160 or 162.

14:635:206 ***Thermodynamics of Materials (4)***
The laws of thermodynamics, chemical potentials and activities, condensed phase equilibria, phase diagrams and microstructure, the reactions between solids and gases, and gas-gas reactions.
Prerequisites: 01:160:160 or 162; 01:640:244.

14:635:212 ***Physics of Materials (3)***
This course extends the coverage of structure-processing-property relationships and emphasizes properties. It includes an introduction to thermal processes, thermal properties, and optical properties.
Prerequisites: 01:640:244, 14:635:203.

14:635:252 ***Laboratory I (2)***
Develops skills for planning, execution, and reporting of formal experimental results relating to processing of materials. Fabrication methods, powder processing, and melt forming.
Lec. 55 min., lab. 3 hrs.

14:635:305 ***Materials Microprocessing (3)***
Emphasizes batch preparation and organic additives. Provides understanding of processing steps that precede forming. Fundamentals of powder processing, organic chemistry, rheology, and colloid science, with examples in various casting technologies.
Prerequisite: 14:635:204.

14:635:307 ***Kinetics of Materials Processes (3)***
Phenomenological approach to the solid-state reactions involved in materials processing, including phase transformations, phase separation, mechanisms, and transport phenomena.
Prerequisites: 14:635:205, 206; 01:640:244.

14:635:309 ***Characterization of Materials (3)***
Interactions of electromagnetic radiation, electrons, and ions with matter and their application in X-ray diffraction and X-ray, IR, UV, electron, and ion spectroscopies in the analysis of materials. Nonspectroscopic analytical techniques also are covered.
Prerequisite: 14:635:205.

14:635:312 ***Glass Engineering (3)***
Basic physical and chemical properties of glass, chemical durability, stress release, annealing and tempering, mechanical strength, raw materials and melting, and methods of manufacture. Design of composition for desired engineered properties.
Prerequisites: 14:635:204, 303.

14:635:314 ***Strength of Materials (3)***
The mechanical behavior of materials is discussed with emphasis on brittle behavior at room temperature and the transition to a limited plasticity regime at high temperatures. The interplay of basic deformation mechanisms with microstructural features and the implication for design and processing of materials are considered.
Prerequisite: 01:640:244.

14:635:316 ***Electronic, Optical, and Magnetic Properties of Materials (3)***
Theoretical and practical consideration of dielectric loss, ferroelectricity, ferromagnetism, and semiconductivity in materials systems (glass, crystal, glass-crystal composites). Variation of properties with composition, structure, temperature, and frequency.
Prerequisites: 14:635:205 and 354.

14:635:320 ***Introduction to Nanomaterials (3)***
Nanotechnology involves behavior and control of materials and processes at the atomic and molecular levels. This interdisciplinary course introduces the student to the theoretical basis, synthetic processes, and experimental techniques for nanomaterials. This course is the introduction to three advanced courses in (1) Structural, Mechanical, and Chemical Applications of Nanostructures and Nanomaterials (321); (2) Photonic, Electronic, and Magnetic Applications of Nanostructures and Nanomaterials (322); and (3) Biological Applications for Nanomaterials (410).
Prerequisite: Open to all science and engineering students who have completed 60 credits.

14:635:321 ***Structural, Mechanical, and Chemical Applications of Nanostructures and Nanomaterials (3)***
Fundamentals of grain boundaries and surfaces; application of nanomaterials to batteries, fuel cells, and catalysts; mechanical applications such as hardness, yield strength, superplasticity, tribology, and wear; and microelectric-electromechanical systems (MEMS).

14:635:322 ***Photonic, Electronic, and Magnetic Applications of Nanostructures and Nanomaterials (3)***
Electronic applications of nanomaterials such as quantum dots, nanowires, field effect transistors, and nanoelectromechanical systems. Magnetic applications include information storage, giant and colossal magnetoresistance, and superparamagnetism. Photonic applications include nanolasers, photonic band gap devices, and dense wavelength multiplexers.

14:635:353 ***Laboratory II (2)***
Develops skills for planning, execution, and reporting of formal experimental results relating to the characterization of materials, particle size measurement, phase identification, and dilatometry.
Lec. 55 min., lab. 3 hrs.

14:635:354 ***Laboratory III (2)***
Focuses on helping the student develop skills for the planning, execution, and reporting of formal experimental results relating to the measurement of materials properties. Properties investigated are optical, electrical, and mechanical in nature. The measurement method as well as the structure-property relationship found in materials will be stressed. Principles of electrical engineering relevant to the property measurements will also be emphasized.
Lec. 55 min., lab. 3 hrs.

14:635:360 ***Materials Science and Engineering of Ceramics (3)***
Focuses on the principal materials fields that are satisfied by ceramic materials. These topics include traditional areas as well as a wide range of advanced materials topics, such as electronic, magnetic, optic, biomedical, catalyst, and structural materials are covered. An emphasis will be placed on understanding the interrelationship among chemistry, structure, properties, and performance.

14:635:361 ***Materials Science and Engineering of Polymers (3)***
Focuses on the principal materials fields that are satisfied by organic polymers. Topics covered include polymerization, structure, characterization methods, stress/strain behavior, processing methods, and structure-property relationships with an emphasis on mechanical, optical, and transport properties.

14:635:362 ***Physical Metallurgy (3)***
Focuses on the principal materials fields that are satisfied by metals and alloys. These topics include crystallography, phase equilibria, alloy crystal chemistry, and traditional and advanced metal and alloy processing. The relationship among structure, properties, and performance will be discussed in detail. These relationships will be used to understand the criteria for process selection, which includes risk assessment, product liability, failure analysis and prevention, and environmental impact.
Prerequisite: 14:635:203.

14:635:401-402 ***Senior Materials Science and Engineering Laboratory I,II (3,3)***
Training in methods of independent research. Students, after consultation, are assigned a problem connected with some phase of materials science and engineering in their elected field of specialization.
Conf. 1 hr., lab. 6 hrs. Prerequisites: 14:635:307, 309.

14:635:403,404 ***Materials Science and Engineering Seminar (1,1)***
Current trends and topics of special interest in materials discussed by faculty, students, and representatives from the materials industry.

14:635:405 ***Solar Cell Design and Processing (3)***
This course will cover principles of photovoltaic solar cell operation and build from that foundation to discuss how these principles guide solar cell design. Lecture format with significant design content to emphasize current/voltage trade-offs encountered in solar cell optimization and the role that processing choices can play in improving system efficiency.
Prerequisites: 01:750:227, 229. This course is offered in alternate years.

14:635:407 ***Mechanical Properties of Materials (3)***
Fundamentals of materials science and engineering. Investigation of properties including elasticity, plasticity, strength, hardness, ductility, fracture, time-dependent deformation, and the impact of environmental effects.
Prerequisites: 14:440:221 and 01:160:160 or 162. For other engineering majors.

14:635:410 ***Biological Applications for Nanomaterials (3)***
Begins with the fundamentals of nanoscience in biology and medicine, and progresses to the current state of research in nanomaterials and nanotechnology as applied to biological applications. Key topics include nanoparticles and phagocytosis, nanoscale drug delivery systems, nanopatterning, scanning probe microscopy, and nanomachines in medicine. Due to the rapidly evolving nature of nanomaterials research, the course contents may change considerably from year to year to reflect the latest advances.

14:635:411,412 ***Materials Science and Engineering Design I,II (3,3)***
Fundamentals of equipment and plant design, construction, installation, maintenance, and cost for manufacture of materials products. Assignment of a problem in elected field of specialization.
Prerequisites: 14:635:204 and 305.

14:635:413 ***Materials Science and Engineering Venture Analysis (3)***
Product innovation and development techniques for materials technology commercialization based on traditional venture-analysis techniques. Aspects of marketing, engineering design, framework structuring, and decision and risk analysis.
Prerequisite: 01:220:200.

14:635:416 ***Physical and Chemical Properties of Glass (3)***
Provides an atomistic understanding of the role of composition on the structure and properties of glasses.
Two 80-min. lectures. Prerequisites: 14:635:312 and 01:160:160 or 162. Offered even years only.

14:635:433 ***Optical Materials (3)***
Fundamentals of optical materials (crystals, glasses, polymers). Relation of structure with optical properties and applications. Spectral characteristics of thin films as well as bulk materials.

14:635:440 ***Electrochemical Materials and Devices (3)***
Introduction to basic electrochemistry, principles of electrochemical devices, electroactive materials used in such devices, and case studies of batteries, fuel cells, and sensors. Emphasis on electrochemical principles and materials science for application in modern electrochemical devices.

14:635:491,492 ***Special Problems in Materials Science and Engineering (BA,BA)***
Individual or group study or study projects, under the guidance of a faculty member, on special areas of interest in materials science and engineering.

14:635:496,497 ***Co-op Internship in Materials Science and Engineering (3,3)***
Provides the student with the opportunity to practice and apply knowledge and skills in various materials science and engineering professional environments. Intended to provide a capstone experience to the student's undergraduate studies by integrating prior coursework into a working engineering environment. Credits earned for the educational benefits of the experience and granted only for a continuous, six-month, full-time assignment.
Prerequisite: Permission of department. Graded pass/no credit.

Mechanical and Aerospace Engineering 650 (ENG)

MECHANICAL AND AEROSPACE ENGINEERING 650

14:650:210 ***Introduction to Aerospace Engineering (3)***
Basic concepts in aerospace engineering; pressure, density, temperature, atmosphere, NACA and NASA, equation of state, airfoils, streamlines, standard atmosphere, interpolation and use of data; basic aerodynamics, continuity equation, Bernoulli's equation, streamlines, lift and drag, Reynolds number, flow separation, boundary layer, drag coefficient; airfoil nomenclature, quarter chord point NACA charts, finite wingspan, aspect ratio, drag polar, summary of drag effects; aircraft performance, required thrust and power, rate of climb, gliding, take-off and landing performance, turning; aircraft equations and stability, effects of wings and tail; astronautics, Newton's law of gravitation, polar coordinates, orbital motion, momentum and energy, types of orbits, escape velocity, Kepler's laws, earth satellites, launch window, reentry dynamics; ballooning.
Prerequisites: 01:640:152 and 14:440:221 (or 14:440:291).

14:650:289 ***Professional and Leadership Development in Mechanical Engineering (1)***
This course is intended to cover a variety of topics that are important and relevant to students graduating from the Department of Mechanical and Aerospace Engineering (MAE) and preparing to enter the workforce. Topics are intended to provide a glimpse of various facets of the professional work environment, regardless of the role or field of choice. Each topic is intended to broaden students' knowledge of professional protocols in industry and give them real-life examples, case studies, and tips that will facilitate success. Focus on "soft skills" for engineers, such as effective communication, presentation, and teamwork, as well as career path, interviewing, and networking topics are discussed.

14:650:291 ***Mechanics of Materials (3)***
The course introduces principles from the mechanics and materials disciplines to train students in analyzing and solving stress and strain problems in elastic solids such as shafts and beams, combined stresses, and statically indeterminate beams. Lectures are intended to provide the students with fundamental concepts in mechanics and materials, cultivate mathematical formulation of engineering problems, and practice problem solving.
Prerequisites: 01:640:152 and 14:440:221 (or 14:440:291).

14:650:298,299 *Undergraduate Research for Sophomores (BA, BA)*
This course seeks to expand student participation in research projects with MAE faculty. It features high-quality interaction between students and faculty, as well as access to appropriate facilities and other professional development opportunities.
Prerequisite: Permission of the department.

14:650:312 *Fluid Mechanics (3)*
Control volume concepts of mass, momentum, and energy transport. Hydrostatics, Euler's equations, potential flow, Navier-Stokes equations, turbulence, and boundary layer theory.
Prerequisites: 01:640:244 and 14:440:222 (or 14:440:292).

14:650:342 *Design of Mechanical Components (3)*
Design philosophy; stress and deflection analysis; energy methods; theories of failure; fatigue; bearings; design of such mechanical elements as springs, weldments, and gears.
Prerequisites: 01:640:251, 14:650:291, 14:650:388, and 14:440:222.

14:650:350 *MAE Measurements with Lab (4)*
Theory of instrumentation, selection, calibration, use of instruments. Error analysis. Sensors, signal conditioners, data acquisition, and processing systems. Design project.
Prerequisites: 01:640:251, 14:650:291, and 14:650:361.

14:650:351 *Thermodynamics (3)*
Fundamental concepts, First Law, reversibility, Second Law, entropy, properties of fluids and perfect gases, processes, cycles, general equations, and mixtures.
Prerequisites: 01:640:244, 01:750:227, and 14:440:222.

14:650:361 *Introduction to Mechatronics (4)*
Emphasizes integration of analog electronics, digital electronics, sensors and transducers, actuators, and microprocessors for mechanical and aerospace systems. Lectures provide students with foundation concepts in mechatronics and practical familiarity with common elements that make up mechatronic systems. Mathematical modeling of electromechanical systems and basic PID controller design are discussed. Laboratory experiments give the students hands-on experience with components and measurement equipment used in the design of mechatronic systems.
Prerequisites: 01:640:152 and 14:440:221.

14:650:388 *Computer-Aided Design in MAE (3)*
Computer-aided design (CAD) applications of analysis, synthesis, and design. Automated drafting and higher-order programming languages. Development of general-purpose functions, components, and command files. Hands-on experience on CAD stations.
Prerequisites: 01:640:152 and 14:440:221.

14:650:398,399 *Undergraduate Research for Juniors (BA, BA)*
This course seeks to expand student participation in research projects with MAE faculty. It features high-quality interaction between students and faculty, as well as access to appropriate facilities and other professional development opportunities.
Prerequisite: Permission of the department.

14:650:401 ***Dynamic Systems and Controls (3)***
Dynamic analysis of mechanical, electromechanical, thermal, hydraulic, and pneumatic feedback control systems. Fundamentals of vibrational systems, including the single- and multi-degree-of-freedom vibrations of mechanical systems.
Prerequisites: 14:440:222, 01:640:244, and 14:650:361.

14:650:431 ***Mechanical and Aerospace Engineering Laboratory I (2)***
Comprehensive experiments in fluid dynamics, acoustics, heat transfer, power systems, and dynamic mechanical and aerospace systems. Preparation of test procedure, data analysis, and presentation of results and conclusions.
Lab. 3 hrs. Prerequisites: 14:650:291, 312, 350, and 351.

14:650:432 ***Mechanical Engineering Lab II (2)***
Comprehensive experiments in fluid dynamics, acoustics, heat transfer, power systems, and dynamic mechanical systems. Preparation of test procedure, data analysis, and presentation of results and conclusions.
Lab. 3 hrs. Prerequisites: 14:650:291, 312, 350, and 351.

14:650:433 ***Aerospace Engineering Laboratory (2)***
Comprehensive experiments in fluid dynamics, heat transfer, acoustics, power systems, and dynamic aerospace systems. Preparation of test procedure, data analysis, and presentation of reports and conclusion.
Lab. 3 hrs. Prerequisites: 14:650:291, 312, 350, and 351.

14:650:435 ***Energy Systems Lab (2)***
In this lab, the students will have hands-on experience and knowledge to start up and troubleshoot solar and wind energy systems. The students will learn the basics of alternate energy systems in theory and practice, and will be able to evaluate the system's characteristics and performance. Designing, analyzing, and evaluating components will also be included in the lab.
Lab. 3 hrs. Prerequisites: 14:650:291, 312, 350, and 351.

14:650:439 ***Multiphysics Simulations (3)***
Survey of the major techniques engineers use for simulating physical systems, specifically particle/molecular dynamics, finite difference time domain, and finite element method, focusing on Multiphysics simulations that include multiple driving forces and phases. Case studies of active areas of research are introduced by guest lecturers to cover topics, including electrospray deposition, smart actuators, and phononics. Students will produce a final project that will be relevant to their research or design projects.
Prerequisites: 14:650:312, 342, and 351.

14:650:443 ***Vibrations (3)***
Mechanical vibration, vibration isolation, and critical speeds. Balancing of rotating and reciprocating machinery.
Prerequisites: 14:440:222, 14:650:291, and 01:640:421.

14:650:447 ***Probabilistic Models in Mechanical and Aerospace Systems (3)***
Probabilistic concepts and modeling in mechanical design and analysis. Reliability of mechanical systems. Introduction to turbulence modeling. Introduction to computational aspects. Design project.
Prerequisite: 01:640:421.

14:650:449 ***Aerospace Materials (3)***
Particle and fiber-reinforced composites, stress-strain relations of anisotropic materials, tensor transformation, derivation of effective moduli of composites from those of the constituents, cross-ply/angle-ply laminates, symmetric/antisymmetric laminates, and engineering applications. Lightweight materials and foams description, constitutive behavior, and applications.
Prerequisites: 14:650:291 and 01:640:244.

14:650:451 ***Vehicle Dynamics (3)***
Performance, handling, and ride of ground vehicles. Tires, slip and traction, braking, aerodynamic effects, and steering.
Prerequisite: 14:440:222.

14:650:455 ***Design of Mechanisms (3)***
Motion analysis. Centrodes, analytical representation of plane motion, Euler-Savary equation, Bobillier's theorem. Linkages and cams. Two- and three-position syntheses, Freudenstein's method, and optimal methods. Design project.
Prerequisite: 14:650:342.

14:650:457 ***Spacecraft and Mission Design (3)***
Provides an introduction and overview of spacecraft and mission design. Topics covered are mission design, spacecraft environment, astrodynamics, propulsion, atmospheric entry, attitude determination and control, configuration and structural design, thermal control, power systems, telecommunications, and reliability analysis.
Prerequisite: 14:650:342.

14:650:458 ***Aerospace Structures (3)***
Load factors, stresses, and deformations in thin-walled members, shear center, torsion of single-cell and multicell structures, and analysis of aircraft and spacecraft components.
Prerequisites: 14:650:291 and 01:640:251.

14:650:459 ***Aerospace Propulsion (3)***
Theory of air-breathing and rocket engines. Propulsion performance parameters and mission requirements. Operation of diffusers, combustors, rockets, and jet engines. Design project.
Prerequisites: 14:650:312 and 351.

14:650:460 ***Aerodynamics (3)***
Circulation and lift, Kutta-Joukowski theorem, thin airfoil theory, finite wing theory, induced drag, static and dynamic longitudinal and lateral stability and control, and aircraft performance.
Prerequisites: 14:650:312 and 351.

14:650:461 ***Internal Combustion Engines (3)***
Thorough analysis of reciprocating engines and gas turbines. Fuel characteristics. Pollutant formation and control. Combustion and lubrication.
Prerequisite: 14:650:351.

14:650:462 ***Power Plants (3)***
Current theory and practice of cycles and design of equipment for the generation of power in central stations and industrial power plants. Design projects.
Prerequisite: 14:650:351.

14:650:463 ***Compressible Fluid Dynamics (3)***
Integral form of conservation laws. One-dimensional compressible flow with friction and heat. Normal and oblique shock waves. Prandtl-Meyer expansion. Differential form of conservation laws. Unsteady wave motion. 2-D subsonic, supersonic, and hypersonic flow.
Prerequisites: 14:650:312 and 351.

14:650:465 ***Orbital Mechanics (3)***
Rocket principle and performance; staging; trajectories in central force field; orbit transfer; reentry dynamics and heating.
Prerequisites: 14:650:312 and 351.

14:650:467 ***Design and Manufacturing I (2)***
First semester of the senior design project to be completed in the fall semester of the final year. Group project under the direction of a faculty adviser.
Prerequisites: 14:650:312, 342, 350, and 351.

14:650:468 ***Design and Manufacturing II (2)***
Second semester of the senior design project to be completed in the spring of the final year. Group project under the direction of a faculty adviser.
Prerequisite: 14:650:467.

14:650:471 ***Aircraft Flight Dynamics (3)***
The goal of this course is to develop an understanding of the fundamentals of the dynamics and control of aircraft with an emphasis on conventional airplane performance and stability, both static and dynamic.
Prerequisites: 01:640:421 and 14:440:222.

14:650:474 ***Alternative Energy Systems I (3)***
Critical analysis of use of wasted energy; design parameters that influence the performance of wind, geothermal, solar, fuel cell, and biomass alternative energy systems; and the challenges associated with incorporation of these systems into the United States' current infrastructure.
Prerequisite: 14:650:351.

14:650:477 ***Alternative Energy Systems II (3)***
The fundamentals of energy and power, and available alternatives to power derived from consumption of fossil fuels will be covered. Course content is divided into several components: 1) fundamentals of energy and power, available resources, and historical perspectives (national and international); 2) solar energy fundamentals; 3) active solar thermal applications; 4) passive solar energy; 5) photovoltaic systems; 6) biomass; and 7) ocean energy. Depth of course content may vary depending on student feedback and instructor discretion.
Prerequisite: 14:650:351.

14:650:481 ***Heat Transfer (3)***
Theory of heat transfer by steady and transient conduction. Heat transfer by radiation. Convection of heat by fluid motion in external and internal flow. Combined heat transfer calculations.
Prerequisites: 14:650:312, 14:650:351, and 01:640:421.

14:650:485 ***Computing Environment (3)***
Course topics include introduction to Linux operating system management and practical exercises with applications. Topic examples: system installation and configuration, shell scripting, networking, file sharing via NFS and SAMBA, centralized authentication with LDAP, virtualization, security, computational Linux clusters.
Prerequisites: 14:440:127 and 14:650:342.

14:650:487 ***Aerospace Engineering Design I (2)***
First semester of senior design project to be completed in fall of the final year. Group project under the direction of a faculty adviser.
Prerequisites: 14:650:210, 312, 342, 350, and 351.

14:650:488 ***Aerospace Engineering Design II (2)***
Second semester senior design project to be completed in spring of the final year. Group project under the direction of a faculty adviser.
Prerequisite: 14:650:487.

14:650:495 ***Internship in Mechanical and Aerospace Engineering (3)***
Provides students with the opportunity to practice and/or apply knowledge and skills in various industrial settings in mechanical, aerospace, or related engineering fields. Credits earned for the educational benefits of the experience and granted only for a continuous, three-month, full-time assignment.
Prerequisites: Permission of the department; open to mechanical and aerospace engineering students only. Graded pass/no credit.

14:650:496 ***Co-op Internship in Mechanical and Aerospace Engineering (3)***
Provides students with the opportunity to practice and/or apply knowledge and skills in various industrial settings in mechanical, aerospace, or related engineering fields. Credits earned for the educational benefits of the experience and granted only for a continuous, six-month, full-time assignment.
Prerequisite: Permission of the department. Graded pass/no credit.

14:650:497 ***Co-op Internship in Mechanical and Aerospace Engineering (3)***
Provides students with the opportunity to practice and/or apply knowledge and skills in various industrial settings in mechanical, aerospace, or related engineering fields. Credits earned for the educational benefits of the experience and granted only for a continuous, six-month, full-time assignment.
Prerequisite: Permission of the department. Graded pass/no credit.

14:650:498,499 ***Undergraduate Research for Seniors (BA, BA)***
This course seeks to expand student participation in research projects with MAE faculty. It features high-quality interaction between students and faculty, as well as access to appropriate facilities and other professional development opportunities.
Prerequisite: Permission of the department.

Academic Policies and Procedures (ENG)

ACADEMIC POLICIES AND PROCEDURES

Note: See the **University Policies and Procedures** section in the Rutgers Main catalog for university-wide academic policies and procedures.

Academic Advising

Major Declaration and Change of Major

Scholastic Standing

Withdrawal, Readmission, and Reenrollment

General Information (EJB-U)

GENERAL INFORMATION

History and Purpose of the School

Admission

HISTORY AND PURPOSE OF THE SCHOOL

The mission of the Bloustein School is to create just, socially inclusive, environmentally sustainable, and healthy local, national, and global communities.

At the Bloustein School, the disciplines and professions of urban planning, public policy, public health, health administration, and public informatics are strongly situated in an educational context that stresses social science education and public service.

The school's research and scholarship touch on a wide array of issues that affect public welfare, including designing healthy communities, better understanding the social determinants of health, researching ways to effectively and economically combat and adapt to climate change, and much more.

Our students are being trained to think about what can be done to make society better.

Edward J. Bloustein--Rutgers president, constitutional scholar, active citizen, philosopher, and teacher--lived a life of civic engagement that the school's ethic seeks to perpetuate. The Bloustein ethic strives to improve the quality of public discourse by producing ideas and measures that have impact, engaging those who do their jobs not just honorably, but with a passion for their work that alters their surroundings. The Bloustein School seeks to foster new research and thinking that achieves both scholarly recognition and public acceptance.

For more information about the school, visit here.

General Information (EJB-U)

ADMISSION

The Bloustein School welcomes current Rutgers-New Brunswick students as well as prospective students to consider our major and minor programs of study. We offer five undergraduate majors and ten minors.

Students seeking the city and regional planning, health administration, public health, public policy, and urban planning and design majors must apply for admission to the Bloustein School.

Students declare their minor with their matriculating school. They need not apply for minor status with the Bloustein School.

Students already enrolled in the School of Arts and Sciences (SAS) or the School of Environmental and Biological Sciences (SEBS) at Rutgers University-New Brunswick should obtain information about Bloustein School admission and an application from the school's website, here.

Transfer students admitted to Rutgers by the Bloustein School of Planning and Public Policy should attend a **Students in Transition Advising and Registration (STAR)** session before the start of classes in order to learn more about their academic program and schedule their courses for their first semester at Rutgers. **Please visit here to learn more.**

Students who:

- successfully meet all of the eligibility requirements (see the Programs of Study section),
- who have completed their area distribution requirements for English and mathematics,
- who hold at least a 2.5 cumulative grade-point average, and
- who have achieved grades of C or better in each of the prerequisite courses for the respective majors

are encouraged to apply for direct admission to the Bloustein School. Acceptance of applications and decisions about admission are made on a cyclical basis.

Students applying to a Bloustein School major who are interested in applied research and who hold a cumulative grade-point average of 3.4 or better are encouraged to apply to the Bloustein Honors Research Program.

Questions about any of the programs, majors, minors, or certificates offered can be directed to the Bloustein School's Office of Student and Academic Services by emailing undergrad@ejb.rutgers.edu. Undergraduate advisers answer all emails.

**Note: Given that there are several different options available in admissions, please see the program's homepage to determine which path is yours.*

History and Purpose of the School (EJB-U)

HISTORY AND PURPOSE OF THE SCHOOL

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The school's research and scholarship touch on a wide array of issues that affect public welfare including designing healthy communities, better understanding the social determinants of health, researching ways to effectively and economically combat and adapt to climate change, and much more.

Our students are being trained to think about what can be done to make society better.

Edward J. Bloustein--Rutgers president, constitutional scholar, active citizen, philosopher, and teacher--lived a life of civic engagement that the school's ethic seeks to perpetuate. The Bloustein ethic strives to improve the quality of public discourse by producing ideas and measures that have impact, engaging those who do their jobs not just honorably, but with a passion for their work that alters their surroundings. The Bloustein School seeks to foster new research and thinking that achieve both scholarly recognition and public acceptance.

For more information about the school, visit here.

Admission (EJB-U)

ADMISSION

The Bloustein School welcomes current Rutgers-New Brunswick students as well as prospective students to consider our major and minor programs of study. We offer five undergraduate majors and nine minors.

Students seeking the planning and public policy, urban planning and design, public policy, public health, or health administration major must apply for admission to the Bloustein School.

Students declare their minor with their matriculating school. They need not apply for minor status with the Bloustein School.

Students already enrolled in the School of Arts and Sciences (SAS) or the School of Environmental and Biological Sciences (SEBS) at Rutgers University-New Brunswick should obtain information about Bloustein School admission and an application from the school's website, here.

Transfer students admitted to Rutgers by the Bloustein School of Planning and Public Policy should attend a Students in Transition Advising and Registration (STAR) session before the start of classes in order to learn more about their academic program and schedule their courses for their first semester at Rutgers. **Please visit here to learn more.**

Students who:

- successfully meet all of the eligibility requirements (see the Programs of Study section),
- who have completed their area distribution requirements for English and mathematics,
- who hold at least a 2.5 cumulative grade-point average, and
- who have achieved grades of C or better in each of the prerequisite courses for the respective majors

are encouraged to apply for direct admission to the Bloustein School. Acceptance of applications and decisions about admission are made on a cyclical basis.

Students applying to a Bloustein School major who are interested in applied research and who hold a cumulative grade-point average of 3.4 or better are encouraged to apply to the Bloustein Honors Research Program.

Questions about any of the programs, majors, minors, or certificates offered can be directed to the Bloustein School's Office of Student and Academic Services by emailing undergrad@ejb.rutgers.edu. Undergraduate advisers answer all emails.

**Note: Given that there are several different options available in admissions, please see the program's homepage to determine which path is yours.*

Programs of Study (EJB-U)

PROGRAMS OF STUDY

The Edward J. Bloustein School of Planning and Public Policy offers five major programs of study and ten minors:

- City and Regional Planning (170, 170D) -- Bachelor of Arts (B.A.) degree
- Health Administration major (501, 501D) -- Bachelor of Science (B.S.) degree
- Public Health major (832, 832D) -- Bachelor of Science (B.S.) degree
- Public Policy major (833, 833D) -- Bachelor of Science (B.S.) degree
- Urban Planning and Design major (971, 971D) -- Bachelor of Science (B.S.) degree
- Minors in:
    - City and Regional Planning
    - Health Administration
    - Public Health
    - Public Policy
    - Urban Planning & Design
    - Public Administration & Management
    - Urban Studies
    - Medical Ethics & Health Policy
    - Disability Studies
    - Health Equity

Please note: The Planning and Public Policy (762, 762D) major and minor were discontinued effective October 2024.

Restrictions of major and minor combinations:

- City and Regional Planning (170) majors may not declare the Urban Studies (975) minor or the Urban Planning and Design (971) major or minor.
- Urban Planning and Design (971) majors may not declare the City and Regional Planning (170) major or minor or the Urban Studies (975) minor.
- Bloustein School direct-admit students are permitted to double major or major/minor across programs except as noted above.
- Students in SAS are allowed to declare a Bloustein School major/minor combination except as noted above.
- Students in SEBS are allowed to declare the Public Health major with a Bloustein School minor.
- Students in a Rutgers-New Brunswick professional school need permission from their dean's office to declare more than one Bloustein School program.

Exceptional, well-prepared students who are admitted to the Bloustein School may be invited by the faculty to pursue dual-degree programs in the following areas:

- B.A. or B.S./M.P.H. for public health
- B.A. or B.S./ M.P.P. for public policy
- B.A. or B.S./M.C.R.P. for city and regional planning

City and Regional Planning (170, 170D) Major (EJB-U)

City and Regional Planning (170) Major

The City and Regional Planning major (170, 170D) provides students with a foundation of important knowledge, skills, and issues in city and regional planning. Key areas of focus include environmental planning and justice, community planning, housing issues, transportation, urban and community health, public policy, fiscal matters, land use planning as well as planning methods and geo-spatial analytics. Students are also prepared for planning and management positions focused on overseeing and improving public programs, such as transportation, housing, planning, the environment, finance, economic development, and urban redevelopment. These career paths can be found in government, consulting, research, and nonprofit settings. This program also prepares students for graduate education in public administration, public policy, urban planning, law and business.

Upon completing all degree requirements, the student will receive the bachelor of arts (B.A.) degree.

City and Regional Planning (170, 170D) Major (EJB-U)

Rutgers School of Arts and Sciences and School of Environmental and Biological Sciences Students

Rutgers School of Arts and Sciences and School of Environmental and Biological Sciences Students

This program is designed to accommodate the needs of traditional students at Rutgers University-New Brunswick.

Students in the School of Arts and Sciences (SAS) and students in the School of Environmental and Biological Sciences (SEBS) must apply for admission prior to declaring the major.

SAS students may pursue City and Regional Planning as their first major and remain within SAS. SEBS students may pursue City and Regional Planning as a second major to remain within SEBS.

Students can apply for the City and Regional Planning major during one of our application cycles listed here. Applicants must have a minimum grade of 'C' or better in each of the prerequisite courses and be in good academic standing. The application may be found on the school's website.

Students are advised to declare the City and Regional Planning major no later than their first semester of junior year to ensure completion of the major by their anticipated graduation date. A minor program is required for this major.

Only courses with a 'C' or better may be counted towards the major, and students must complete the core curriculum requirements of their primary school.

The most current information for the City and Regional Planning major may be found on the Bloustein School website.

City and Regional Planning (170, 170D) Major (EJB-U)

Transfer Students

Transfer Students

This program is designed to accommodate the needs of transfer, adult, and nontraditional students.

Students seeking the City and Regional Planning major must have at least 30 credits before applying to the Bloustein School. Successful applicants will have completed the prerequisite courses with a grade of 'C' or better and have achieved an overall GPA of at least 2.5.

Current Rutgers students seeking a school-to-school transfer from another Rutgers unit, or students transferring to Rutgers from another college or university, must apply via the Rutgers Office of Undergraduate Admissions. Contact ugadmissions@ejb.rutgers.edu for more information.

Transfer students from New Jersey community colleges are encouraged to complete lower-division prerequisite courses and the associate's degree to benefit from the NJ Statewide Transfer Agreement.

Only courses with a 'C' or better may be counted towards the major. A minor program is required for this major.

For more information about transferring, please see the school's website.

City and Regional Planning (170, 170D) Major (EJB-U)

City and Regional Planning Major Requirements (170, 170D)

City and Regional Planning Major Requirements (170, 170D)

(42-44 credits)

Core Courses
(18-20 credits)

- 10:775:205 Basic Statistical Methods or pre-approved 200-level or higher equivalent (3-4)

- One of the following:
    - 10:170:200 or 10:762:200 or 10:971:200 Introduction to City & Regional Planning (3)
    - 10:971:201 Introduction to Urban Planning and Design (3)
    - 01:220:103 Introduction to Macroeconomics (3)
    - 01:790:104 American Government (3)
    - 10:833:210 Principles of Public Policy (3)
- One of the following:
    - 10:170:250 or 10:762:250 or 10:971:250 Introduction to GIS (3)
    - 10:833:220 Public Economic Policy (3)
    - 01:220:102 Introduction to Microeconomics (3)
    - 11:373:121 Principles & Applications of Microeconomics (3)
- One of the following:
    - 10:170:393 or 10:971:393 Mapping and Analyzing Urban Data (3)
    - 10:775:300 Writing for Professionals (3)
    - 01:355:302 Science and Technology Writing (3)
    - 01:355:303 Writing for Business & Professions (3)
    - 01:355:315 Writing Grant Proposals (3)
- One of the following:
    - 10:170:314 or 10:971:314 Graphic Communications for Planners (3)
    - 10:170:302 or 10:971:302 Design Sustainability (3)
    - 10:775:395 Research Methods (4) – Open to declared majors only
- 10:170:400 or 10:762:400 Internship* (3) Open to majors only with at least 100 credits and no outstanding core requirements

** Students qualifying for departmental honors may replace with 10:170:497, 498 Bloustein Honors Research.*

Required Planning Specialization Courses (9 credits)

- Select three of the following, two of which must be at 300-level or above:
    - 10:170:233 Urban World (3)
    - 10:170:307 Community Development (3)
    - 10:170:310 US Housing Policy (3)
    - 10:170:311 Affordable Housing (3)
    - 10:170:430 International Urbanization & Housing Issues (3)
    - 10:170:448 Historic Preservation (3)
    - 10:170:472 Transportation Planning (3)
    - 10:170:235 Urban Health (3)
    - 10:170:464 Planning and the Global Environment (3)
    - 10:170:465 Environmental Activism, Justice and Change (3)

Required Electives (12 credits)

- Select four from the following, three of which must be at 300-level or above:
    - 10:170:101 Introduction to Urban Studies (3)

- 10:170:202 Designing Healthy Cities (3)
- 10:170:200 Introduction to City and Regional Planning (3)
- 10:170:201 Introduction to Urban Planning and Design (3)
- 10:170:230 Global Poverty (3)
- 10:170:231 Poverty in the United States (3)
- 10:170:232 Economics of Poverty (3)
- 10:170:250 Introduction to GIS (3)
- 10:170:296,297 Special Topics in City and Regional Planning (3)
- 10:170:298,299 Independent Study (3)
- 10:170:302 Design Sustainability (3)
- 10:170:308 Placemaking (3)
- 10:170:312 Principles of Housing (3)
- 10:170:313 Public & Nonprofit Sector Finance (3)
- 10:170:314 Graphic Communication for Planning (3
- 10:170:315 Fundamentals of Urban Planning and Design (3)
- 10:170:316 Introduction to Site Planning & Urban Design (3)
- 10:170:317 Urban Municipal Management (3)
- 10:170:319 Bridging Public Health & Urban Planning (3)
- 10:170:320 Protecting Public Health & the Environment (3)
- 10:170:324 Social Movements (3)
- 10:170:326 Sustainable Food & Energy Policy (3)
- 10:170:329 Managing Crisis & Chaos (3)
- 10:170:331 U.S. Social Policy (3)
- 10:170:332 Public Transportation & Equitable Accessibility (3)
- 10:170:335 Women, Inequality, and Public Policy (3)
- 10:170:337 Population Health and Urbanization (3)
- 10:170:340 Aging and Public Policy (3)
- 10:170:346 Program Evaluation (3)
- 10:170:352 Technology in the City (3)
- 10:170:354 Immigration Policy (3)
- 10:170:360 Managing Public Sector Organizations (3)
- 10:170:362 Nonprofit Management (3)
- 10:170:371 Globalization, Sustainability & Justice (3)
- 10:170:394 Data Visualization & Storytelling (3)
- 10:170:440 Real Estate Development (3)
- 10:170:461 Voorhees Research Seminar (3)
- 10:170:463 Environmental Law and Policy (3)
- 10:170:483,484 Special Topics (3)
- 10:170:485,486 Independent Study (3)
- 10:170:497,498 Bloustein Honors Research (3)
- 10:832:212 Health Disparities (3)

City and Regional Planning (170, 170D) Major (EJB-U)

City and Regional Planning Minor (18 credits)

City and Regional Planning Minor (18 credits)

The Bloustein School welcomes current and prospective Rutgers-New Brunswick students to consider the City and Regional Planning minor. Students should declare a minor with their matriculating school. They need not apply to the Bloustein School to declare the minor. Only courses with a grade of 'C' or better can be counted toward the minor program of study.

This minor is well-matched to majors in public policy; public health, business, Africana studies, Latino and Caribbean studies, economics, geography, political science, psychology, sociology, and women's, gender, and sexuality studies.

Students seeking the City and Regional Planning minor must complete 10:170:200 Introduction to City & Regional Planning and five elective courses in course code 170.

For the most current configuration of courses for the City and Regional Planning minor, please see the school's website.

City and Regional Planning (170, 170D) Major (EJB-U)

Joint BA/MCRP or BA/MPP Programs

Joint BA/MCRP or BA/MPP Programs

Exceptional, well-prepared students from any Rutgers University-New Brunswick matriculating unit with a GPA of 3.5 or higher, a dedication to public service and outstanding recommendations who wish to study urban planning or public policy are encouraged to seek advising about the 3-1-1 Master of City and Regional Planning (M.C.R.P.) or Master of Public Policy (M.P.P.) programs. Contact ugadmissions@ejb.rutgers.edu for more information.

City and Regional Planning (170, 170D) Major (EJB-U)

City and Regional Planning Certificate

City and Regional Planning Certificate

The Bloustein School currently offers a 15-credit Historic Preservation certificate open to all Rutgers-New Brunswick undergraduates in any major. The certificate is awarded with, or subsequent to, a bachelor's degree. Only courses with a C or better may be applied toward a certificate program.

Certificates do not qualify as a minor. Students must declare their intention to pursue a certificate program with the Bloustein School before their last semester of study in order to qualify to receive a certificate. Awarded certificates appear on the student's final transcript.

For the most current configuration of courses for the Historic Preservation certificate, please see the school's website.

Health Administration Major (501, 501D) and Minor (EJB-U)

HEALTH ADMINISTRATION MAJOR (501, 501D) AND MINOR

This program is designed to accommodate the needs of traditional, nontraditional, and transfer students.

The health administration (501, 501D) major prepares students for entry-level positions leading to a career path in administration. Students learn to address administrative and managerial problems in health systems, hospitals, ambulatory care facilities, medical practices, post-acute care facilities, and other healthcare delivery settings. Students learn about the challenges and innovative solutions, frameworks and methods regarding financial, operations, quality, informational systems and patient experience challenges in healthcare today as well as the policies, laws, and regulations governing institutional management and resulting in best practices and improved clinical and organizational outcomes. They also learn about the ethical context in which administrative decisions are made in the healthcare field.

Upon completing all degree requirements, the student will receive the bachelor of science (B.S.) degree.

Rutgers School of Arts and Sciences and School of Environmental and Biological Sciences Students

Rutgers School of Arts and Sciences and School of Environmental and Biological Sciences Students

This program is designed to accommodate the needs of traditional students at Rutgers University-New Brunswick.

Students in the School of Arts and Sciences (SAS) and students in the School of Environmental and Biological Sciences (SEBS) who wish to remain in their primary unit must apply for admission prior to declaring the major.

SAS students may pursue Health Administration as their first major and remain within SAS. SEBS students may pursue Health Administration as a second major to remain within SEBS.

SAS students are advised to declare the Health Administration major no later than their first semester of junior year to ensure completion of the major by their anticipated graduation date. Applicants must have achieved a minimum grade of 'C' or better in each of the prerequisite courses and obtained at least a 2.00 cumulative grade point average.

Students can apply for the Health Administration major during one of our application cycles listed here. The application may be found on the school's website.

Only courses with 'C' or better may be counted towards the health administration major, and students must complete the core curriculum requirements of their primary school.

Health Administration is a credit-intensive major so the minor requirement is waived. However, students are encouraged to complete a minor, even though they are not required to do so.

Health Administration Major (501, 501D) and Minor (EJB-U)

Transfer Students

Transfer Students

This program is designed to accommodate the needs of transfer, adult, and nontraditional students.

Students seeking the Health Administration major must have at least 30 credits before applying to the Bloustein School. Successful applicants will have completed the prerequisite courses with a grade of 'C' or better, and have achieved an overall GPA of at least 2.5.

Current Rutgers students seeking a school-to-school transfer from another Rutgers unit, or students transferring to Rutgers from another college or university, must apply via the Rutgers Office of Undergraduate Admissions. Contact ugadmissions@ejb.rutgers.edu for more information.

Transfer students from New Jersey community colleges are encouraged to complete lower-division prerequisite courses and the associate's degree to benefit from the NJ Statewide Transfer Agreement.

Only courses with a 'C' or better may be counted towards the major.

For more information about transferring, please see the school's website.

Health Administration Major (501, 501D) and Minor (EJB-U)

Health Administration Major Requirements (501, 501D)

Health Administration Major Requirements (501, 501D)

(51 credits)

Prerequisite Courses (6-7credits)

- 355:101 Expository Writing (3) or equivalent
- 775:205 Basic Statistical Methods (4) or 200-level of higher equivalent (3-4) (see approved equivalent statistics courses in Degree Navigator)

Recommended Lower-Division Core Courses (3 credits)
It is recommended students complete Intro to Financial Accounting or equivalent at the community college or four-year college/university from which they are transferring. The course is not required for admission to the program. Completion of accounting prior to admission will provide transfer students more flexibility in scheduling once at the

Bloustein School.

Major Requirements (501, 501D) (51 credits)

- 10:501:203 Introduction to Health Administration (3)
- 10:501:207 Accounting for Supervisors/Managers *(open to declared 501 majors and 843 minors only)* **or** Intro to Financial Accounting (33:010:272) (3)
- 10:501:260 Health Care Systems (3)
- One of the following:
    - 10:775:300 Writing for Professionals (3)
    - 01:355:302 Scientific and Technical Writing (3)
    - 01:355:303 Writing for Business and the Professions (3)
- 01:355:315 Writing Grant Proposals (3)
- One of the following:
    - 10:501:310 Administrative Issues for Health Care Managers (3) *Prerequisite 10:501:260*
    - 10:501:420 Human Resource Management in Health Administration (3)
- 10:501:332 Health Care Economics (3) - *Prerequisites: 10:501:203, 207*
- 10:501:333 Financial Aspects of Health Administration (3) *Prerequisites: 10:501:203, 207*
- 10:501:335 Population Health (3) - *Prerequisite: 10:501:203*
- 10:501:354 Marketing for Health Care Organizations (3) - *Prerequisites: 10:501:203, 207*
- 10:501:356 Health Care Ethics and Law (3) - *Prerequisite: 10:501:203*
- 10:501:363 Health Systems Operations (3) - *Prerequisites: 10:501:203, 207, 260*
- 10:501:395 Data Management for Healthcare (3) - *Open to majors only; 10:775:205* ***or*** *equivalent*
- 10:501:410 Information Systems for Health Care (3) - *Prerequisites: 10:501:203, 333*
- 10:501:425 Financial Management (3) - *Prerequisite 10:501:333*
- 10:775:450 Leadership Seminar (3) - *Prerequisites: Open to majors only; min. 85 credits; Pre- or Corequisite Data Management for Healthcare 10:501:395*
- 10:775:499 Professional Practice Internship (6) - *Open to majors only; Prerequisites: 10:775:300* ***or*** *01:355:303, 10:501:395, 10:775:450* ***and*** *min. 100 credits*

Health Administration Major (501, 501D) and Minor (EJB-U)

Health Administration Minor (18 credits)

Health Administration Minor (18 credits)

The Bloustein School welcomes current and prospective Rutgers-New Brunswick students to consider the Health Administration minor. Students should declare a minor with their matriculating school. They need not apply for minor status with the Bloustein School. Only courses with a grade of 'C' or better can be counted toward the minor program of study.

The Health Administration minor is well-matched to majors in business, economics, human resource management, information technology & informatics, labor studies & employment relations, nursing, psychology, public health, social work, as well as clinical health tracks such as pre-medicine/dental.

Students seeking the Health Administration minor must complete three core courses and three 300-level or higher 501 course code electives, excluding 775:395, 775:450, and 775:499, which are open to majors only.

Information about the Health Administration minor at the Bloustein School may be found here.

- 10:501:203 Introduction to Health Administration (3)
- 10:501:207 Accounting for Supervisors & Managers (3)
  or 33:010:272 Intro to Financial Accounting (3)
- 10:501:260 Health Care Systems (3)
- Three upper-level electives with course code 501 (9)

Prerequisite Courses (6-7 cr)

- 01:355:101 Expository Writing (3) or equivalent
- 10:775:205 Basic Statistical Methods (4) or 200-level of higher equivalent (3-4)

Planning and Public Policy Major (762, 762D) and Minor (EJB-U)

Planning and Public Policy Major (762, 762D) and Minor

The Planning and Public Policy major (762, 762D) or minor are no longer accepting enrollments as of October 2024.

For more information about requirements for completing and already-in-progress majors or minors, please see the Bloustein School website.

Planning and Public Policy Major (37 credits)

The Planning and Public Policy major (762, 762D) provides students with a foundation in areas such as city dynamics, environmental aspects of cities, community health, urban poverty, public policy, housing issues, social concerns, fiscal matters, and land use planning. Students are prepared for entry-level professional management and planning positions focused on overseeing and improving public programs, such as transportation, housing, planning, the environment, finance, economic development, and urban renewal. These career paths can be found in business, government, education, banking, and nonprofit settings. This program also prepares students for graduate education in public administration, public policy, and urban planning.

Upon completing all degree requirements, the student will receive the bachelor of arts (B.A.) degree.

Rutgers School of Arts and Sciences and School of Environmental and Biological Sciences Students

This program is designed to accommodate the needs of traditional students at Rutgers University-New Brunswick.

Students in the School of Arts and Sciences (SAS) and students in the School of Environmental and Biological Sciences (SEBS) who wish to remain in their primary unit must apply for admission prior to declaring the major.

SAS students may pursue Planning and Public Policy as their first major and remain within SAS. SEBS students may pursue Planning and Public Policy as a second major to remain within SEBS.

Students can apply for the Planning and Public Policy major during one of our application cycles listed here. Applicants must have a minimum grade of 'C' or better in each of the prerequisite courses and be in good academic standing. The application may be found on the school's website.

Students are advised to declare the Planning and Public Policy major no later than their first semester of junior year to ensure completion of the major by their anticipated graduation date. **A minor program is required for this major.**

Only courses with a 'C' or better may be counted towards the major, and students must complete the core curriculum requirements of their primary school.

The most current information for the Planning and Public Policy major may be found on the Bloustein School website here.

Transfer Students

This program is designed to accommodate the needs of transfer, adult, and nontraditional students.

Students seeking the Planning and Public Policy major must have at least 30 credits before applying to the Bloustein School. Successful applicants will have completed the prerequisite courses with a grade of 'C' or better, and have achieved an overall GPA of at least 2.5.

Current Rutgers students seeking a school-to-school transfer from another Rutgers unit, or students transferring to Rutgers from another college or university, must apply via the Rutgers Office of Undergraduate Admissions. Contact ugadmissions@ejb.rutgers.edu for more information.

Transfer students from New Jersey community colleges are encouraged to complete lower-division prerequisite courses and the associate's degree to benefit from the NJ Statewide Transfer Agreement.

Only courses with a 'C' or better may be counted towards the major. **A minor program is required for this major.**

For more information about transferring, please see the school's website.

PLANNING AND PUBLIC POLICY MAJOR REQUIREMENTS (762, 762D)

(37 credits)

Prerequisite Courses (9-10 credits)

- 01:355:101 College Writing (3)
- 10:775:205 Basic Statistical Methods (4) or equivalent (3-4)
- 01:220:102 Introduction to Microeconomics (3)

Major Requirements (762, 762D) (37 credits)
Core Courses (16 credits)

- One of the following (3):
    - 01:220:103 Introduction to Macroeconomics (3)

    - 01:790:104 American Government (3)
    - 10:833:210 Principles of Public Policy (3)
    - 10:971:201 Intro to Urban Planning and Design (3)
- One of the following intensive writing courses (3):
    - 10:775:300 Writing for Professionals (3)
    - 01:355:302 Scientific and Technical Writing (3)
    - 01:355:303 Writing for Business and the Professions (3)
    - 01:355:315 Writing Grant Proposals (3)
- 10:775:395 Research Methods (4) *Open to majors only*
- 10:762:400 Internship with Seminar* (3) *Open to majors only*
- 10:762:499 Senior Seminar* (3) Open to majors only with at least 100 credits **and** no outstanding core requirements

** Students qualifying for departmental honors may replace 10:762:400 and 10:762:499 with 10:762:497, 498 Bloustein Honors Research.*

Required Electives (21 credits)

- 21 credits of electives from Bloustein School undergraduate courses, 15 credits of which must be at the 300-level or higher

Students interested in specific career paths should consider clustering their electives and seek advising early in their program of study.

Joint BA/MCRP or BS/MCRP Program

Exceptional, well-prepared students from any Rutgers University-New Brunswick matriculating unit with a GPA of 3.5 or higher, exceptional GRE scores, a dedication to public service and outstanding recommendations who wish to study urban planning are encouraged to seek advising about the 3-1-1 master of city and regional planning (M.C.R.P.) program. Contact ugadmissions@ejb.rutgers.edu for more information.

Planning and Public Policy Minor (18 credits)

The Bloustein School welcomes current and prospective Rutgers-New Brunswick students to consider the Planning and Public Policy minor. Students should declare a minor with their matriculating school. They need not apply for minor status with the Bloustein School. Only courses with a grade of 'C' or better can be counted toward the minor program of study.

This minor is well-matched to majors in economics; labor studies & employment relations; political science; geography; sociology; urban planning and design; as well as the pre-law track.

Students seeking the Planning and Public Policy minor must complete three core courses and five elective courses in course code 762, excluding those designated for 'majors only'.

- 10:775:101 Introduction to Planning, Policy and Health (3)
- Five electives selected from all the undergraduate Bloustein courses that are open to non-majors. At least four of the five must be 300 or 400-level.

For the most current configuration of courses for the Planning and Public Policy minor, please see the school's website here.

Planning and Public Policy Certificate Programs

The Bloustein School currently offers four Planning and Public Policy certificates open to all Rutgers-New Brunswick undergraduates. Certificate programs are open to students in any major and are awarded with, or subsequent to, a bachelor's degree. Only courses with a C or better may be applied toward a certificate program.

Certificates do not qualify as a minor. **Students must declare their intention to pursue a certificate program with the Bloustein School before their last semester of study in order to qualify to receive a certificate.** Awarded certificates appear on the student's final transcript.

For the most current configuration of courses for each certificate, please see the school's website here.

- Community Development Certificate (24 credits)
- Community Sustainability Certificate (18 credits)
- Urban Planning Certificate (24 credits)
- Historic Preservation Certificate (15 credits)

Public Health Major (832, 832D) and Minor (EJB-U)

PUBLIC HEALTH MAJOR (832, 832D) AND MINOR

Public Health Major (46 credits)

The major in public health prepares students for entry-level careers in population health and disease prevention. Public health professionals perform a wide range of services in areas such as infectious disease control, community health promotion, health monitoring and surveillance, environmental and occupational health, and emergency preparedness.

Our students learn to apply evidence-based decision-making to address the social and structural determinants of health. The program emphasizes policy, equity, and systems-level change, equipping students to approach population health challenges through a public policy lens. The public health major culminates in the Leadership Seminar and Professional Practice Internship, in which students apply what they've learned and hone the skills necessary to succeed in diverse public health and health-adjacent careers.

Upon completion of all degree requirements, students are awarded the Bachelor of Science (B.S.) degree in Public Health.

Public Health Major (832, 832D) and Minor (EJB-U)

Rutgers School of Arts and Sciences or School of Environmental and Biological Sciences Students

Rutgers School of Arts and Sciences or School of Environmental and Biological Sciences Students

This program is designed to accommodate the needs of traditional students at Rutgers University-New Brunswick.

Students in the School of Arts and Sciences (SAS) or the School of Environmental and Biological Sciences (SEBS) who wish to pursue the public health major must apply for admission to the major.

To ensure degree completion by their anticipated graduation date, students are advised to declare the public health major no later than the first semester of their junior year. Applicants must have achieved a minimum grade of C or better in each of the prerequisite courses and obtain at least a 2.0 cumulative grade point average.

Students can apply for the public health major during one of the application cycles listed here. The application may be found on the school's website.

Public health is a credit-intensive major. Students are encouraged, but not required, to pursue a minor.

The most current information for the Public Health major may be found on the Bloustein School website.

Public Health Major (832, 832D) and Minor (EJB-U)

Transfer Students

Transfer Students

This program is designed to accommodate the needs of transfer, adult, and nontraditional students.

Students seeking the public health major must have at least 30 credits before applying to the Bloustein School.

Successful applicants will have completed the prerequisite courses with a grade of 'C' or better, and maintained an overall GPA of at least 2.5.

Current Rutgers students seeking a school-to-school transfer from another Rutgers unit, or students transferring to Rutgers from another college or university, must apply via the Rutgers Office of Undergraduate Admissions. Contact ugadmissions@ejb.rutgers.edu for more information.

Transfer students from New Jersey community colleges are encouraged to complete lower-division prerequisite courses and the associate's degree to benefit from the NJ Statewide Transfer Agreement.

For more information about transferring, please see the school's website here.

Public Health Major (832, 832D) and Minor (EJB-U)

Public Health Major Requirements (832, 832D)

Public Health Major Requirements (832, 832D)

(46 credits)

For the most current competencies required to earn the Bachelor of Science in Public Health, please see the school's website here.

Prerequisite Courses (12-15 credits)

- 355:101 Expository Writing (3) or equivalent
- 775:205 Basic Statistical Methods (4) or equivalent (3-4)
- One human biology course (3-4)*
- One chemistry course (3)
    - 160:127 Impact of Chemistry (3)
    - 160:128 Chemistry of Life (3)
    - 160:161 or General Chemistry I or II

Major Requirements (832, 832D) (46 credits)

Core Courses (31 credits)

- 10:832:201 Principles of Public Health (3)
- 10:832:212 Introduction to Health Disparities (3) *Open to majors only*
- 10:832:240 Global Health Perspectives (3)
- One of the following intensive writing courses (3):
    - 10:775:300 Writing for Professionals (3)
    - 10:832:339 Public Health Literature (3) *Prerequisites 10:832:201 and¿ 01:355:101*
    - 01:335:302 Scientific and Technical Writing (3)
    - 01:335:315 Writing Grant Proposals (3)
    - 01:355:303 Writing for Business and the Professions (3)
- 10:832:335 Epidemiology (3) *Prerequisites: Statistics or Pre-calculus and 10:832:201*
- 10:832:356 Public Health Law and Ethics (3)
- 10:775:395 Research Methods (4) *Prerequisites 775:205 or equivalent statistics. Open to majors only*
- 10:775:450 Leadership Seminar (3) *Pre-or Co-requisite 10:775:395. Open to majors only. Minimum 85 credit.*
- *10:775:499 Professional Practice Internship (6) *Prerequisites 10:775:395, 10:775:450,* ***and*** *100 credits. Open to majors only.*

  **Students seeking to replace 775:499 with 832:497, 498 Bloustein Honors Research (3, 3) should contact their advisor.*

Rutgers School of Public Health Electives

Juniors and seniors have the option to take up to two of the following electives offered by the School of Public Health for credit towards the degree:

- 75:832:504 Introduction to Biostatistics
- 75:832:505 Social and Behavioral Health Sciences in Public Health
- 75:832:629 Climate Change: Planetary and Human Health
- 75:832:628 Sustainability: Planetary and Human Health
- 75:832:623 Principles of Industrial Hygiene
- 75:832:668 Adult Psychopathology for Public Health
- 75:832:659 Understanding Suicide: Risk, Prevention, and Intervention

- 75:832:677 Global Food and Culture *Prerequisite: 10:832:240 Global Health Perspectives*
- 75:832:629 Climate Change and Planetary and Human Health *Prerequisite: 10:832:240 Global Health Perspectives*

Required Electives (15 credits)

- 15 credits of 832 electives, 9 credits of which must be at the 300 level or higher; can apply up to 6 credits from other Bloustein undergraduate disciplines

Students interested in select career paths should consider clustering their electives, pursuing a certificate, and seek advising early in their program of study.

Public Health Major (832, 832D) and Minor (EJB-U)

Public Health Minor (24 credits)

Public Health Minor (24 credits)

The Bloustein School welcomes current and prospective Rutgers-New Brunswick students to consider the public health minor. Students should declare a minor with their matriculating school. They need not apply for minor status with the Bloustein School. Only courses with a grade of 'C' or better can be counted toward the minor program of study.

The public health minor complements majors in the health sciences, biological and environmental sciences, social and behavioral sciences, and health-related professional fields such as health administration and the pre-medical track.

Students seeking the public health minor complete three core courses and five elective courses in 832, three of which must be at the 300-level or higher, excluding those restricted to 'majors only'.

- 832:201 Principles of Public Health (3)
- 832:212 Introduction to Health Disparities (3)
  or 832:240 Global Health Perspectives (3)
- 832:335 Epidemiology (3)
- Required elective courses: 15 credits of 832 electives, 9 credits of which must be at the 300 level or higher; can apply up to 6 credits from other Bloustein undergraduate disciplines

  For the most current configuration of courses for the Public Health minor, please see the school's website here.

Public Health Major (832, 832D) and Minor (EJB-U)

Public Health Certificates

Public Health Certificate Programs

The Bloustein School offers several public health certificates open to all Rutgers-New Brunswick undergraduates. Certificate programs are open to students in any major and are awarded with, or subsequent to, a bachelor's degree. *Certificates do not qualify as a minor.* **Students must declare their intention to pursue a certificate program with the Bloustein School before their last semester of study to qualify to receive a certificate.** Awarded certificates appear on the student's final transcript.

- Cancer Surveillance and Epidemiology Certificate (18 credits)
- Global Health and Health Policy Certificate (18 credits)
- Health Disparities Certificate (18 credits)
- Health Policy Certificate (18 credits)
- Public Health Education and Advocacy Certificate (18 credits)
- Public Health Preparedness Certificate (18 credits)

For the most current configuration of courses for each certificate, please see the school's website here.

Public Policy Major (833, 833D) and Minor (EJB-U)

PUBLIC POLICY MAJOR (833, 833D) AND MINOR

Public Policy Major (53 credits)

The public policy major prepares students for jobs in government, politics, and public affairs within public, nonprofit, or for-profit sectors or for graduate education in law, public administration, public affairs, and public policy.

The major introduces students to the use of analytical techniques to better understand public problems and evaluate alternative solutions to those problems. Examples include income inequality, health care reform, climate change, and immigration policy.

Upon completing all degree requirements, the student will receive the bachelor of science (B.S.) degree.

Public Policy Major (833, 833D) and Minor (EJB-U)

Rutgers School of Arts and Sciences and School of Environmental and Biological Sciences Students

Rutgers School of Arts and Sciences and School of Environmental and Biological Sciences Students

This program is designed to accommodate the needs of traditional students at Rutgers University-New Brunswick.

Students in the School of Arts and Sciences (SAS) and students in the School of Environmental and Biological Sciences (SEBS) who wish to remain in their primary unit must apply for admission prior to declaring the major.

SAS students may pursue Public Policy as their first major and remain within SAS. SEBS students may pursue Public Policy as a second major to remain within SEBS.

Students are advised to declare the Public Policy major no later than their first semester of junior year to ensure completion of the major by their anticipated graduation date. Applicants must be in good academic standing.

Students can apply for the Public Policy major during one of our application cycles listed here. The application may be found on the school's website here.

Only courses with a 'C' or better may be counted towards the major, and students must complete the core curriculum requirements of their primary school.

The most current information for the Public Policy major may be found on the Bloustein School website.

Public Policy Major (833, 833D) and Minor (EJB-U)

Transfer Students

Transfer Students

This program is designed to accommodate the needs of transfer, adult, and nontraditional students.

Students seeking the Public Policy major must have at least 30 credits before applying to the Bloustein School. Successful applicants will have completed the prerequisite courses with a grade of 'C' or better and have achieved an overall GPA of at least 2.5.

Current Rutgers students seeking a school-to-school transfer from another Rutgers unit, or students transferring to Rutgers from another college or university, must apply via the Rutgers Office of Undergraduate Admissions. Contact ugadmissions@ejb.rutgers.edu for more information.

Transfer students from New Jersey community colleges are encouraged to complete lower-division prerequisite courses and the associate's degree to benefit from the NJ Statewide Transfer Agreement.

Only courses with a 'C' or better may be counted towards the major.

For more information about transferring, please see the school's website here.

Public Policy Major (833, 833D) and Minor (EJB-U)

Public Policy Major Requirements (833, 833D)

Public Policy Major Requirements (833, 833D)

(53 credits)

Effective Spring 2024

The Public Policy major and minor were updated during the spring 2023 term. **The curriculum below is effective as of spring 2024**. Students who declared at the end of spring 2024 and onward will follow the new requirements. Students who completed the previous prerequisites (American Government, microeconomics, and statistics) may count those courses towards the major electives.

Prerequisite Courses (3 credits)

- 01:355:101 Expository Writing (3) or equivalent

Major Requirements (833, 833D) (53 credits)

Core Courses (29 credits)

- 10:775:205 Basic Statistics or equivalent (3-4)
- 10:833:210 Principles of Public Policy (3)
- 10:833:215 Writing, Reasoning and Public Policy (3)
- 10:833:220 Public Economic Policy (3)
- One of the following (3):
    - 10:843:360 Managing Public Sector Organizations (3)
    - 10:833:361 Managing People and Organizations (3)
    - 10:833:362 Non-Profit Management (3)
- 10:775:395 Research Methods (4) *Prerequisite: 10:775:205 or equivalent statistics. Open to majors only.*
- 10:775:450 Leadership Seminar (3) *Pre or Corequisite 10:775:395 Research Methods. Open to majors only; min. 85 credits.*
- 10:775:499 Professional Practice Internship* (6) *Prerequisites: 10:775:395 Research Methods and 10:775:450 Leadership Seminar; open to majors only*

**Students with a minimum 3.4 cumulative GPA may replace 10:775:499 with 10:833:495, 496 Public Policy Honors Thesis I and II (3, 3). Students seeking to replace 10:775:499 with Bloustein Honors Research (3, 3) should contact their advisor.*

Electives (24 credits)

- At least 12 credits (4 electives) must be in 833. Up to two courses (6 credits) may be taken from other Bloustein School departments. Up to two courses (6 credits) may be taken outside the Bloustein School.

Public Policy Major (833, 833D) and Minor (EJB-U)

Public Policy Minor (18 credits)

Public Policy Minor (18 credits)

The Bloustein School welcomes current and prospective Rutgers-New Brunswick students to consider the Public Policy minor. Students should declare a minor with their matriculating school. They need not apply for minor status with the Bloustein School. Only courses with a grade of 'C' or better can be counted toward the minor program of study.

This minor is well-matched to majors in criminal justice; economics; labor studies & employment relations; political science; sociology; women's & gender studies; as well as the pre-law track.

Students seeking the public policy minor must complete one core course and five elective courses.

Effective Summer 2023

- 10:833:102 Introduction to Public Policy (3)
  or 10:833:210 Principles of Public Policy (3)
- Five electives selected from all the undergraduate Bloustein courses that are open to non-majors. At least four of the five must be 300 or 400-level.

For the most current configuration of courses for the Public Policy minor, please see the school's website here.

Urban Planning and Design Major (971, 971D) and Minor (EJB-U)

URBAN PLANNING AND DESIGN MAJOR (971, 971D) AND MINOR

Urban Planning and Design Major (51 credits)

The major in Urban Planning and Design (971, 971D) combines the processes of urban design and urban planning to provide students with a sharper focus on city design, community development, GIS and graphic communication, as well as planning practice.

It prepares students for entry-level positions in the planning sector and graduate studies in city and regional planning. Students learn graphic communications, video software, geographic information systems, and web communication. They help design, promote, and administer plans to address issues involving land use, zoning, transportation, infrastructure, housing, community facilities, and more. Studios allow students to conduct field and observational studies and surveys, and analyze data that evaluate community demands for land uses and services.

Upon completing all degree requirements, the student will receive the bachelor of science (B.S.) degree.

Urban Planning and Design Major (971, 971D) and Minor (EJB-U)

Rutgers School of Arts and Sciences and School of Environmental and Biological Sciences Students

Rutgers School of Arts and Sciences and School of Environmental and Biological Sciences Students

This program is designed to accommodate the needs of traditional students at Rutgers University-New Brunswick.

Students in the School of Arts and Sciences (SAS) must apply for admission prior to declaring the major. SAS students may pursue UPD as their first major and remain within SAS. Students in the School of Environmental and Biological Sciences (SEBS) wishing to declare Urban Planning & Design (UPD) as their second major should contact the Bloustein School's Office of Student and Academic Services at ugadmissions@ejb.rutgers.edu.

To ensure degree completion by their anticipated graduation date, students are advised to declare the UPD major no later than the first semester of their junior year. **However, students must start planning their scheduled set of courses with a Bloustein advisor during the first semester of sophomore year.**

Students can apply for the UPD major during one of our application cycles listed here. Applicants must have a minimum grade of 'C' or better in each of the prerequisite courses and be in good academic standing. The application may be found on the school's website.

The UPD major is *sequence-dependent*. To prepare students for two capstone design studios during their final undergraduate year, the curriculum builds knowledge and skills in urban planning and design over the preceding two semesters. The required sequence of courses is listed below. Please note that the capstone courses, Planning and Design Studio I and II are only offered consecutively in the fall and spring semester. **Because all required courses are sequenced, it is important that a student develop an academic plan with their Bloustein advisor when they declare the UPD major.**

As a credit intensive major, UPD does not require declared students to complete a minor. However, students may benefit from completing a minor and this option should be discussed with the Bloustein School advisor while developing their academic plan. In addition, if choosing a minor, students are encouraged to meet with the UPD Program Coordinator for career advice.

Only courses with 'C' or better may be counted towards the health administration major, and students must complete the core curriculum requirements of their primary school.

The most current information for the Urban Planning and Design major may be found on the Bloustein School website here.

Urban Planning and Design Major (971, 971D) and Minor (EJB-U)

Transfer Students

Transfer Students

This program is designed to accommodate the needs of transfer, adult, and nontraditional students.

Students seeking the Urban Planning and Design major must have at least 30 credits before applying to the Bloustein School. Successful applicants will have completed the prerequisite courses with a grade of 'C' or better, and have achieved an overall GPA of at least 2.5.

Current Rutgers students seeking a school-to-school transfer from another Rutgers unit, or students transferring to Rutgers from another college or university, must apply via the Rutgers Office of Undergraduate Admissions. Contact ugadmissions@ejb.rutgers.edu for more information.

Transfer students from New Jersey community colleges are encouraged to complete lower-division prerequisite courses and the associate's degree to benefit from the NJ Statewide Transfer Agreement.

Only courses with a 'C' or better may be counted towards the major.

For more information about transferring, please see the school's website.

Urban Planning and Design Major (971, 971D) and Minor (EJB-U)

Urban Planning and Design Major Requirements

Urban Planning and Design Major Requirements

(51 credits)

Effective Spring 2024

Prerequisite Courses (3 credits)

- 01:355:101 College Writing (3) or equivalent

Major Requirements (971, 971D) (51 credits)

Core Courses (36 credits)

- 10:775:205 Basic Statistical Methods or equivalent (3-4)
- 10:971:201 Introduction to Urban Planning and Design (3)
  or Environmental Design Analysis (3)
- 10:971:202 Designing Healthy Cities (3)
- 10:971:250 Introduction to GIS (3)
- 10:971:314 Graphic Communication for Planning (3)
- 10:971:315 Fundamentals of Urban Planning & Design (3)
- 10:971:316 Introduction to Site Planning and Urban Design (3)
- 10:971:318 History and Theory of Urban Planning & Design (3)
- 10:971:395 Methods of Planning Analysis (3)
- 10:971:403 Advanced Graphic Communication (3)
- 10:971:404 Planning and Design Studio I (3)
- 10:971:405 Planning and Design Studio II (3)
- 10:971:463 Environmental and Land Use Law (3)

Required Electives (15 credits)

- Five, 3-credit courses see approved list in Degree Navigator.

Urban Planning and Design Major (971, 971D) and Minor (EJB-U)

Joint BA/MCRP or BS/MCRP Program

Joint BA/MCRP or BS/MCRP Program

Exceptional, well-prepared students from any Rutgers University-New Brunswick matriculating unit with a GPA of 3.5 or higher, exceptional GRE scores, a dedication to public service and outstanding recommendations who wish to study urban planning or public policy are encouraged to seek advising about the 3-1-1 Master of City and Regional Planning (M.C.R.P.) or Master of Public Policy (M.P.P.) program. Contact ugadmissions@ejb.rutgers.edu for more information.

Urban Planning & Design Minor (18 credits)

Urban Planning & Design Minor (18 credits)

The Bloustein School welcomes current and prospective Rutgers-New Brunswick students to consider the Urban Planning and Design minor. Students should declare a minor with their matriculating school. They need not apply for minor status with the Bloustein School. Only courses with a grade of 'C' or better can be counted toward the minor program of study.

This minor is well-matched to majors in art history; civil engineering; environmental science; public health; geography; landscape architecture; sociology; and more.

Students seeking the urban planning and design minor must complete four core courses and three 300-level or higher 971 electives, excluding those designated for 'majors only'.

- 10:971:201 Introduction to Urban Planning and Design (3)
- 10:971:202 Designing Healthy Cities (3)
- 10:971:314 Graphic communication for Planners (3)
- 10:971:315 Fundamentals of Urban Planning and Design (3)
- Three upper-level 971 (or substituted upper-level 762) electives, as above (9)

For the most current configuration of courses for the Urban Planning and Design minor, please see the school's website here.

Disability Studies (304) Minor (EJB-U)

DISABILITY STUDIES (304) MINOR

The 18-credit Disability Studies (652) minor examines the meaning, nature, and consequences of disability as a social, cultural, and political construct. It provides students the opportunity to challenge normative ableist paradigms that reinforce rigid ideas about the body and personhood for people with disabilities.

This minor is well-matched to majors in public health, public policy, urban planning and design, city and regional planning, kinesiology and health, labor and employment relations, visual and performing arts, health administration, sociology, psychology, and more.

Students seeking the Disability Studies minor must complete three core courses and three electives from an approved list.

- 37:575:265 Introduction to Disability Studies (3)
- 10:833:353 Disability Policy & Law (3)
- 01:377:327 Field Experience for Special Populations* (3)
- Three electives (9)

*May substitute other relevant fieldwork experience with undergraduate advisor's approval.

For the most current configuration of courses for the Disability Studies minor, please see the school's website here.

Health Equity (386) Minor (SEBS)

Health Equity Minor 386

The health equity minor (386) offers a unique interdisciplinary curriculum, drawing upon the strengths of the School of Environmental and Biological Sciences, School of Social Work, Bloustein School of Planning and Public Policy, School of Arts and Sciences, and Graduate School of Education to provide students with a comprehensive understanding of health equity and its underlying social, economic, and environmental determinants, with specializations in topics such as housing, food justice, and education.

Students will engage in the critical analysis of current policies and research, develop culturally competent practices, and gain hands-on experience through applied learning opportunities. Graduates of the minor will be well-equipped to advocate for and implement impactful solutions that advance health equity within diverse communities.

Students seeking the health equity minor will complete 18 credits of courses, including the two required courses (6 credits), two courses from one of the three tracks (6 credits from ONE track), and two electives from affiliated departments.

Required Courses (6 credits, choose two)

- 11:374:424 Segregation and Health (3)
  or 10:832:212 Health Disparities (3)
- 01:920:115 The Color of Health: How Does Inequality Get Under the Skin? (3)
  or 01:920:335 Health and Inequality (3)

Two Courses from the Chosen Track (6 credits)

Track 1 Health Equity: Food Justice

- 11:020:333: Community Food Justice and Advocacy (3)
- 11:374:289 Sustainable Food: Politics, Policy, and Ethics (3)
- 11:020:337 Sustainability: Tackling Food Waste (3)
- 11:400:315 (01:959:409) - Food and Sustainability – Thailand Study Abroad
- 11:400:316 (01:959:409) Sustainable Food Production- Ireland Study Abroad
- 11:193:255 Integrated Nutrition, Health, Environment, and Agricultural Systems

Track 2 Health Equity: Housing Equity

- 10:762:310 U.S. Housing Policy (3)
- 910:240 Housing Inequality & Homelessness (3)
- 10:762:307 Community Development (3)

Track 3 Health Equity: Education

- 10:833:325 Education Policy and Social Justice (3)
- 10:833:365 Higher Education Policy (3)
- 05:300:406 Community-Based Language Learning (3)
- 05:300:464 Race & Ethnicity in American Schools (3)
- 05:300:465 Sexuality, Gender, and the Politics of U.S. Public Schooling (3)
- 05:300:401 Individual and Cultural Diversity (3)

Two Electives from Affiliated Departments (6 credits)

The remaining 6 credits required for the minor can be selected from a list elective courses from the following select departments: School of Environmental and Biological Sciences, Edward J. Bloustein School of Planning and Public Policy, School of Social Work, Graduate School of Education, and School of Arts and Sciences.

For the most current configuration of courses and approved electives for the Health Equity minor, please see the Bloustein School website.

Medical Ethics and Health Policy Minor (EJB-U)

Medical Ethics and Health Policy Minor

The 21-credit Medical Ethics and Health Policy (652) minor teaches undergraduate students to explore the conceptual foundations of medical ethics as well as develop an appreciation of how they inform contemporary health policy in an era of major scientific innovation, technological advances, and resource constraints.

- 10:652:201 or 01:730:248 Foundations of Medical Ethics & Policy (3)
- 10:652:400 or 01:730:348 Research Ethics (3) Prerequisite 10:652:201 or 01:730:248
- Six credits of Ethics courses *see Bloustein website for approved courses*
- Six credits of Health Policy courses *see Bloustein website for approved courses*
- One additional three-credit course from either the Ethics or Health Policy lists *see Bloustein website for approved courses*

Courses taken in fulfillment of the Medical Ethics and Health Policy minor (21 credits) cannot be double-counted to fulfill the requirements of a major **EXCEPT** Public Health Law and Ethics (10:832:356) for Public Health majors. Credit issued only once for cross-listed courses. Not all courses are offered every semester.

For the most current configuration of courses for the Medical Ethics and Health Policy minor, please see the school's website here.

Public Administration and Management Minor (EJB-U)

PUBLIC ADMINISTRATION AND MANAGEMENT (843) MINOR

The 18-credit Public Administration and Management (843) minor is well matched to majors in public policy, criminal justice, economics, human resource management, labor studies and employment relations, political science, social work, as well as the pre-law track.

Students seeking the public administration and management minor (18 credits) must complete four core courses and two elective courses, one of which must be at the 300-level or higher

- 10:843:209 Introduction to Public Administration (3)
- 10:833:210 Principles of Public Policy (3)
- 10:843:313 Public & Nonprofit Sector Finance (3)
- 10:843:360 Managing Public Sector Organizations (3)
- Two electives, selected from all undergraduate Bloustein courses that are open to non-majors. At least one of the two courses must be 300-level or higher.

For the most current configuration of courses for the Public Administration and Management minor, please see the school's website here.

Urban Studies Minor (EJB-U)

URBAN STUDIES MINOR

The 18-credit Urban Studies (975) minor is well matched to majors in sociology, economics, labor studies and employment relations, political science, social justice, geography, psychology, ethnic studies, public health, and urban planning and design, as well as the pre-law track

Students seeking the Urban Studies minor must complete one core course and five Urban Studies elective courses, four of which must be 300-level or higher, excluding those designated for 'majors only'.

- 10:975:101 Introduction to Urban Studies (3)
- Five electives
  For the most current configuration of courses for the Urban Studies minor, please see the school's website here.

Fellowships and Scholarships (EJB-U)

FELLOWSHIPS AND SCHOLARSHIPS

FUNDING AND SUPPORT FOR UNDERGRADUATES

The Bloustein School has a limited number of scholarship and fellowship opportunities for undergraduate students in specific major areas. Please see the Bloustein School website here for more information, eligibility requirements, and application materials.

MARY ANN AND STEVEN J. ALLARD FELLOWSHIP PROGRAM IN PUBLIC HEALTH

The Mary Ann & Steven J. Allard Fellowship is for outstanding non-traditional students, including veterans making the transition from military service to the classroom, returning adults whose formal education has been interrupted and post-baccalaureate students pursuing a public health undergraduate degree or major, who have demonstrated a personal commitment and/or outstanding academic potential in pursuit of studies in public health at the Bloustein School.

Two (2) undergraduate students in the public health major are selected to receive the Allard Fellowships.

RALPH W. VOORHEES PUBLIC SERVICE FELLOWSHIP

The Ralph W. Voorhees Public Service Fellowship Program honors Ralph W. Voorhees's long commitment to community public service.

Up to five (5) undergraduate students from Rutgers University-New Brunswick, who are dedicated to community service, are selected to receive Ralph Voorhees Public Service Fellowships. Fellows receive a stipend so they may participate in a credit-bearing community research project.

Students interested in the fellowship apply in the spring semester here. Questions about the program may be directed to voorheesfellowship@ejb.rutgers.edu.

DESIGN MAKES A DIFFERENCE ENDOWED SCHOLARSHIP

This scholarship supports undergraduate students at the Edward J. Bloustein School of Planning and Public Policy. Preference will be given to students majoring in Urban Planning and Design.

E. MAE MCCARROLL SCHOLARSHIP

Recipients are selected among full-time undergraduate students at the Edward J. Bloustein School of Planning and Public Policy based on financial need. Preference will be given to students studying Public Health and Health Disparities and whose educational objectives are similar to or likely to further the legacy of E. Mae McCarroll, who was active in various civic and community affairs.

ROBIN AND ROBERT J. NARDI ENDOWED SCHOLARSHIP

Recipients are to be selected among full-time undergraduate students at the Edward J. Bloustein School of Planning and Public Policy based on academic merit and financial need.

Course Listing (EJB-U)

COURSE LISTING

Explanation of Three-Part Course Numbers

Explanation of Three-Part Course Numbers

The number preceding each course title is divided into three parts. The first two digits are the administrative code (standing for a faculty or a school), the next three digits are the subject code, and the final three digits are the course code.

Administrative Codes

The code for the Bloustein School is 10. For a complete list of administrative codes used in this catalog, see the beginning of the Programs, Faculty, and Courses section.

Subject Codes

A subject code comprises the third through fifth digits in all course numbers and indicates the subject matter of the course. Courses with the following subject codes are listed in this chapter:

170 City and Regional Planning

501 Health Administration

652 Medical Ethics and Policy

762 Planning and Public Policy

775 Policy, Health, and Administration

832 Public Health

833 Public Policy

843 Public Administration and Management

971 Urban Planning and Design

975 Urban Studies

Note: At this time, there are no specific courses for Disability Studies (304) or Health Equity. These are interdisciplinary minors with courses taken from different schools and programs.

Course Codes

The course code comprises the sixth, seventh, and eighth digits in all course numbers. Course codes from 100 to 299 indicate introductory and intermediate undergraduate courses. Codes from 300 to 499 indicate advanced undergraduate courses.

Two course codes separated by a comma indicate that each semester may be taken independently of the other (example: 10:832:491,492). Two course codes separated by a hyphen indicate that satisfactory completion of the first semester is a prerequisite to the second semester; the first semester may be taken for credit without taking the second, except where a statement is added to indicate that both semester courses must be completed in order to receive credit.

Credits awarded for the successful completion of each course are indicated in parentheses following the course title. The notation BA indicates that the number of credits is determined by arrangement with the department offering the course.

Course Listing (EJB-U)

Health Administration 501

Health Administration 501 Course Listing

This list includes the required core courses and electives for the undergraduate health administration (501) major and minor offered at the Bloustein School as of September 1, 2025. Courses are taught by multiple instructors and may not be offered every semester.

Undergraduate health administration major requirements, and the complete list of undergraduate health administration core courses and electives offered, may be found at the Bloustein School website here.

Students should refer to WebReg for information about special topics courses.

10:501:203 ***Introduction to Health Administration (3)***
CORE COURSE

Introduction of administrative theory to health care delivery, policy, and planning. Focus on managerial structures and functions and their application in the health care workplace.

10:501:207 ***Accounting for Supervisors and Managers (3)***
CORE COURSE

An introductory course that gives a basic understanding of accounting, including basic corporate operations, preparation of financial statements, basic accounting principles, etc.

10:501:260 ***Health Care Systems (3)***
CORE COURSE

Introduction to the elements of the American health care system including provider roles, the basic structure of health systems, financial aspects, and the legal and regulatory framework.
Credit not given for this course and 10:832:260.

10:501:296,297 ***Special Topics (3,3)***
ELECTIVE

See WebReg for current offerings. This course is designed to address current issues in health administration.

10:501:298,299 ***Independent Study (BA,BA)***
ELECTIVE

Prerequisites: Students must contract with a faculty sponsor and be granted permission by the program director.

10:501:310 ***Administrative Issues for Health Care Managers (3)***
CORE COURSE

Exploration of how managers work with staff in health care delivery to develop job descriptions, provide incentives, perform evaluations, support promotions, and recommend training.

10:501:332 ***Health Care Economics (3)***
CORE COURSE

Examination of microeconomics within the context of the supply and demand for health care services. Focus on health insurance and the behaviors of health care consumers and providers.

10:501:333 ***Financial Aspects of Health Administration (3)***
CORE COURSE

Review of financial management tools for various health care delivery settings. Interpret financial information and understand the processes performed by financial departments of an institution.

10:501:335 ***Population Health (3)***
CORE COURSE

Study of the principles and methods of epidemiology; the application of epidemiologic methods to the heath care setting including outcomes measures, decision-making, and infection control concepts.

10:501:342 ***Long-Term Care Management (3)***
ELECTIVE

Review of management techniques and practices for those seeking a career in long-term care management. Emphasis on skilled nursing home care, assisted living, adult day care, home health care hospice, and senior retirement communities.

10:501:354 ***Marketing for Health Organizations (3)***
CORE COURSE

Overview of the marketing process, strategic planning, consumerism, the competitive environment, and the marketing mix as they relate to modern health organizations.
Credit not given for this course and 10:832:354.

10:501:355 ***Health Administration Consulting (3)***
ELECTIVE

Introduces the principles of healthcare consulting, focusing on strategic problem-solving, data analysis, and client management within healthcare organizations.

10:501:356 ***Health Care Ethics and Law (3)***
CORE COURSE

Introduction to ethics and law in the health care delivery and clinical settings including an examination of the rights of the patient and their decision makers.

10:501:360 ***Managing Public Sector Organizations (3)***
ELECTIVE

Examines the fundamental tasks and responsibilities of management in the public sector, with an emphasis on the external and internal environments in which managers implement public policy.
Credit not given for both this course and 10:833:360 or 10:762:360 or 10:843:360.

10:501:362 ***Nonprofit Management (3)***
ELECTIVE

Applies management concepts to nonprofit organizations, emphasizing the challenges faced by managers under resource scarcity and uncertain boundaries among public, for-profit, and nonprofit sectors.
Credit not given for both this course and 10:833:362.

10:501:363 ***Health Systems Operations (3)***
CORE COURSE

Study of an integrated and strategic approach to operations management that transforms complex health policy into efficient operations that improve care, clinical operations, and financial outcomes.

10:501:395 ***Data Management in Health Care (3)***
CORE COURSE

Students will gain an introductory understanding of health care data and how analytical programs such as Excel can be utilized to leverage data for decision-making opportunities within an organization. This course will cover the basics of Excel and data quality to identify trends and summarize analysis of various scenarios that may occur within the health care industry.

10:501:410 ***Information Systems for Health Care (3)***
CORE COURSE

Exploration of the types and uses of information systems; their management and strategic application; related privacy policies; and their transformative role in health care delivery.
Open to majors only. Prerequisites: 10:501:203 or 10:832:334 and 10:501:333 or 10:832:333.

10:501:412 ***Introduction to LEAN for Health Care (3)***
ELECTIVE

Understand and apply the LEAN management system that eliminates waste, improves employees' satisfaction, and assures better patient care.

10:501:420 ***Human Resource Management in Health Administration (3)***
ELECTIVE

Utilizes psychology, management and economics to explore the management of staff in the nation's largest and fastest growing industry.

10:501:425 ***Financial Management (3)***
CORE COURSE

In-depth application of financial theory to health care systems, including financial analysis and forecasting, strategic formulation, and economic application.
Open to 501 and 832 majors only. Prerequisite: 10:501:333.

10:501:483,484 ***Special Topics (3,3)***
ELECTIVES.

These courses are designed to address current issues in health administration. See WebReg for current offerings

10:501:485,486 ***Independent Study (BA,BA)***
ELECTIVES.
Prerequisite: Students must contract with a faculty sponsor and be granted permission by the program director.

10:501:497,498 ***Bloustein Honors Research (3,3)***
ELECTIVES.

Participation of advanced undergraduates as research assistants at one of the institutes or centers at the Bloustein School. Students contract with and are supervised by the principal investigator of the project.

Course Listing (EJB-U)

Medical Ethics and Policy 652

Medical Ethics and Policy 652 Course Listing

This list includes the required core courses and electives for the undergraduate medical ethics and policy (652) minor offered at the Bloustein School as of September 1, 2025. Courses are taught by multiple instructors and may not be offered every semester.

Medical ethics and health policy minor requirements, and the complete list of undergraduate medical ethics and policy courses offered, may be found at the Bloustein School website here.

Students should refer to WebReg for information about special topics courses.

10:652:201 ***Foundations of Medical Ethics and Policy (3)***
CORE COURSE

Students explore the conceptual foundations of medical ethics that challenge the practice of medicine and health research in different world settings.
Credit cannot be given for both this course and 01:730:248.

10:652:296,297 ***Special Topics (3,3)***
ELECTIVE

Topics vary. See WebReg for current offerings. This course is designed to address current issues in planning and public policy.

10:652:298,299, 498, 499 *Independent Study (BA,BA)*
ELECTIVE
Prerequisites: A contract with a faculty sponsor and permission of the program director.

10:652:400 *Research Ethics (3)*
CORE COURSE

Examines the origins of contemporary research ethics and paradigm studies that contributed to modern day rules and regulations. Particular attention is given to ethical issues arising in research involving vulnerable populations and research in international settings.

Course Listing (EJB-U)

Planning and Public Policy 762

Planning and Public Policy 762 Course Listing

The planning and public policy major and minor are no longer accepting new students for enrollment as of October 2024. Courses are offered for those students enrolled in the major and minor prior to October 2024. More information may be found at the Bloustein School website here.

This list includes the core and elective courses offered by the planning and public policy (762) major and minor at the Bloustein School as of September 1, 2025. Courses are taught by multiple instructors and may not be offered every semester.

Students should refer to WebReg for information about special topics courses.

10:762:103 *Introduction to Urban Studies (3)*
A general introduction to urban studies leading into the history of cities, suburbs, and the urban system, politics and economics of cities and metropolitan areas, and the peopling of urban areas.
Credit not given for this course and 10:971:101 and 10:975:101.

10:762:200 *Introduction to City & Regional Planning (3)*
Deploys a rigorous tradition of analysis, interdisciplinary practice, and justice-oriented creativity to challenges such as climate adaptation justice, effective public transportation and water infrastructure, affordable housing, and democratic decision-making
Credit not given for this course and 10:971:200 or 10:170:200.

10:762:201 *Introduction to Urban Planning and City Design (3)*
Introduction to the purpose of plans and planning including domains such as housing, land use, and transportation with an emphasis on solutions to local problems.
Credit not given for both this course and 10:971:201.

10:762:202 ***Designing Healthy Cities (3)***
A review of the nature of America's cities and suburbs from their original planning to their ultimate reality and their effects on human health and well-being.
Credit not given for both this course and 10:832:202, 10:971:202, and 10:975:202.

10:762:230 ***Global Poverty (3)***
Introduction to the causes and governmental responses to urban poverty in developing nations: economic, historical, and cultural factors.
Credit not given for both this course and 10:833:230 and 10:975:230.

10:762:231 ***Poverty in the United States (3)***
Assessment of causes and consequences of poverty in the United States: economic, historical, and cultural factors, plus governmental solutions.
Credit not given for both this course and 10:833:231 and 10:975:231.

10:762:232 ***Economics of Poverty (3)***
Uses economic concepts, theories, tools, evidence, and analyses to examine poverty in the United States.
Credit not given for both this course and 10:833:232 and 10:975:232 and 10:170:232

10:762:233 ***The Urban World (3)***
Interdisciplinary perspectives on the study of cities, historical and contemporary, and urban processes and problems.
Credit not given for both this course and 10:975:233.

10:762:235 ***Urban Health (3)***
Exploration of patterns of disease and disability associated with global urban populations: understanding the factors contributing to them and evaluating policies intended to reduce the burden of disease.
Credit not given for both this course and 10:170:235 or 10:832:235.

10:762:250 ***Introduction to GIS (3)***
Study of computing concepts and methods applicable to planning and health, including database management, introduction to geographic information systems (GIS), and graphics.
Credit not given for both this course and 10:971:250.

10:762:295 ***Internship in Public Service (BA)***
Completion of between 40 and 125 hours in the field (1 to 3 credits) doing a preapproved public service internship under the direction of a faculty member.

10:762:296,297 ***Special Topics in Planning and Public Policy (3,3)***
Topics vary. See WebReg for current offerings. This course is designed to address current issues in planning and public policy

10:762:298,299 ***Independent Study (BA,BA)***
Prerequisite: A contract with a faculty sponsor and permission of the program director.

10:762:307 ***Community Development (3)***
Analysis of neighborhood-based community development efforts to address housing, economic, and social issues affecting low-income communities. Resources for community building.
Credit not given for both this course and 10:975:307.

10:762:308 ***Placemaking (3)***
The course examines physical, social, economic, cultural, and political factors to produce a viable design and ensure successful management of a specific public place.
Credit not given for both this course and 10:971:308 and 10:170:308. Cross listed with 34:970:534.

10:762:310 ***U.S. Housing Policy (3)***
Exploration of major issues in housing: historical, economic, and social factors. Political and regulatory dimensions of housing decision-making: housing codes and the landlord-tenant relationship.
Credit not given for both this course and 10:833:310 and 10:975:310.

10:762:311 ***Affordable Housing (3)***
Presents an overview of the idea and history of affordable housing and what it means for housing to be affordable and to whom.
Credit not given for both this course and 10:971:311, 10:170:311 or 10:975:311.

10:762:312 ***Principles of Housing (3)***
Housing and development policy as it has evolved historically and as it is being practiced currently on the federal, state, and local levels. Basic economic factors affecting housing, political context, and social outcomes.
Credit not given for both this course and 10:170:312, 10:971:312 or 10:833:312. Cross listed with 34:970:529.

10:762:313 ***Public and Nonprofit Sector Finance (3)***
An introduction to the ways that the public and nonprofit sectors determine which goods and services they will provide and how they will finance the production of those goods.
Credit not given for this course and 10:170:313, 10:501:313, 10:832:313, 10:833:313, 10:843:313, 10:971:313, or 10:975:313.

10:762:314 ***Graphic Communication for Planning (3)***
Development of basic graphic skills necessary to communicate the visual and spatial characteristics of streets, buildings, and neighborhoods using Autocad, Sketchup, and Photosimulations.
Credit not given for both this course and 10:170:315 or 10:971:315.

10:762:315 ***Fundamentals of Urban Planning and Design (3)***
Focuses on discussions about design within the context of urban planning systems.
Credit not given for both this course and 10:170:315 or 10:971:315.

10:762:316 ***Introduction to Site Planning & Urban Design (3)***
Understanding the impact of physical design on quality of life with a focus on analytic processes for the basic elements of human environments. Fieldwork is required.
Prerequisite: 10:971:201. Credit not given for both this course and 10:971:316 or 10:170:316.

10:762:317 ***Urban Municipal Management (3)***
Introduction to management issues for service delivery (e.g., police and fire, health, housing, transportation, and welfare). Focus on internal organizational structure and leadership.
Credit not given for both this course and 10:975:317, 10:843:317, or 10:170:317.

10:762:318 ***History and Theory of Urban Planning & Design (3)***
Assessment of major ideas in city and regional planning since the early 19th century. Origin, growth, and impact of these ideas on the evolution of planning in the context of intellectual, social, and technological change.
Credit not given for both this course and 10:170:318 or 10:971:318.

10:762:320 ***Protecting Public Health and the Environment (3)***
Assessment of the policies and realities facing places trying to protect community health in the face of economic feasibility and political forces.
Credit not given for both this course and 10:832:320 and 10:170:320.

10:762:324 ***Social Movements (3)***
Exploration of how social movements translate changing social values into political forces. Issues include democracy, environment, health, human rights, labor, peace, and women.
Credit not given for both this course and 10:833:324.

10:762:326 ***Sustainable Food & Energy Policy (3)***
Examines through an interdisciplinary lens the interconnectedness of sustainability-focused policy across diverse sectors such as food and agriculture, urban planning, and energy, and their collective impact on health outcomes.
Credit not given for this course and 10:833:326.

10:762:329 ***Managing Crisis & Chaos (3)***
Focuses on the key aspects of managing crises and disasters including strategic planning, crisis communications, organizational learning, recognizing internal and external threats, leadership, and prevention/preparedness.
Credit not given for this course and 10:833:329.

10:762:331 ***U.S. Social Policy (3)***
Examination of the historical emergence of social policy in the United States with a focus on housing, welfare, race relations, education, intergovernmental, and environmental issues.
Credit not given for both this course and 10:833:331.

10:762:332 ***Public Transportation & Equitable Accessibility (3)***
Explores the history, evolution, and challenges of public transportation in the U.S., examining whether the federal transit program has met its original goals of equitable access.
Credit not given for both this course and 10:170:332 or 10:971:332.

10:762:335 ***Women, Inequality, and Public Policy (3)***
Exploration of women's evolving role in both family and the labor market and addresses contemporary public policy debates around these changes.
Credit not given for both this course and 10:833:335. Cross-listed with 34:833:591.

10:762:337 ***Population Health and Urbanization (3)***
This course introduces students to the health impacts of industrialization and urbanization from the mid-18th century through the early 21st century.

10:762:340 ***Aging and Public Policy (3)***
Examination of aging and public policy including ageism, cultural and racial-ethnic diversity as it pertains to aging, and the impact of longevity on national health and social service diversity.
Credit not given for both this course and 10:833:323 or 10:832:323.

10:762:346 ***Program Evaluation (3)***
Study of evaluation tools that ensure programs are effective after their implementation. Focus on the framework, key concepts, and standards of effective evaluation.
Credit not given for both this course and 10:833:346, 10:170:346 or 10:971:346.

10:762:352 ***Technology in the City (3)***
Exploration of the social and economic implications of new communications technologies for urban life. Includes consideration of e-commerce, online education, e-government, and infrastructure needs.
Credit not given for both this course and 10:775:352 and 10:975:352.

10:762:354 ***Immigration Policy (3)***
Explores the roots of today's modern immigration policy, including border and citizenship policy as well as how states and localities have responded to changes in federal immigration policy.
Credit not given for both this course and 10:833:354 or 10:170:354.

10:762:360 ***Managing Public Sector Organizations (3)***
Examines the fundamental tasks and responsibilities of management in the public sector, with an emphasis on the external and internal environments in which managers implement public policy.
Credit not given for both this course and 10:833:360 or 10:843:360 or 10:501:360.

10:762:361 ***Managing People and Organizations (3)***
Introduction to organizational theory and concepts of management. Explores approaches that promote and hinder effective management.
Credit not given for both this course and 10:833:361 or 10:843:361.

10:762:362 ***Nonprofit Management (3)***
Applies management concepts to nonprofit organizations, emphasizing the challenges faced by managers under resource scarcity and uncertain boundaries among public, for-profit, and nonprofit sectors.
Credit not given for both this course and 10:501:362 or 10:833:362

10:762:371 ***Globalization, Sustainability, and Justice (3)***
Examines the core issues of the social, economic, environmental, and political dimensions of developing sustainable, just societies.

10:762:394 ***Data Visualization & Storytelling (3)***
This course introduces students to Data Visualization. It will cover important data visualization techniques which will be useful for a broad range of applications across public, government, social and business domains. Students will learn to work with a broad variety of datasets to create advanced visualizations and professional report-ready data visualizations.
Credit not given for both this course and 10:170:394, 10:832:394, 10:833:394, or 10:971:394. Cross listed with 34:833:535.

10:762:413 ***Urban Revitalization (3)***
Assessment of the causes of urban decline and subsequent renewal efforts. Emphasis on contemporary programs such as neighborhood renovation, gentrification, historic preservation, and economic development.

10:762:440 ***Principles of Real Estate (3)***
Analysis of real estate in the marketplace, the organization and services of the real estate industry, and the tools of real estate practitioners.
Cross-listed with 34:970:604.

10:762:448 ***Historic Preservation (3)***
Overview of historical evolution of the preservation movement in the United States, examining important public preservation regulations and programs and the economics of historic preservation.
Credit not given for both this course and 10:170:448 and 10:971:448. Cross-listed with 34:970:521.

10:762:461 ***Voorhees Research Seminar (3)***
The Ralph W. Voorhees Public Service Fellows will work with Middlesex County Food Organization and Outreach Distribution Services to research innovative 1) models of emergency food delivery and 2) regional/local emergency food coalitions.

10:762:463 ***Environmental Law & Policy (3)***
Understanding of the legal principles behind environmental constraints on land use, including critical areas, farmland preservation, water and sewer facilities, storm water and erosion management, and more.
Credit not given for both this course and 10:971:463 or 10:170:463.

10:762:465 ***Environmental Activism, Justice & Change (3)***
This course examines how systems of power produce unjust environmental and climate conditions, how local and global activists respond to and engage with environmental injustice, and the relevance of environmental activism for urban planning and policymaking. The course examines three main questions: 1) How are certain groups systematically burdened with environmental hazards and when do activists mobilize? 2) What tactics do they employ and why? 3) What constitutes an environmental justice planning success or failure and what can we - as citizens and planners - do to improve our community's environmental justice record?
Credit not given for both this course and 10:971:465 or 10:170:465. Cross-listed with 34:970:574.

10:762:472 ***Transportation Planning (3)***
Study of planning for transit, pedestrian, and bicycle priority networks and land uses at various scales.
Credit not given for both this course and 10:971:472.

10:762:483,484 ***Special Topics (3,3)***
Topics vary. See WebReg for current offerings. These courses are designed to address current issues in planning and policy.

10:762:485,486 ***Independent Study (BA,BA)***
Open to 762 majors only. Prerequisites: A contract with a faculty sponsor and permission of the program director.

10:762:497,498 ***Bloustein Honors Research (3,3)***
Participation of advanced undergraduates as research assistants at one of the institutes or centers at the Bloustein School. Students contract with and are supervised by the principal investigator of the project.

Course Listing (EJB-U)

Policy, Health, and Administration 775

Policy, Health, and Administration 775 Course Listing

Policy, Health, and Administration

The Policy, Health, and Administration sequence of courses represent a series of skills and competences that extend among and between the major program and discipline areas including:

- 170 City and Regional Planning
- 501 Health Administration
- 652 Medical Ethics and Policy
- 832 Public Health
- 833 Public Policy
- 843 Public Administration and Management
- 971 Urban Planning and Design
- 975 Urban Studies

This list includes the policy, health, and administration (775) courses offered at the Bloustein School as of September 1, 2025. **Many of these courses are also requirements in other major sequences.**

Please see the curriculum specified for each major by visiting the Bloustein School website here.

10:775:101 ***Introduction to Planning, Policy, and Health (3)***
Overview of public health, public policy, and urban planning with an emphasis on how these fields intersect in a U.S. context.

10:775:205 ***Basic Statistical Methods (4)***
Introduction to descriptive and inferential statistics, data presentation, and analysis: sampling methods, probability, estimation, hypothesis testing, and chi-square.

10:775:297 ***Exploratory Internship (BA)***
Working with a health care professional, students learn about the roles and functions within the field.

10:775:300 ***Writing for Professionals (3)***
Formulate ideas, use critical thinking, and analyze information to produce the types of appropriate, clear, and effective writing used by professionals.

10:775:395 ***Research Methods (4)***
Research concepts and skills applied to public health, public policy, and planning. Includes development of original and online data sources, coding, appropriate selection of statistical methods for analysis, and professional presentation of results.

10:775:396 ***Data Visualization for Health, Administration, and Policy (3)***
Learn how to design and create ways to communicate numeric information to public health, policy, planning, and administrative audiences using Excel and other common software. Formats include infographics, fact sheets, and slides for budget and other presentations.

10:775:450 ***Leadership Seminar (3)***
Application and synthesis of skills to analyze options, set priorities, communicate goals, and demonstrate emotional intelligence. Focus on leadership, collaboration, professionalism, and project management.
Open to majors only.

10:775:493,494 ***Bloustein Honors Research I,II (3,3)***
Bloustein Honors Research I,II is a two-semester, six-credit course sequence for students enrolled in the Bloustein Honors Research Program. The program is a formal, supervised yearlong project that involves both a peer classroom learning environment under the guidance of the course instructor and research with an individual faculty mentor.

10:775:499 ***Professional Practice Internship (6)***
Completion of a 225-hour professional experience requiring completion of an outcomes-driven project under the supervision of a field preceptor and a faculty supervisor. Projects are presented in a public forum.
Prerequisites: 10:775:395, 10:775:450, and 100 credits toward graduation.

Course Listing (EJB-U)

Public Health 832

Public Health 832 Course Listing

This list includes the required core courses and electives for the undergraduate public health (832) major and minor offered at the Bloustein School as of September 1, 2025. Courses are taught by multiple instructors and may not be offered every semester.

Public health major requirements, and the complete list of undergraduate public health courses and electives offered, may be found at the Bloustein School website here.

Students should refer to WebReg for information about special topics courses.

10:832:201 ***Principles of Public Health (3)***
CORE COURSE

Introduction to the U.S. public health system. Focus on health and the life course, and how personal and environmental health relates to social, economic, cultural, psychological, and political factors. Measurements of community health status.

10:832:202 ***Designing Healthy Cities (3)***
ELECTIVE

A review of America's cities and suburbs from their original planning stage to their ultimate reality and how it affects human health and well-being.
Credit not given for both this course and 10:762:202, 10:971:202, and 10:975:202.

10:832:212 ***Health Disparities (3)***
CORE COURSE

Examination of how structural and social determinants—including race, socioeconomic status, gender, nativity, housing, education, and employment—contribute to persistent health inequities across U.S. populations.

10:832:235 ***Urban Health (3)***
ELECTIVE

Exploration of patterns of disease and disability associated with global urban populations: understanding the factors contributing to them and evaluating policies intended to reduce the burden of disease.
Credit not given for both this course and 10:762:235 or 10:170:235..

10:832:240 ***Global Health Perspectives (3)***
CORE COURSE

Examination of how sociocultural, economic, environmental, and political forces contribute to vulnerability and inequality in different countries, and their impact on health and well-being.
Credit not given for both this course and 09:910:240.

10:832:241 ***Principles of Health Education (3)***
ELECTIVE

Introduction to the health education learning theory/models aimed at health promotion, disease prevention, and behavioral change at the individual, family, and community level.

10:832:242 ***Principles of Health and Wellness (3)***
ELECTIVE

Examination of health promotion and behaviors, human growth and wellness, disease prevention, nutrition, and the ramifications of lifestyle choices from a personal, community, and societal perspective.

10:832:243 ***Wellness Learning Community (3)***
ELECTIVES

In a shared learning experience, students examine wellness at personal, institutional, and community levels.

10:832:252 ***Health and Social Justice (3)***
ELECTIVE

Introduction to social justice issues, health equity and policy, determinants of health, and health disparities, with a focus on individual and community health.
Credit not given for both this course and 01:377:252.

10:832:253 ***Lesbian, Gay, Bisexual, Transgender and Queer Public Health (3)***
ELECTIVE

Evaluate the disparities and health care needs of LGBTQ populations; review current policy issues, initiatives, and affirming strategies related to LGBTQ health.

10:832:254 ***Health and Cancer Terminology (3)***
ELECTIVE

This course provides a fluent understanding of health and cancer terminology for future health and public health professionals seeking to understand the complex language related to cancer.

10:832:255 ***Bullying, Violence, and Society (3)***
ELECTIVE

Explore the relationship between mass media and violence; consider the epidemiology, risk factors, and treatments for aggressive and violent behavior and their impact on victims, perpetrators, and society.

10:832:260 ***Health Care Systems (3)***
ELECTIVE

Review of elements of the American health care system, including provider components, financing of health care, and basic structure of public policymaking and public health systems.
Credit not given for both this course and 10:501:260.

10:832:262 ***Peer Education Advocacy (3)***
ELECTIVE

Training in health outreach, promotion, advocacy, and education in order to serve as peer-educators on topics such as mental health and alcohol and/or other drug use.
Prerequisite: Permission of instructor. Course not open to seniors.

10:832:291 (1 Credit), 295 (4 Credits); 292, 293, 294, 296, 297 (All 3 Credits) ***Special Topics (as shown)***
ELECTIVE

Topics vary. See WebReg for current offerings. This course is designed to address current issues in public health.

10:832:298,299 ***Independent Study (BA,BA)***
ELECTIVE
Prerequisites: A contract with a faculty sponsor and permission of the program director.

10:832:301 ***Sexual Health Advocacy (3)***
ELECTIVE

Opportunities for learning new information about sexual health and community development, strengthening critical thinking skills, and broadening empathy for others.
Prerequisite: Permission of instructor. Course not open to seniors.

10:832:302 ***Sexual and Reproductive Health Policy (3)***
ELECTIVE

Examination of the health, political, and moral influences that impact current sexual and reproductive health policies. Focus on the origins of reproductive health policies and the ramification of their implementation.
Credit not given for both this course and 10:833:302.

10:832:313 ***Public & Nonprofit Sector Finance (3)***
ELECTIVE

An introduction to the ways that the public and nonprofit sectors determine which goods and services they will provide and how they will finance the production of those goods.
Credit not given for this course and 10:170:313, 10:762:313, 10:833:313 or 10:843:313.

10:832:320 ***Protecting Public Health and the Environment (3)***
ELECTIVE

Overview of the policies and realities facing communities trying to protect community health in the face of economic feasibility and political forces.
Credit not given for both this course and 10:762:320.

10:832:321 ***Environmental and Occupational Health (3)***
ELECTIVE

Examination of contemporary topics in environmental and occupational health, including workers' compensation, ergonomics, hazardous waste, and air and water pollution.

10:832:323 ***Demography and Population Studies (3)***
ELECTIVE

Review of demographic concepts, methods, and applications from an interdisciplinary perspective. Global population studies, with a historical focus on distributions of wealth and power.
Credit not given for both this course and 10:762:323, 10:775:323, or 10:833:323.

10:832:326 ***Sustainable Food & Energy Policy (3)***
ELECTIVE

Examines through an interdisciplinary lens the interconnectedness of sustainability-focused policy across diverse sectors such as food and agriculture, urban planning, and energy, and their collective impact on health outcomes.
Credit not given for this course and 10:170:326, 10:762:326, or 10:833:326.

10:832:332 ***Health Economics (3)***
ELECTIVE

Examination of microeconomics within the context of the demand for health and the allocation of public resources to improve the public's health.

10:832:334 ***Public Health Management (3)***
ELECTIVE

Overview of fundamental management practices in public health settings including leadership, team building, credentialing and standards, regulatory oversight, budgeting, and professionalism.
Credit not given for both this course and 11:375:406.

10:832:335 ***Epidemiology (3)***
CORE COURSE

Study of the principles and methods of epidemiology: the study of the distribution (patterns of occurrence) and determinants (causes) of disease and injury in human populations.
Pre- or corequisite: Statistics or Precalculus and 10:832:201

10:832:336 ***Information Systems for Public Health (3)***
ELECTIVE

Connects the role of information systems in the well-established domains of public health to highlight the impact of technology in social determinants of health, government regulations, health information exchange, and dynamic trends across public health.

10:832:337 ***Population Health and Urbanization (3)***
ELECTIVE

The health impacts of industrialization and urbanization from the last 100 years, with examples from the literature and former industrial clusters located within 20 miles of our campus, as well as from Asia and other areas of the world.

10:832:338 ***Health and Public Policy (3)***
ELECTIVE

Investigation of the basic machinery of policymaking and the legal processes that underpin the U.S. health care and public health systems with an emphasis on recent health care reform.
Credit not given for both this course and 10:833:338.

10:832:339 ***Public Health Literature (3)***
CORE COURSE

Review of the historic and current public health literature, intensive writing, and various forms of communication emphasized, including summaries of resources, preparing public presentations, and a public service announcement.

10:832:340 ***Aging and Public Policy (3)***
ELECTIVE

Overview of aging and public policy including ageism, cultural and racial-ethnic diversity as it pertains to aging, and the impact of longevity on national health and social service delivery.
Credit not given for both this course and 10:762:340 or 10:833:340.

10:832:341 ***Public Health and Aging (3)***
ELECTIVE

Overview of the physical, mental, and social aspects of aging. Focus is placed on the implications of aging for families and communities, wellness models, long-term care, reimbursement, and health care delivery issues.

10:832:343 ***Public Health & Disability (3)***
ELECTIVE

Examine public health programs, policies, and systems that impact the health and well-being of people with disabilities across the lifespan.

10:832:345 ***Health Program Development (3)***
ELECTIVE

Understanding of the planning process for the promotion and improvement of the public's health through individual, group, institutional, and community-level interventions.

10:832:346 ***Health Program Evaluation (3)***
ELECTIVE

Study of evaluation tools that ensure public health actions are effective after their implementation. Focus on the framework, key concepts, and standards of effective evaluation.

10:832:350 ***Drugs, Culture, and Society (3)***
ELECTIVE

Overview of the history, physical/psychological effects, current trends, and legal/social consequences of drugs. Discussion of prevention, intervention, and treatment approaches.

10:832:351 ***Addictions Policy (3)***
ELECTIVE

Review of basic pharmacology and scientific nature of addiction as public health issue. Exposure to treatment facilities, mutual aid meetings, and discussions of substance abuse policies.
Credit not given for both this course and 10:833:351.

10:832:352 ***Community Health Promotion (3)***
ELECTIVE

Dimensions of health education concepts and theory as applied to the community level. Focus on community assessment, capacity building, and evaluation.
Prerequisite: 10:832:241.

10:832:353 ***Science of Prevention (3)***
ELECTIVE

Introduction to the theory and methods of prevention in alcohol, drug, and tobacco addiction at the individual, family, and community level.
Prerequisite: 10:832:350.

10:832:356 ***Public Health Law and Ethics (3)***
CORE COURSE

Introduction to public health law, ethics, and advocacy. A key theme is the health and well-being of the community versus the rights of the individual. .

10:832:360 ***Managing Public Sector Organizations (3)***
ELECTIVE

Examines the fundamental tasks and responsibilities of management in the public sector, with an emphasis on the external and internal environments in which managers implement public policy.
Credit not given for both this course and 10:170:360, 10:501:360, 10:762:360, 10:833:360 or 10:843:360.

10:832:362 ***Nonprofit Management (3)***
ELECTIVE

Applies management concepts to nonprofit organizations, emphasizing the challenges faced by managers under resource scarcity and uncertain boundaries among public, for-profit, and nonprofit sectors.
Credit not given for both this course and 10:170:362, 10:501:362, 10:762:362 or 10:833:362.

10:832:363 ***LGBTQIA+ Policy (3)***
ELECTIVE

Explores the history of LGBTQIA+ political movements, their impact on public policy, how intersecting identities correlate to public strategy, and how the media has affected the movement.
Credit not given for both this course and 10:833:363

10:832:371 ***Special Topics (1)***
ELECTIVE

This 1-credit course is designed to address current issues in public health. Topics vary. See WebReg for current offerings.

10:832:372, 373, 374 ***Special Topics (3, 3, 3)***
ELECTIVE

This 3-credit course is designed to address current issues in public health. Topics vary. See WebReg for current offerings

10:832:375 ***Special Topics (4)***
ELECTIVE

This 4-credit course is designed to address current issues in public health. Topics vary. See WebReg for current offerings.

10:832:401 ***Public Health Preparedness I (3)***
ELECTIVE

Dimensions of biological, chemical, and radiological agents that have the potential to cause widespread harm to public health. Scenarios for various exposures and public health responses are presented.

10:832:402 ***Public Health Preparedness II (3)***
ELECTIVE

Review of emergency management concepts as they apply to public health including enhancing emergency response and minimizing the impact of disasters. Case studies and interactive exercises will be conducted.

10:832:404 ***Emerging Infectious Diseases (3)***
ELECTIVE

Consideration of the public health impacts of new and emerging infectious diseases in global populations.
Prerequisite: 10:832:335 or permission of instructor.

10:832:405 ***Cancer and Society (3)***
ELECTIVE

Exploration of the epidemiology of cancer, including the cultural and political history of the disease, global burden, causal mechanisms, disparities, cancer survivorship, and prevention.
Prerequisite: 10:832:335 or permission of instructor.

10:832:406 ***Cancer Surveillance I (3)***
ELECTIVE

Covers the fundamentals of cancer registration and surveillance, including history of cancer registries, cancer as a disease, the different types and functions of cancer registries, statutory laws, privacy and confidentiality, data collection, standards and coding, quality assurance and education, cancer surveillance systems, data utilization and research.

10:832:413 ***Advanced Topics in Health Disparities (3)***
ELECTIVE

Investigates the primary ways in which health disparities are produced and reproduced, with a focus on structural and institutional forces in different domains.
Prerequisite: 10:832:212.

10:832:414 ***Culture and Health (3)***
ELECTIVE

Analysis of belief and value systems rooted in families, along with perceptions and experiences of health/wellness and disease/illness. Discussion of traditional practitioners and alternative healers.

10:832:415 ***Women and Health (3)***
ELECTIVE

Assessment of issues raised by women's health care needs and by women's participation in the health labor force in the context of contemporary feminist thought.

10:832:416 ***Mental Health and Society (3)***
ELECTIVE

Exploration of historical and contemporary policies regarding mental health care in the United States. Deinstitutionalization, public versus private care facilities, patient and consumer empowerment.
Credit not given for both this course and 10:833:416.

10:832:438 ***Environmental and Public Health Practice (6)***
ELECTIVE

Preparation to sit for the Registered Environmental Health Specialist (REHS) examination including an intensive review program and a 200-hour internship at a local health department.
Prerequisites: 32 credits of science and math and permission of the department. Offered during Summer Session only.

10:832:440 ***Global Public Health (3)***
ELECTIVE

Assessment of the wide range of global health issues and the various policies and programs nations adopt to deal with them.
Prerequisite: 10:832:240.

10:832:484 ***Special Topics (3)***
ELECTIVES

Topics vary. See WebReg for current offerings. These courses are designed to address current issues in public health.

10:832:485,486 ***Independent Study (BA,BA)***
ELECTIVE
Open to 832 majors only. Prerequisites: Students must contract with a faculty sponsor and be granted permission by the program director.

10:832:497,498 ***Bloustein Honors Research (3,3)***
ELECTIVE

Advanced undergraduates conduct applied research in public health under the supervision of a faculty member.

Course Listing (EJB-U)

Public Policy 833

Public Policy 833 Course Listing

This list includes the required core courses and electives for the undergraduate public policy (833) major and minor offered at the Bloustein School as of September 1, 2025. Courses are taught by multiple instructors and may not be offered every semester.

Undergraduate public policy major requirements, and the complete list of public policy courses and electives offered, may be found at the Bloustein School website here.

Students should refer to WebReg for information about special topics courses.

10:833:102 ***Introduction to Public Policy (3)***
ELECTIVE

Introduction to policy analysis by applying concepts from political science, economics, sociology, statistics, and science to current policy issues affecting the country and the world.
Credit not given for both this course and 10:762:102 and 10:843:102.

10:833:210 ***Principles of Public Policy (3)***
CORE COURSE

Implementation of public policy including federal, state, and intergovernmental decision-making. Policy areas examined include environment, health care, development, labor, and others.
Credit not given for both this course and 10:762:210 and 10:843:210.

10:833:215 ***Writing, Reasoning, and Public Policy (3)***
CORE COURSE

Understanding how to use words accurately, think and write logically, and formulate valid and true arguments for the creation of evaluation of public policy.
Credit not given for both this course and 10:762:215.

10:833:220 ***Public Economic Policy (3)***
CORE COURSE

Evaluation of government decision-making and its effects on economic markets large and small from cars to textbooks.
Credit not given for both this course and 10:762:220 and 10:843:220.

10:833:230 ***Global Poverty (3)***
ELECTIVE

Introduction to the causes and governmental responses to urban poverty in developing nations: economic, historical, and cultural factors
Credit not given for both this course and 10:762:230.

10:833:231 ***Poverty in the United States (3)***
ELECTIVE

Assessment of causes and consequences of poverty in the United States: economic, historical, and cultural factors, plus governmental solutions.
Credit not given for both this course and 10:762:231.

10:833:232 ***Economics of Poverty (3)***
ELECTIVE

Uses economic concepts, theories, tools, evidence, and analyses to examine poverty in the United States.
Credit not given for both this course and 10:762:232 and 10:975:232 and 10:170:232

10:833:296, 297 ***Special Topics (3,3)***
ELECTIVE

Topics vary. See WebReg for current offerings. These courses are designed to address current issues in public policy

10:833:298,299 ***Independent Study (BA,BA)***
ELECTIVE

Prerequisites: A contract with a faculty sponsor and permission of the program director.

10:833:302 ***Sexual and Reproductive Health Policy (3)***
ELECTIVE

Assessment of the health, political, and moral influences that impact current sexual and reproductive health policies including their origins and the ramification of their implementation.
Credit not given for both this course and 10:832:302.

10:833:310 ***U.S. Housing Policy (3)***
ELECTIVE

Exploration of major issues in housing: historical, economic, and social factors. Political and regulatory dimensions of housing decision-making: housing codes and the landlord-tenant relationship.
Credit not given for both this course and 10:762:310 and 10:975:310.

10:833:312 ***Principles of Housing (3)***
ELECTIVE

Housing and development policy as it has evolved historically and as it is being practiced currently on the federal, state, and local levels. Basic economic factors affecting housing, political context, and social outcomes.
Credit not given for both this course and 10:762:312, 10:971:312 or 10:170:312. Cross listed with 34:970:529.

10:833:313 ***Public and Nonprofit Sector Finance (3)***
ELECTIVE

An introduction to the ways that the public and nonprofit sectors determine which goods and services they will provide and how they will finance the production of those goods.
Credit not given for this course and 10:170:313, 10:501:313, 10:762:313, 10:832:313, 10:843:313, 10:971:313, or 10:975:313.

10:833:323 ***Demography and Population Studies (3)***
ELECTIVE

Review of demographic concepts, history, methods, and applications, from an interdisciplinary perspective. Global population studies, with a historical focus on distributions of wealth and power.
Credit not given for both this course and 10:762:323 and 10:832:323.

10:833:325 ***Education Policy & Social Justice (3)***
ELECTIVE

Examines the intersection of education policy and social justice, including the impacts on equity of school segregation, changes to school funding and policies such as charter schools, forced school closings, and using high-stakes standardized testing to evaluate students, teachers, and public schools.

10:833:326 Sustainable *Food and Energy Policy (3)*
ELECTIVE

Examines, through an interdisciplinary lens, the interconnectedness of sustainability-focused policy across diverse sectors, such as food and agriculture, urban planning, and energy, and their collective impact on health outcomes.
Credit not given for this course and 10:762:326.

10:833:327 *The Racial Wealth Gap and Why It Persists (3)*
ELECTIVE

Explores policies and practices that worsen the racial wealth gap; identifies the barriers that prevent stakeholders from changing those policies; and introduces experts and advocates currently working to tackle those barriers.

10:833:328 *Legislative Policy Making (3)*
ELECTIVE

Examines policy making in the states with a special focus on governors and state legislatures, and the processes by which policies are determined (including legislative representation, lobbying, agenda setting, issue campaigning, etc.)

10:833:329 *Managing Crisis and Chaos (3)*
ELECTIVE

Focuses on the key aspects of managing crises and disasters including strategic planning, crisis communications, organizational learning, recognizing internal and external threats, leadership, and prevention/preparedness.
Credit not given for this course and 10:762:329.

10:833:331 *U.S. Social Policy (3)*
ELECTIVE

Examination of the historical emergence of social policy in the United States with a focus on housing, welfare, race relations, education, intergovernmental, and environmental issues.
Credit not given for both this course and 10:762:331.

10:833:335 *Women, Inequality, and Public Policy (3)*
ELECTIVE

Exploration of women's evolving role in both the family and the labor market, including contemporary public policy debates around these changes.
Credit not given for both this course and 10:762:335.

10:832:338 *Health and Public Policy (3)*
ELECTIVE

Investigation of the basic machinery of policymaking and the legal processes that underpin the U.S. health care and public health systems with an emphasis on recent health care reform.
Credit not given for both this course and 10:832:338.

10:833:340 ***Aging and Public Policy (3)***
ELECTIVE

Assessment of aging for society. Topics include ageism, cultural and racial-ethnic diversity as it pertains to aging, and the impact of longevity on national health and social service policy.
Credit not given for both this course and 10:762:340.

10:833:346 ***Program Evaluation (3)***
ELECTIVE

Study of evaluation tools that ensure programs are effective after their implementation. Focus on the framework, key concepts, and standards of effective evaluation.
Credit not given for both this course and 10:170:346, 10:762:346 or 10:971:346.

10:833:351 ***Addictions Policy (3)***
ELECTIVE

Review of basic pharmacology and the scientific nature of addiction as a public health issue. Exposure to treatment facilities, mutual aid meetings, and discussions of substance abuse policies.
Credit not given for both this course and 10:832:351.

10:833:353 ***Disability Policy & Law (3)***
ELECTIVE

Examines laws that most substantively impact individuals with disabilities (e.g., Vocational Rehabilitation Act, Individuals with Disabilities Education Act, Americans with Disabilities Act, Social Security and Medicare/ Medicaid), including their implementation, court interpretations, and individuals' lived experiences.

10:833:354 ***Immigration Policy (3)***
ELECTIVE

Explores the roots of today's modern immigration policy, including border and citizenship policy as well as how states and localities have responded to changes in federal immigration policy.

10:833:360 ***Managing Public Sector Organizations***
CORE COURSE

Examines the fundamental tasks and responsibilities of management in the public sector, with an emphasis on the external and internal environments in which managers implement public policy.
Credit not given for both this course and 10:762:360 or 10:843:360 or 10:501:360.

10:833:361 ***Managing People and Organizations (3)***
CORE COURSE

Designed to enhance understanding of one's own motivation and behavior as well as that of others, to increase effectiveness in present and future positions and career satisfaction.
Credit not given for both this course and 10:762:361 and 10:843:361.

10:833:362 ***Nonprofit Management (3)***
CORE COURSE

Applies management concepts to nonprofit organizations, emphasizing the challenges faced by managers under resource scarcity and uncertain boundaries among public, for-profit, and nonprofit sectors.
Credit not given for both this course and 10:501:362 or 10:762:362.

10:833:363 ***LGBTQIA+ Policy (3)***
ELECTIVE

Explores the history of LGBTQIA+ political movements, their impact on public policy, how intersecting identities correlate to public strategy, and how the media has affected the movement.

10:833:364 ***Children, Law and Public Policy (3)***
ELECTIVE

Explores two key tensions in public policy about children: Parental rights to raise their children vs. state duties to protect children and mold future generations; and children as small adults with a full range of adult autonomy vs. children as a uniquely vulnerable class of people requiring special protection.

10:833:365 ***Higher Education Policy (3)***
ELECTIVE

Examines the historic and contemporary policy debates in higher education and the tradeoffs between affordability, access, quality, academic freedom, and accountability. Covers federal, state, and local roles in policymaking and addresses a key challenge in applying policy theory to higher education policy because of the limited role of the federal government.

10:833:366 ***Criminal Justice Policy (3)***
ELECTIVE

Explores the criminal legal system's far-reaching impact on housing, employment, education, child rearing, and healthcare, particularly for lower-income and otherwise marginalized groups. Students formulate comprehensive policy proposals aimed at rectifying disparities and promoting social justice.

10:833:367 ***Media, Democracy and Public Policy (3)***
ELECTIVE

Examines how our democracy is influenced by the media and the impact that has on our politics, our elected officials, and public policy.

10:833:368 ***Equity in State Policymaking (3)***
ELECTIVE

Evaluating public policies adopted in the 50 states known as the ¿laboratories of democracy¿ with a focus on identifying, measuring, and comparing policies of equality, equity, and fairness that at times extend and limit the rights of American citizens.

10:833:372 ***Urban Revitalization (3)***
ELECTIVE

Assessment of the causes of urban decline and subsequent renewal efforts. Emphasis on contemporary programs such as neighborhood renovation, gentrification, historic preservation, and economic development.
Credit not given for both this course and 10:762:372 and 10:170:372 and 10:971:372.

10:833:381 ***Special Topics (1)***
ELECTIVE

This 1-credit course is designed to address current issues in public policy. Topics vary. See WebReg for current offerings.

10:833:382 ***Special Topics (4)***
ELECTIVE

This 4-credit course is designed to address current issues in public policy. Topics vary. See WebReg for current offerings.

10:833:383,384,385,386, 387 (3) ***Special Topics (3)***
ELECTIVE

These 3-credit courses are designed to address current issues in public policy. Topics vary. See WebReg for current offerings.

10:833:394 ***Data Visualization & Storytelling (3)***
ELECTIVE

This course introduces students to Data Visualization. It will cover important data visualization techniques which will be useful for a broad range of applications across public, government, social and business domains. Students will learn to work with a broad variety of datasets to create advanced visualizations and professional report-ready data visualizations.
Credit not given for both this course and 10:170:394, 10:762:394, 10:832:394, 10:843:394, or 10:971:394. Cross listed with 34:833:535.

10:833:416 ***Mental Health & Society (3)***
ELECTIVE

Exploration of historical and contemporary policies regarding mental health care in the United States. Deinstitutionalization, public versus private care facilities, patient and consumer empowerment.
Credit not given for both this course and 10:832:416.

10:833:417 ***Impacted Folks Leading Policy Change (3)***
ELECTIVE

Focuses on the realities faced by impacted folks that advocate for policies at all levels of government. Particular attention paid to the role of power, politics, poverty, and educational access and attainment.

10:833:418 ***Political Communications for Public Policy (3)***
ELECTIVE

Explores how to translate often complex policy ideas into readily understandable language. Focuses on framing policies, testing messaging through focus groups and polling, and winning public approval through public statements and social media.

10:833:483,484 ***Special Topics (3,3)***
ELECTIVE

Topics vary. See WebReg for current offerings. These courses are designed to address current issues in public policy.

10:833:485,486 ***Independent Study (BA,BA)***
ELECTIVE

Open to public policy (833) majors only. Prerequisites: Students must contract with a faculty sponsor and be granted permission by the program director.

10:833:495,496 ***Public Policy Thesis I,II (3,3)***
ELECTIVE

Develop, complete, and defend a thesis topic under the supervision of a faculty mentor.
Open to students with GPAs over 3.4 and a faculty supervisor.

10:775:493,494 ***Bloustein Honors Research I,II (3,3)***
ELECTIVE

Bloustein Honors Research I,II is a two-semester, six-credit course sequence for students enrolled in the Bloustein Honors Research Program. The program is a formal, supervised yearlong project that involves both a peer classroom learning environment under the guidance of the course instructor and research with an individual faculty mentor.

10:833:497,498 ***Bloustein Honors Research (3,3)***
ELECTIVE

Participation of advanced undergraduates as research assistants at one of the institutes or centers at the Bloustein School. Students contract with and are supervised by the principal investigator of the project.
Open to students enrolled in the Bloustein School only.

Course Listing (EJB-U)

Public Administration and Management 843

Public Administration and Management 843 Course Listing

This list includes the required core courses for the undergraduate public administration and management (843) minor offered at the Bloustein School as of September 1, 2025. Courses are taught by multiple instructors and may not be offered every semester.

Public administration and management minor requirements, and the complete list of public administration and management courses and electives offered, may be found at the Bloustein School website here.

Students should refer to WebReg for information about special topics courses.

10:843:209 ***Introduction to Public Administration***
CORE COURSE

Introduction to the foundational elements of government and public administration. Overview of the essential characteristics of government, such as revenue collection, expenditure, and government workforce.

10:843:210 ***Principles of Public Policy (3)***
CORE COURSE

Implementation of public policy including federal, state, and intergovernmental decision-making. Policy areas examined include environment, health care, development, labor, and others.
Credit not given for both this course and 10:762:210 or 10:833:210.

10:843:313 ***Public and Nonprofit Sector Finance (3)***
CORE COURSE

An introduction to the ways that the public and nonprofit sectors determine which goods and services they will provide and how they will finance the production of those goods.
Credit not given for both this course and 10:170:313, 10:762:313, 10:832:313, or 10:833:313.

10:843:360 ***Managing Public Sector Organizations***
CORE COURSE

Examines the fundamental tasks and responsibilities of management in the public sector, with an emphasis on the external and internal environments in which managers implement public policy.
Credit not given for both this course and 10:501:360 or 10:833:360 or 10:762:360.

10:843:394 ***Data Visualization & Storytelling (3)***
ELECTIVE

This course introduces students to Data Visualization. It will cover important data visualization techniques which will be useful for a broad range of applications across public, government, social and business domains. Students will learn to work with a broad variety of datasets to create advanced visualizations and professional report-ready data visualizations.
Credit not given for both this course and 10:170:394, 10:762:394, 10:832:394, 10:833:394, or 10:971:394. Cross-listed with 34:833:535.

Urban Planning and Design 971

Urban Planning and Design 971 Course Listing

This list includes the required core courses and electives for the undergraduate urban planning and design (971) major and minor offered at the Bloustein School as of September 1, 2025. Courses are taught by multiple instructors and may not be offered every semester.

Urban planning and design major requirements, and the complete list of urban planning and design courses offered, may be found at the Bloustein School website here.

Students should refer to WebReg for information about special topics courses.

10:971:101 ***Introduction to Urban Studies (3)***
ELECTIVE

A general introduction to urban studies leading into the history of cities, suburbs, and the urban system, politics and economics of cities and metropolitan areas, and the peopling of urban areas.
Credit not given for this course and 10:762:103, 10:975:101 or 10:170:101.

10:971:200 ***Introduction to City & Regional Planning (3)***
ELECTIVE

Deploys a rigorous tradition of analysis, interdisciplinary practice, and justice-oriented creativity to challenges such as climate adaptation justice, effective public transportation and water infrastructure, affordable housing, and democratic decision-making.
Credit not given for this course and 10:170:200 or 10:762:200.

10:971:201 ***Introduction to Urban Planning and Design (3)***
CORE COURSE

Introduction to the purpose of plans and planning including planning domains such as housing, land use, and transportation with an emphasis on solutions to local problems.
Credit not given for both this course and 10:762:201.

10:971:202 ***Designing Healthy Cities (3)***
CORE COURSE

A review of the nature of America's cities and suburbs from their original planning stage to their ultimate reality and how it affects human health and well-being.
Credit not given for both this course and 10:762:202, 10:832:202, and 10:975:202

10:971:233 ***The Urban World (3)***
ELECTIVE

Interdisciplinary perspectives on the study of cities, historical and contemporary, and urban processes and problems.
Credit not given for both this course and 10:762:233 or 10:975:233

10:971:250 ***Introduction to GIS (3)***
CORE COURSE

Review of computing concepts and methods applicable to planning and health, including database management, introduction to GIS, and graphics.
Credit not given for both this course and 10:762:250.

10:971:296,297 ***Special Topics (3,3)***
ELECTIVE

Topics vary. See WebReg for current offerings. This course is designed to address current issues in planning and public policy.

10:971:298,299 ***Independent Study (BA,BA)***
ELECTIVE
Prerequisites: A contract with a faculty sponsor and permission of the program director.

10:971:307 ***Community Development (3)***
ELECTIVE

Analysis of neighborhood-based community development efforts to address housing, economic, and social issues affecting low-income communities. Resources for community building.
Credit not given for both this course and 10:975:307, 10:762:307, or 10:170:307.

10:971:308 ***Placemaking (3)***
ELECTIVE

The course examines physical, social, economic, cultural, and political factors to produce a viable design and ensure successful management of a specific public place.
Credit not given for both this course and 10:971:308 and 10:762:308. Cross-listed with 34:970:534.

10:971:310 ***U.S. Housing Policy (3)***
ELECTIVE

Exploration of major issues in housing: historical, economic, and social factors. Political and regulatory dimensions of housing decision-making: housing codes and the landlord-tenant relationship.
Credit not given for both this course and 10:833:310, 10:975:310, 10:170:310, or 10:762:310.

10:971:311 ***Affordable Housing (3)***
ELECTIVE

Presents an overview of the idea and history of affordable housing and what it means for housing to be affordable and to whom.
Credit not given for both this course and 10:762:311, 10:170:311 or 10:975:311.

10:971:312 ***Principles of Housing (3)***
ELECTIVE

Housing and development policy as it has evolved historically and as it is being practiced currently on the federal, state, and local levels. Basic economic factors affecting housing, political context, and social outcomes.
Credit not given for both this course and 10:762:312, 10:170:312 or 10:833:312. Cross listed with 34:970:529.

10:971:313 ***Public & Nonprofit Sector Finance (3)***
ELECTIVE

An introduction to the ways that the public and nonprofit sectors determine which goods and services they will provide and how they will finance the production of those goods.
Credit not given for this course and 10:170:313, 10:762:313, 10:832:313, 10:833:313, or 10:843:313.

10:971:314 ***Graphic Communication for Planners (3)***
CORE COURSE

Development of basic graphic skills necessary to communicate the visual and spatial characteristics of streets, buildings, and neighborhoods using Autocad, Sketchup, and Photosimulations.

10:971:315 ***Fundamentals of Urban Design (3)***
CORE COURSE

This course is an open lecture class that will focus on discussions about design within the context of urban planning systems.
Credit not given for both this course and 10:762:315.

10:971:316 ***Introduction to Site Planning and Urban Design (3)***
CORE COURSE

Understanding the impact of physical design on quality of life with a focus on analytic processes for the basic elements of human environments. Fieldwork is required.
Prerequisite: 10:971:201. Credit not given for both this course and 10:762:316.

10:971:317 ***Urban Municipal Management (3)***
ELECTIVE

Introduction to management issues for service delivery (e.g., police and fire, health, housing, transportation, and welfare). Focus on internal organizational structure and leadership.
Credit not given for both this course and 10:975:317.

10:971:318 ***History and Theory of Urban Planning and Design (3)***
CORE COURSE

Assessment of major ideas in city and regional planning since the early 19th century. Origin, growth, and impact of these ideas on the evolution of planning in the context of intellectual, social, and technological change.
Credit not given for both this course and 10:762:318.

10:971:319 ***Bridging Public Health & Urban Planning (3)***
ELECTIVE

Uses an interdisciplinary perspective to study the intersection of public health and urban planning. Will examine the prevention, assessment, and communication or management of an issue that connects public health outcomes to planning decisions and activities.

10:971:332 ***Public Transportation & Equitable Accessibility (3)***
ELECTIVE

Explores the history, evolution, and challenges of public transportation in the U.S., examining whether the federal transit program has met its original goals of equitable access.
Credit not given for both this course and 10:762:332 or 10:170:332.

10:971:395 ***Methods of Planning Analysis (3)***
CORE COURSE

Review of research concepts and skills applied to planning. Includes development of original online data sources, coding, appropriate selection of statistical methods for analysis, and the professional presentation of results.
Open to 971 majors only.

10:971:396, 397, 398 ***Special Topics (3,3,3)***
ELECTIVE

Topics vary. See WebReg for current offerings. This course is designed to address current issues in planning and public policy.

10:971:400 ***Internship (3)***
ELECTIVE

Completion of a 125-hour field experience in a planning agency.
Prerequisites: 10:971:395, senior status, and a faculty sponsor.

10:971:403 ***Advanced Graphic Communication (3)***
CORE COURSE

Develop advanced graphics skills and learn to communicate complex visual and spatial plans to clients.
Prerequisites: 10:971:201 and 10:971:316.

10:971:404 ***Planning and Design Studio I (3)***
CORE COURSE

Application and synthesis of planning theory under the supervision of a professional planner to develop site plans, graphics, and form-based codes for a small town.
Pre- or corequisite: 10:971:403.

10:971:405 ***Planning and Design Studio II (3)***
CORE COURSE

Development of a comprehensive plan for a sustainable small town, including a professional quality report and group presentation of the deliverable.
Prerequisite: 10:971:404.

10:971:413 ***Urban Revitalization (3)***
ELECTIVE

Assessment of the causes of urban decline and subsequent renewal efforts. Emphasis on contemporary programs such as neighborhood renovation, gentrification, historic preservation, and economic development.
Credit not given for both this course and 10:975:413 , 10:762:413, or 10:833:415.

10:971:448 ***Historic Preservation (3)***
ELECTIVE

Overview of historical evolution of the preservation movement in the United States, examining important public preservation regulations and programs and the economics of historic preservation.
Credit not given for both this course and10:762:448 or 10:170:448. Cross-listed with 34:970:521.

10:971:463 ***Environmental Law & Policy (3)***
CORE COURSE

Understanding of the legal principles behind environmental constraints on land-use, including critical areas, farmland preservation, water and sewer facilities, storm water and erosion management, and more.
Credit not given for both this course and 10:762:463 or 10:170:463.

10:971:464 ***Planning & the Global Environment (3)***
ELECTIVE

This course examines broad environmental factors that are outside the control of a singular community, some of the issues that emerge, and challenges and opportunities to address them. Through a critical reading of scholarly and gray literature, we analyze the role of political, social, and economic institutions and organizations in shaping our understanding and approaches to the global environment.
Cross-listed with 34:970:680.

10:971:465 ***Environmental Activism, Justice & Change (3)***
ELECTIVE

This course examines how systems of power produce unjust environmental and climate conditions, how local and global activists respond to and engage with environmental injustice, and the relevance of environmental activism for urban planning and policymaking. The course examines three main questions: 1) How are certain groups systematically burdened with environmental hazards and when do activists mobilize? 2) What tactics do they employ and why? 3) What constitutes an environmental justice planning success or failure and what can we - as citizens and planners - do to improve our community's environmental justice record?
Cross-listed with 34:970:574.

10:971:472 ***Transportation Planning (3)***
ELECTIVE

Study of planning for transit, pedestrian, and bicycle priority networks and land uses at various scales.
Credit not given for both this course and 10:762:472.

10:971:483,484 ***Special Topics (3,3)***
ELECTIVES

Topics vary. See WebReg for current offerings. These courses are designed to address current issues in planning and public policy

10:971:485,486 ***Independent Study (BA,BA)***
ELECTIVES
Prerequisites: Students must contract with a faculty sponsor and be granted permission by the program director.

10:971:497,498 ***Bloustein Honors Research (3,3)***
ELECTIVES

Participation of advanced undergraduates as research assistants at one of the institutes or centers at the Bloustein School. Students contract with and are supervised by the principal investigator of the project.

Course Listing (EJB-U)

Urban Studies 975

Urban Studies 975 Course Listing

This list includes the required core courses and electives for the undergraduate urban studies (975) minor offered at the Bloustein School as of September 1, 2025. Elective courses are taught by multiple instructors and may not be offered every semester.

Urban studies minor requirements, and the complete list of urban studies courses and electives offered, may be found at the Bloustein School website here.

Students should refer to WebReg for information about special topics courses.

10:975:101 ***Introduction to Urban Studies (3)***
CORE COURSE

A general introduction to urban studies leading into the history of cities, suburbs, and the urban system, politics and economics of cities and metropolitan areas, and the peopling of urban areas.
Credit not given for both this course and 10:170:101, 10:971:101, or 10:762:101.

10:975:202 ***Designing Healthy Cities (3)***
ELECTIVE

A review of the nature of America's cities and suburbs from their original planning to their ultimate reality and their effects on human health and well-being.
Credit not given for both this course and 10:170:202, 10:762:202, 10:775:202, 10:832:202, or 10:971:202.

10:762:230 ***Global Poverty (3)***
ELECTIVE

Introduction to the causes and governmental responses to urban poverty in developing nations: economic, historical, and cultural factors.
Credit not given for both this course and 10:170:230, 10:762:230 or 10:833:230.

10:975:231 ***Poverty in the United States (3)***
Assessment of causes and consequences of poverty in the United States: economic, historical, and cultural factors, plus governmental solutions.
Credit not given for both this course and 10:170:231, 10:762:231 or 10:833:231.

10:975:233 ***The Urban World (3)***
ELECTIVE

Interdisciplinary perspectives on the study of cities, historical and contemporary, and urban processes and problems.
Credit not given for both this course and 10:170:233, 10:762:233 or 10:971:233.

10:975:235 ***Urban Health (3)***
ELECTIVE

Exploration of patterns of disease and disability associated with global urban populations: understanding the factors contributing to them and evaluating policies intended to reduce the burden of disease.
Credit not given for both this course and 10:170:235, 10:762:235 or 10:832:235.

10:975:296,297 ***Special Topics (3,3)***
ELECTIVE

Topics vary. See WebReg for current offerings. This course is designed to address current issues in planning and public policy.

10:975:298,299 ***Independent Study (BA,BA)***
ELECTIVE
Prerequisites: A contract with a faculty sponsor and permission of the program director.

10:975:307 ***Community Development (3)***
ELECTIVE

Analysis of neighborhood-based community development efforts to address housing, economic, and social issues affecting low-income communities. Resources for community building.
Credit not given for both this course and 10:170:307 or 10:762:307.

10:975:310 ***U.S. Housing Policy (3)***
ELECTIVE

Exploration of major issues in housing: historical, economic, and social factors. Political and regulatory dimensions of housing decision-making: housing codes and the landlord-tenant relationship.
Credit not given for both this course and 10:170:310, 10:762:310 or 10:833:310.

10:975:352 ***Technology in the City (3)***
ELECTIVE

Exploration of the social and economic implications of new communications technologies for urban life. Includes consideration of e-commerce, online education, e-government, and infrastructure needs.
Credit not given for both this course and 10:170:352, 10:762:352 or 10:775:352.

10:975:413 ***Urban Revitalization (3)***
ELECTIVE

Assessment of the causes of urban decline and subsequent renewal efforts. Emphasis on contemporary programs such as neighborhood renovation, gentrification, historic preservation, and economic development.
Credit not given for both this course and 10:170:413, 10:762:413 or 10:971:413.

10:975:483,484 ***Special Topics (3,3)***
ELECTIVE

These courses are designed to address current issues in urban studies. Topics vary. See WebReg for current offerings.

10:975:485,486 ***Independent Study (BA,BA)***
ELECTIVE

Prerequisites: Students must contract with a faculty sponsor and be granted permission by the program director.

10:975:498,499 ***Bloustein Honors Research (3,3)***
ELECTIVE

Participation of advanced undergraduates as research assistants at one of the institutes or centers at the Bloustein School. Students contract with and are supervised by the principal investigator of the project.

Course Listing (EJB-U)

CITY AND REGIONAL PLANNING 170

City and Regional Planning 170 Course Listing

This list includes the core and elective courses offered by the city and regional planning (170) major and minor at the Bloustein School as of September 1, 2025. Courses are taught by multiple instructors and may not be offered every semester.

City and regional planning major requirements, and the complete list of undergraduate city and regional planning courses, may be found at the Bloustein School website here.

Students should refer to WebReg for information about special topics courses.

10:170:101 ***Introduction to Urban Studies (3)***
ELECTIVE

A general introduction to urban studies leading into the history of cities, suburbs, and the urban system, politics and economics of cities and metropolitan areas, and the peopling of urban areas.
Credit not given for this course and 10: 971:101 and 10:975:101 and 10:762:103.

10:170:200 ***Introduction to City and Regional Planning (3)***
CORE COURSE

Deploys a rigorous tradition of analysis, interdisciplinary practice, and justice-oriented creativity to challenges such as climate adaptation justice, effective public transportation and water infrastructure, affordable housing, and democratic decision-making.
Credit not given for this course and 10:971:200 or 10:762:200.

10:170:*201 Introduction to Urban Planning and Design (3)*
ELECTIVE

Introduction to the purpose of plans and planning including domains such as housing, land use, and transportation with an emphasis on solutions to local problems.
Credit not given for both this course and 10:971:201 and 10:762:201.

10:170:202 *Designing Healthy Cities (3)*
ELECTIVE

A review of the nature of America's cities and suburbs from their original planning to their ultimate reality and their effects on human health and well-being.
Credit not given for both this course and 10:832:202, 10:971:202, and 10:975:202 and 10:762:202.

10:170:230 *Global Poverty (3)*
ELECTIVE

Introduction to the causes and governmental responses to urban poverty in developing nations: economic, historical, and cultural factors.
Credit not given for both this course and 10:833:230 and 10:975:230 and 10:762:230.

10:170:231 *Poverty in the United States (3)*
ELECTIVE

Assessment of causes and consequences of poverty in the United States: economic, historical, and cultural factors, plus governmental solutions.
Credit not given for both this course and 10:833:231 and 10:975:231 and 10:762:231.

10:170:232 *Economics of Poverty (3)*
ELECTIVE

Uses economic concepts, theories, tools, evidence, and analyses to examine poverty in the United States.
Credit not given for both this course and 10:833:232 and 10:975:232 and 10:762:232.

10:170:233 *The Urban World (3)*
PLANNING SPECIALIZATION

Interdisciplinary perspectives on the study of cities, historical and contemporary, and urban processes and problems.
Credit not given for both this course and 10:975:233 and 10:762:233.

10:170:235 *Urban Health (3)*
PLANNING SPECIALIZATION

Exploration of patterns of disease and disability associated with global urban populations: understanding the factors contributing to them and evaluating policies intended to reduce the burden of disease.
Credit not given for both this course and 10:762:235 or 10:832:235.

10:170:250 ***Introduction to GIS (3)***
CORE COURSE

Study of computing concepts and methods applicable to planning and health, including database management, introduction to geographic information systems (GIS), and graphics.
Credit not given for both this course and 10:971:250 and 10:762:250.

10:170:295 ***Internship in Public Service (BA)***
ELECTIVE

Completion of between 40 and 125 hours in the field (1 to 3 credits) doing a preapproved public service internship under the direction of a faculty member.

10:170:296,297 Special Topics in City and Regional Planning (3,3)
ELECTIVE

Topics vary. See WebReg for current offerings. This course is designed to address current issues in planning and public policy

10:170:298,299 ***Independent Study (BA,BA)***
ELECTIVE

Prerequisite: A contract with a faculty sponsor and permission of the program director.

10:170:302 ***Design Sustainability (3)***
CORE COURSE

The course introduces important design concepts and skills to city and regional planning with a focus on sustainable urbanism, climate change and resilience, and environmental issues.
Credit not given for both this course and 10:971:302.

10:170:307 ***Community Development (3)***
PLANNING SPECIALIZATION

Analysis of neighborhood-based community development efforts to address housing, economic, and social issues affecting low-income communities. Resources for community building.
Credit not given for both this course and 10:975:307 and 10:762:307.

10:170:308 ***Placemaking (3)***
ELECTIVE

The course examines physical, social, economic, cultural, and political factors to produce a viable design and ensure successful management of a specific public place.
Credit not given for both this course and 10:971:308 and 10:762:308. Cross listed with 34:970:534.

10:170:310 ***U.S. Housing Policy (3)***
PLANNING SPECIALIZATION

Exploration of major issues in housing: historical, economic, and social factors. Political and regulatory dimensions of housing decision-making: housing codes and the landlord-tenant relationship.
Credit not given for both this course and 10:833:310 and 10:975:310 and 10:762:310.

10:170:311 ***Affordable Housing (3)***
PLANNING SPECIALIZATION

Presents an overview of the idea and history of affordable housing and what it means for housing to be affordable and to whom.
Credit not given for both this course and 10:762:311, 10:971:311 or 10:975:311.

10:170:312 ***Principles of Housing (3)***
ELECTIVE

Housing and development policy as it has evolved historically and as it is being practiced currently on the federal, state, and local levels. Basic economic factors affecting housing, political context, and social outcomes.
Credit not given for both this course and 10:762:312, 10:971:312 or 10:833:312. Cross listed with 34:970:529.

10:170:313 ***Public and Nonprofit Sector Finance (3)***
ELECTIVE

An introduction to the ways that the public and nonprofit sectors determine which goods and services they will provide and how they will finance the production of those goods.
Credit not given for this course and 10:833:313 and 10:843:313 and 10:762:313 and 10:832:313 and 10:501:313 and 10:975:313.

10:170:314 ***Graphic Communication for Planning (3)***
CORE COURSE

Development of basic graphic skills necessary to communicate the visual and spatial characteristics of streets, buildings, and neighborhoods using Autocad, Sketchup, and Photosimulations.
Credit not given for both this course and 10:762:315 or 10:971:315.

10:170:315 ***Fundamentals of Urban Planning and Design (3)***
ELECTIVE

Focuses on discussions about design within the context of urban planning systems.
Credit not given for both this course and 10:762:315 or 10:971:315.

10:170:316 ***Introduction to Site Planning & Urban Design (3)***
ELECTIVE

Understanding the impact of physical design on quality of life with a focus on analytic processes for the basic elements of human environments. Fieldwork is required.
Prerequisite: 10:971:201. Credit not given for both this course and 10:971:316 or 10:762:316.

10:170:317 ***Urban Municipal Management (3)***
ELECTIVE

Introduction to management issues for service delivery (e.g., police and fire, health, housing, transportation, and welfare). Focus on internal organizational structure and leadership.
Credit not given for both this course and 10:975:317, 10:843:317, or 10:762:317.

10:170:318 ***History and Theory of Urban Planning & Design (3)***
ELECTIVE

Assessment of major ideas in city and regional planning since the early 19th century. Origin, growth, and impact of these ideas on the evolution of planning in the context of intellectual, social, and technological change.
Credit not given for both this course and 10:762:318 or 10:971:318.

10:170:320 ***Protecting Public Health and the Environment (3)***
ELECTIVE

Assessment of the policies and realities facing places trying to protect community health in the face of economic feasibility and political forces.
Credit not given for both this course and 10:832:320 and 10:762:320.

10:170:324 ***Social Movements (3)***
ELECTIVE

Exploration of how social movements translate changing social values into political forces. Issues include democracy, environment, health, human rights, labor, peace, and women.
Credit not given for both this course and 10:833:324 and 10:762:324 and 10:975:324.

10:170:326 ***Sustainable Food & Energy Policy (3)***
ELECTIVE

Examines through an interdisciplinary lens the interconnectedness of sustainability-focused policy across diverse sectors such as food and agriculture, urban planning, and energy, and their collective impact on health outcomes.
Credit not given for this course and 10:833:326 and 10:762:326.

10:170:329 ***Managing Crisis & Chaos (3)***
ELECTIVE

Focuses on the key aspects of managing crises and disasters including strategic planning, crisis communications, organizational learning, recognizing internal and external threats, leadership, and prevention/preparedness.
Credit not given for this course and 10:833:329 and 10:762:329.

10:170:331 ***U.S. Social Policy (3)***
ELECTIVE

Examination of the historical emergence of social policy in the United States with a focus on housing, welfare, race relations, education, intergovernmental, and environmental issues.
Credit not given for both this course and 10:833:331 and 10:762:331.

10:170:332 ***Public Transportation & Equitable Accessibility (3)***
ELECTIVE

Explores the history, evolution, and challenges of public transportation in the U.S., examining whether the federal transit program has met its original goals of equitable access.
Credit not given for both this course and 10:762:332 or 10:971:332.

10:170:335 ***Women, Inequality, and Public Policy (3)***
ELECTIVE

Exploration of women's evolving role in both family and the labor market and addresses contemporary public policy debates around these changes.
Credit not given for both this course and 10:833:335 and 10:762:335. Cross-listed with 34:833:591.

10:170:337 ***Population Health and Urbanization (3)***
ELECTIVE

This course introduces students to the health impacts of industrialization and urbanization from the mid-18th century through the early 21st century.
Credit not given for both this course and 10:832:337

10:170:340 ***Aging and Public Policy (3)***
ELECTIVE

Examination of aging and public policy including ageism, cultural and racial-ethnic diversity as it pertains to aging, and the impact of longevity on national health and social service diversity.
Credit not given for both this course and 10:833:323 or 10:832:323 and 10:762:323.

10:170:346 ***Program Evaluation (3)***
ELECTIVE

Study of evaluation tools that ensure programs are effective after their implementation. Focus on the framework, key concepts, and standards of effective evaluation.
Credit not given for both this course and 10:833:346, 10:762:346 or 10:971:346.

10:170:*352 Technology in the City (3)*
ELECTIVE

Exploration of the social and economic implications of new communications technologies for urban life. Includes consideration of e-commerce, online education, e-government, and infrastructure needs.
Credit not given for both this course and 10:775:352 and 10:975:352 and 10:170:352.

10:170:354 ***Immigration Policy (3)***
ELECTIVE

Explores the roots of today's modern immigration policy, including border and citizenship policy as well as how states and localities have responded to changes in federal immigration policy.
Credit not given for both this course and 10:833:354 or 10:762:354.

10:170:360 ***Managing Public Sector Organizations (3)***
ELECTIVE

Fundamental tasks and responsibilities of management in the public sector, with an emphasis on the external and internal environments in which managers implement public policy.
Credit not given for both this course and 10:833:360 or 10:843:360 or 10:501:360 and 10:762:360.

10:170:362 ***Nonprofit Management (3)***
ELECTIVE

Applies management concepts to nonprofit organizations, emphasizing the challenges faced by managers under resource scarcity and uncertain boundaries among public, for-profit, and nonprofit sectors.
Credit not given for both this course and 10:501:362 or 10:833:362 and 10:762:362.

10:170:371 ***Globalization, Sustainability, and Justice (3)***
ELECTIVE

Examines the core issues of the social, economic, environmental, and political dimensions of developing sustainable, just societies.
Credit not given for both this course and 10:762:371.

10:170:372 ***Urban Revitalization (3)***
ELECTIVE

Assessment of the causes of urban decline and subsequent renewal efforts. Emphasis on contemporary programs such as neighborhood renovation, gentrification, historic preservation, and economic development.
Credit not given for both this course and 10:762:372 and 10:833:372 and 10:971:372.

10:170:395 ***Methods of Planning Analysis (3)***
CORE COURSE

Review of research concepts and skills applied to planning. Includes development of original online data sources, coding, appropriate selection of statistical methods for analysis, and the professional presentation of results.
Open to 170 majors only. Credit not given for both this course and 10:971:395.

10:170:400 ***Internship with Seminar (3)***
CORE COURSE

A 125-hour field experience in the public or private sector, plus a weekly classroom experience. Students complete a project under the supervision of a field preceptor and a faculty supervisor. Projects are presented in a public forum.
Open to 170 majors only with at least 100 credits and no outstanding core requirements.

10:170:430 ***International Urbanization and Housing Issues (3)***
PLANNING SPECIALIZATION

This course actively engages students in a critical examination of international urbanisms particularly in the Global South as well as what planners do, how they do it, and the impacts on the ground. It introduces urban development and housing issues with a particular focus on the content knowledge, planning practices, key actors and power dynamics, and debates that are necessary for gaining global planning literacy.

10:170:440 ***Real Estate Development (3)***
ELECTIVE

Analysis of real estate in the marketplace, the organization and services of the real estate industry, and the tools of real estate practitioners.
Credit not given for both this course and 10:762:440, 10:833:440 or 10:971:440. Cross-listed with 34:970:604.

10:170:448 ***Historic Preservation (3)***
PLANNING SPECIALIZATION

Overview of historical evolution of the preservation movement in the United States, examining important public preservation regulations and programs and the economics of historic preservation.
Credit not given for both this course and 10:971:448 and 10:762:448. Cross-listed with 34:970:521.

10:170:461 ***Voorhees Research Seminar (3)***
ELECTIVE

The Ralph W. Voorhees Public Service Fellows will work with Middlesex County Food Organization and Outreach Distribution Services to research innovative 1) models of emergency food delivery and 2) regional/local emergency food coalitions.

10:170:463 ***Environmental Law and Policy (3)***
ELECTIVE

Understanding of the legal principles behind environmental constraints on land use, including critical areas, farmland preservation, water and sewer facilities, stormwater and erosion management, and more.
Credit not given for both this course and 10:971:463 and 10:762:463.

10:170:464 ***Planning & the Global Environment***
PLANNING SPECIALIZATION

This course examines broad environmental factors that are outside the control of a singular community, some of the issues that emerge, and challenges and opportunities to address them. Through a critical reading of scholarly and gray literature, we analyze the role of political, social, and economic institutions and organizations in shaping our understanding and approaches to the global environment.
Credit not given for both this course and 10:971:464

10:170:465 ***Environmental Activism, Justice & Change (3)***
PLANNING SPECIALIZATION

This course examines how systems of power produce unjust environmental and climate conditions, how local and global activists respond to and engage with environmental injustice, and the relevance of environmental activism for urban planning and policymaking.
Credit not given for both this course and 10:971:465 or 10:762:465. Cross-listed with 34:970:574.

10:170:472 ***Transportation Planning (3)***
PLANNING SPECIALIZATION

Study of planning for transit, pedestrian, and bicycle priority networks and land uses at various scales.
Credit not given for both this course and 10:971:472 and 10:762:472.

10:170:483,484 ***Special Topics (3,3)***
ELECTIVE

Topics vary. See WebReg for current offerings. These courses are designed to address current issues in city and regional planning.

10:170:485,486 ***Independent Study (BA,BA)***
ELECTIVE

Open to 170 majors only. Prerequisites: A contract with a faculty sponsor and permission of the program director.

10:170:497,498 ***Bloustein Honors Research (3,3)***
ELECTIVE

Participation of advanced undergraduates as research assistants at one of the institutes or centers at the Bloustein School. Students contract with and are supervised by the principal investigator of the project.

Administration, Centers, and Faculty (EJB-U)

ADMINISTRATION, CENTERS, AND FACULTY

Office of the Dean

Program and Center Directors

Faculty

Associated Faculty

Fellows

Office of the Dean (EJB-U)

OFFICE OF THE DEAN

Stuart Shapiro, *Professor and Dean*

Jazmine Roberts, *Clerical Assistant*

Katie Cung, *Assistant to the Dean*

Clinton J. Andrews, *Distinguished Professor and Associate Dean for Research*

Theresa Kirby, *Associate Dean of Administration*

Robert B. Noland, *Distinguished Professor and Associate Dean of Faculty*

Julia Sass Rubin, *Professor and Associate Dean of Academic Programs*

Jennifer Senick, *Assistant Dean for Research*

Patricia O'Brien-Richardson, *Associate Teaching Professor; Chief Diversity, Equity, and Inclusion Officer*

Samantha Brannigan, *Research Specialist for Assessment and Accreditation*

Student and Academic Services

Graduate Program

Stephen D. Weston, *Assistant Dean of Academic Administration*

Christina Torian, *Assistant Dean of Undergraduate Education*

Lynn Astorga, *Director of Student Recruitment and Adjunct Faculty*

Cheryl Egan, *Assistant Director for Career Management*

Andrea Garrido, *Assistant Director for Career Management*

Courtney Culler, *Associate Director for Graduate Student Services*

Greg Marrero, *Senior Counselor for Graduate Student Services*

Natashia Huff, *Assistant Director, Undergraduate Student Services*

Jessica Reyes, *Student Counselor, Undergraduate Student Services*

Mekhi Rivers, *Student Counselor, Undergraduate Student Services*

Delvin Thorpe, *Student Counselor and Recruiter, Undergraduate Student Services*

Marie O'Brien, *Administrative Assistant, Student Services*

Business Services

Madelaine Corcoran, *Director, Business Services and Human Resources*

Keri Ferreira, *Department Administrator*

Olufunke Odukoya, *Business Manager*

Katie Cung, *Business Assistant*

Vivian Percoco, *Office Assistant*

Communications and Marketing

Karyn Olsen, *Director, Communications, Marketing & Public Relations*

Tamara Swedberg, *Communications, Social Media, and Website Specialist*

Development

Janet Cole, *Director of Development*

Madison Welch, *Alumni and Development Specialist*

Event Support

Stephanie Kose-Crozier, *Events Manager*

Iram Faisal. *Administrative Assistant*

Facilities

Thomas W. Calhoun, *Assistant Campus Facilities Manager*

Information Technology

Joseph Abraham , *Director, Information Technology Services*

Robert Urbanowicz, *Systems Administrator*

Michael Samman, *Lead Instructional Designer*

Ariel Sanchez, *Unit Computing Manager*

Ravi D'Elia, *Unit Computing Manager*

Program and Center Directors (EJB-U)

PROGRAM AND CENTER DIRECTORS

ACADEMIC PROGRAMS

Undergraduate Programs
Christina Torian, Assistant Dean of Undergraduate Education

Doctoral Program in Planning and Public Policy
Michael Smart, Director

Public Policy Program
Julia Sass Rubin, Director

Urban Planning and Policy Development Program
Mi Shih, Director

Health Administration Program
Soumitra Bhuyan, Executive Director

Informatics Program
Jim Samuel, Executive Director

RESEARCH CENTERS AND INSTITUTES

Bloustein Center for Survey Research
Nancy Wolff, Director
Siobhan Power, Associate Director

Center for Urban Policy Research
Clinton J. Andrews, Director
David Listokin, Associate Director
Jennifer Senick, Executive Director

- Bloustein Local
- Built Environment and Green Building
- Infrastructure Networks
- Environmental Analysis and Communications Group
- Urban Policy

John J. Heldrich Center for Workforce Development
Carl Van Horn, Director
Andrea Hetling, Associate Director
Laurie Harrington, Executive Director

New Jersey State Policy Lab
Elizabeth Cooner, Executive Director

- Center for Negotiation and Conflict Resolution
- Rutgers Economic Advisory Service (R/ECON)
  Will Irving, Director

Rutgers Urban and Civic Informatics Lab
Piyushimita "Vonu" Thakuriah, Director

Alan M. Voorhees Transportation Center
Robert B. Noland, Director
Leigh Ann Von Hagen, Executive Director

- National Transit Institute
  Geisha Ester, Director
- New Jersey Travel Independence Program (NJTIP @ Rutgers)
  Andrea Lubin, Managing Director
- New Jersey Bicycle & Pedestrian Resource Center
- New Jersey Safe Routes to School

Ralph W. Voorhees Center for Civic Engagement
Kathe Newman, Director

Faculty (EJB-U)

FACULTY

Amy E. Abruzzi, Associate Teaching Professor; Undergraduate Public Health Program Coordinator
B.A., M.L.S., Rutgers; M.A., M.A., New York; Ph.D., M.P.H., UMDNJ-School of Public Health
Teaching and research interests include the prevention of chronic illness and comorbidities; the geography of health, especially urban/rural issues in the United States as well as globally; and environmental and occupational contributions to disease disparities.

Hooshang Amirahmadi, Distinguished Service Professor
B.A. Tabriz (Iran); M.S., Dallas; Ph.D., Cornell
Teaching and research interests include national economic development policies and planning; globalization and international relations; foreign investment and trade; regional economic development; and industrial and technology policy.

Clinton J. Andrews, Distinguished Professor and Associate Dean for Research
Sc.B., Brown; Ph.D., Massachusetts Institute of Technology
Teaching and research interests include the use of technical knowledge in environmental decision making; environmental management; energy policy; and social science aspects of industrial ecology.

Juan Ayala, Associate Professor of Practice
B.S., Rutgers; M.Arch., NJIT
Teaching and research interests include urban design; community participation and visioning; expansion of the semipublic realm; 3-D visualization and image sequencing; critical thinking, decision making and design; and parametric design development in planning.

Bernadette V. Baird-Zars, Assistant Professor
B.A., Swarthmore; M.C.P., MIT; Ph.D., Columbia
Teaching and research interests include land use; local government; implementation and enforcement; transition and uncertainty; environmental justice; institutional analysis; action/project-based learning; longitudinal data; and planning ethics and theory.

Francis Barchi, Associate Professor
B.A., Smith; Ph.D., M.B.E., M.Sc., Pennsylvania
Teaching and research interests include global health ethics; gender-based violence and women's health in sub-Saharan Africa; ethical issues in international research; capacity-building in research ethics in low- and middle-income countries; and ethics education.

Marci Berger, Associate Teaching Professor
B.A., Cornell; M.A., Rutgers; M.P.H., UMDNJ/RWJ Medical School; Ph.D., Rutgers
Teaching and research interests include health policy; public policy; reproductive rights; and poverty in the United States.

Soumitra Bhuyan, Associate Professor and Executive Director, Master of Health Administration Program
M.P.H., Western Kentucky; Ph.D., University of Nebraska Medical Center College of Public Health
Teaching and research interests include chronic disease management; health information systems; and population health.

Debra Borie-Holtz, Associate Teaching Professor
B.A., M.P.A.P., Ph.D., Rutgers
Teaching and research interests include policy formation and implementation; legislative leadership and governing; federal and state regulatory process; women in government; and survey research design, delivery, and data analysis.

Joel Cantor, Distinguished Professor; Director, Center for State Health Policy
B.A., Wisconsin; Sc.D., Johns Hopkins
Teaching and research interests include healthcare financing and delivery; healthcare policy; and access to health services by low-income populations.

Yen-Tyng Chen, Assistant Professor
B.S., M.S., National Taiwan; Ph.D. Emory
Teaching and research interests include HIV status-neutral care; substance use; mental health; social determinants of health; place-based epidemiology; and network epidemiology.

Céu Cirne-Neves, FACHE, Assistant Teaching Professor
B.A., Rutgers; M.P.A., Fairleigh Dickinson; Lean Six Sigma Green Belt, Villanova
Teaching and research interests include leadership development and mentorship; strategic planning & performance excellence; population health (alignment of public health, healthcare, and social services); community needs assessment, health equity and systems alignment; operations management and patient safety; employee engagement and patient experience; diversity and inclusion.

Jocelyn Elise Crowley, Professor
B.A., Cornell; M.P.P., Georgetown; Ph.D., Massachusetts Institute of Technology
Teaching and research interests include American social policy; family policy; and women and politics.

William Cundiff, Assistant Teaching Professor
B.S., MBA, Wagner; J.D., Touro College Law Center
Teaching and research interests include marketing, artificial intelligence, finance, health administration, health policy, and U.S. health systems.

Thomas P. Davis, Assistant Teaching Professor
B.A., Villanova; M.C.R.P., Rutgers; M.P.A., Columbia
Teaching and research interests include comparative health policy; gun safety; social theory; and ethics.

James DeFilippis, Professor
B.A., Vermont; M.A., Ph.D., Rutgers
Teaching and research interests include urban political economy and political philosophy; community development theory and practice; unregulated work and the informal economy; and immigration.

Derek DeLia, Associate Professor
B.A., Rutgers-Camden; M.A., Ph.D., Cornell
Teaching and research interests include healthcare payment and delivery reform; federal and state health policy; performance measurement for accountable care organizations (ACOs); shared savings arrangements; coordination of care for complex patients; emergency medical care; healthcare access; and health insurance coverage.

Aakanksha Deoli, Instructor of Teaching and Undergraduate Internship Coordinator
M.H.A., Rutgers
Teaching interests include maternal health; population health; healthcare disparities; healthcare management; and process improvement.

Barbara Faga, Professor of Professional Practice in Urban Design
B.S., Michigan State; Ph.D., Georgia Institute of Technology
Teaching and research interests include participatory planning; landscape architecture; planning practice and theory; zoning; and urban design.

Anita Franzione, Associate Teaching Professor
B.A., M.P.A., NYU; Dr.P.H., Columbia
Teaching and research interests include U.S. health care systems; aging; long-term care; quality improvement in patient care in various settings; and public health initiatives.

Irina Grafova, Associate Professor
B.S., Moscow State; M.A., New Economic School (Moscow, Russia); Ph.D., University of Michigan
Teaching and research interests include socio-economic inequalities in health; financial strain; financial toxicity of cancer; health policy; healthcare spending; and neighborhoods.

Andrea Hetling, Professor; Associate Director, Heldrich Center for Workforce Development
B.A., Columbia; Ph.D., Maryland
Teaching and research interests include anti-poverty and human services policy; Temporary Assistance for Needy Families (TANF) and the safety net; equity analysis of public policies; social policy implementation; and intimate partner violence.

James W. Hughes, University Professor and Dean Emeritus, Edward J. Bloustein School of Planning and Public Policy
B.S., M.C.R.P., Ph.D., Rutgers
Teaching and research interests include demographics and housing; regional and New Jersey economics; development patterns and transportation.

Carmelo Ignaccolo, Assistant Professor
BEng + MArch, University of Catania; Master's of Architecture and Urban Design (MAUD), Columbia; PhD, Urban Planning, Massachusetts Institute of Technology
Teaching and research interests include spatial inequalities, environmental justice, urban history and historical cartography, heritage and tourism, port cities and waterfronts, climate resilience, digital humanities, shrinking towns, sensory urbanism, data co-creation and participatory mapping, and the Mediterranean region.

Will Irving, Associate Professor of Practice
B.A., University of California Santa Cruz; M.P.P., Rutgers, Edward J. Bloustein School of Planning and Public Policy
Teaching and research interests include economic policy; historical and current tax trends; economic forecasting; economic impact analysis; and quantitative economics.

Radha Jagannathan, Professor
B.A., School of Economics, Delhi (India); M.A., Rutgers; Ph.D., Princeton
Teaching and research interests include school-to-work transition; social capital and community development; culture and human capital development; international comparative studies on youth; poverty, public welfare, and child welfare; and evaluation of social programs.

Jane Kaye, Associate Professor of Teaching
B.A., Pennsylvania; M.B.A., Boston
Teaching and research interests include budget and finance; health economics; health policy; strategic planning; business development; and healthcare management and operations.

Susan Krum, Associate Professor of Teaching
B.S., East Stroudsburg; M.A., Temple; Au.D., Salus
Teaching and research interests include strategic planning; business development; healthcare management; healthcare operations; budget and finance; organizational strategy; and population health.

Ellen Kurtzman, Professor
B.S.N., Pennsylvania School of Nursing; M.P.H., Johns Hopkins; Ph.D., George Washington
Teaching and research interests include the impact of federal, state, and institutional policies on health care delivery; cannabis use and cannabis policy; the role of the health care workforce in achieving higher value care; team-based care; quality of care and the services delivered by nurse practitioners and physician assistants; the influence of performance-based payment programs on practitioner behavior.

Zoe Lindenfeld, Assistant Professor
B.S., Cornell; Ph.D., NYU School of Global Public Health
Teaching and research interests include health policy and services; mitigating factors that perpetuate health inequities for individuals with substance use disorders; mixed-methods research designs; operationalizing harm reduction as an approach to care within clinical settings; racial disparities in the availability of hospital-based substance use treatment; and disparities in the distribution of services for substance use disorders.

David Listokin, Distinguished Professor; Director, Center for Urban Policy Research
B.A., CUNY (Brooklyn); M.C.R.P., Ph.D., Rutgers
Teaching and research interests include housing and land development; development impact assessment; and historic preservation.

Alexandra Lopez, Associate Teaching Professor
B.A., Rutgers; M.A., Kean
Teaching and research interests include clinical supervision in addictions counseling and cultural competency; and clinical service provision within the Latino community.

Kathe Newman, Professor and Director, Ralph W. Voorhees Center for Civic Engagement
B.A., Manhattan; Ph.D., CUNY
Teaching and research interests include urban change, revitalization, and community development; community food planning; housing policy and finance; and economic development.

Fereydoun Nikpour, Professor of Teaching
B.A., M.A., National University of Iran (NUI); M.C.R.P., Ph.D., Rutgers
Teaching and research interests include statistical research methods; national spatial development planning; development of metropolitan areas in developing countries; and methods of regional analysis.

Robert B. Noland, Distinguished Professor; Associate Dean of Faculty; Director, Alan M. Voorhees Transportation Center
B.A., California; M.Sc., Ph.D., Pennsylvania
Teaching and research interests include the impacts of transport planning and policy on environmental outcomes; micro-simulation of pedestrian-vehicle interactions; non-motorized transportation; and safety analysis.

Patricia O'Brien-Richardson, Associate Teaching Professor and Chief Diversity, Equity and Inclusion Officer
B.A., SUNY Old Westbury; M.S.Ed., CUNY Brooklyn; Ph.D. Rutgers
Teaching and research interests include urban public health disparities; education policy; social justice; race, class, and gender policies.

Emily Parker, Assistant Professor
B.A., American; M.A., Ph.D., Cornell
Teaching and research interests include health and social policy; poverty and inequality; gender and family; and spatial demography.

Mark Paul, Assistant Professor
B.A., Ph.D., UMass Amherst
Teaching and research interests include political economy; environmental policy; and inequality of race, gender, and class.

Will B. Payne, Assistant Professor
A.B., Harvard; Ph.D., California (Berkeley)
Teaching and research interests include urban geography, geographic information science (GIS), urban informatics, spatial data science, critical and feminist GIS, food studies, and gentrification studies.

Laura Peck, Associate Professor and Principal Faculty Fellow, Heldrich Center for Workforce Development
B.A., Arizona State University, M.P.A., M.Phil., Ph.D, New York University, Robert F. Wagner Graduate School of Public Service
Teaching and research interests include social welfare and employment policies and programs, and evaluation research methods and policy analysis.

Katie Pincura, Associate Teaching Professor
B.A., Georgia; M.A., Adler-Vacouver, B.C.; M.P.H., Armstrong State; D.P.H. Leadership, Georgia Southern
Teaching and research interests include community health and social services management; health policy; healthcare workforce issues in underserved communities such as the uninsured, people with intellectual and developmental disabilities, people living with HIV, and those impacted by the opioid epidemic.

Ronald Quincy, Professor of Professional Practice
B.A., M.A., University of Detroit; Ph.D., Michigan State
Teaching and research interests include nonprofit sector leadership and governance; fundraising, institutional branding, and grantsmanship; organizational strategy; human capital, performance, and executive coaching; international civil society organizations; and international affairs.

Kelcie Ralph, Associate Professor
B.S., Alaska (Anchorage); M.E.P., Cambridge; M.C.D.S.S., London School of Economics; Ph.D., California (Los Angeles)
Teaching and research interests include travel behaviors of special populations; and causes and consequences of the decline in driving among young adults.

Andrea Restrepo-Mieth, Assistant Professor
B.A. SUNY New Paltz; M.P.P., National University of Singapore; Ph.D., Cornell
Teaching and research interests include planning institutions; politics of planning for water and sanitation; grassroots involvement in urban governance; cities and metropolitan areas in the Global South; progressive planning; and climate change adaptation.

Julia Sass Rubin, Associate Professor, Associate Dean for Academic Administration, and Director, Program in Public Policy
A.B., Harvard (Radcliffe); M.B.A., A.M., Ph.D., Harvard
Teaching and research interests include education policy; social justice; nonprofit advocacy; grassroots mobilization; and community economic development.

Melinda Rushing, Assistant Professor
B.A., M.S. Social Work, Houston; Ph.D., Texas Health Sciences Center at Houston, School of Public Health
Teaching and research interests include data science and social work; inequities in health services delivery among individuals living with chronic illnesses; trends in health behavior; health disparities and their effect on health outcomes.

Hal Salzman, Professor and Senior Faculty Fellow, John J. Heldrich Center for Workforce Development
B.A., California (Santa Cruz); M.A., Ph.D., Brandeis
Research interests include workforce development and labor markets; science and engineering workforce policy; socioeconomic analysis of Arctic communities and employment; effects of technological change; and low-wage workers, internal labor markets, and corporate restructuring.

Jim Samuel, Associate Professor of Practice and Executive Director, Master of Public Informatics
M.Arch, Sir J.J. College of Architecture, an affiliate of the Royal Institute of British Architects; M.B.A., Arizona State; Ph.D., Baruch
Teaching and research interests include artificial intelligence; data science; social media analytics; AI bias and ethics; and computer simulation modeling.

Eric Seymour, Associate Professor
B.A., Florida Atlantic; M.U.R.P., Florida; Ph.D., Michigan
Teaching and research interests include community development; housing; informatics; statistical research methods; and GIS.

Stuart Shapiro, Professor and Dean, Edward J. Bloustein School of Planning and Public Policy
B.S., Case Western Reserve; M.P.P., Ph.D., Harvard
Teaching and research interests include the regulatory process; cost-benefit analysis; federal bureaucracy; regulatory reform; and policy analysis.

Mi Shih, Associate Professor and Director, Program in Urban Planning and Policy Development;
B.S., M.S., National Taiwan; Ph.D., Rutgers
Teaching and research interests include international urbanization; land development, land politics and property rights; displacement; social protests and community participation; ethnographic methods.

Michael Smart, Associate Professor and Director, Ph.D. Program in Planning and Public Policy
B.A., Yale; M.C.R.P., Pennsylvania; Ph.D., California (Los Angeles)
Teaching and research interests include transportation; immigrant neighborhoods; LGBT neighborhoods; urban modeling; and GIS.

Piyushimita "Vonu" Thakuriah, Distinguished Professor and Dean Emeritus, Edward J. Bloustein School of Planning and Public Policy; Director, Rutgers Urban and Civic Informatics Laboratory (RUCI Lab)
B.A., M.A., Delhi (India); M.U.P.P., Ph.D., Illinois (Chicago)
Teaching and research interests include transportation planning and operations; big data, urban informatics, smart cities, and urban mobility analytics; social and economic cyberinfrastructure; data justice, equity, and ethical aspects of information technology, AI, and automation.

Jermaine Toney, Assistant Professor
B.A., St. Thomas; M.S., Ph.D., Milano - The New School
Teaching and research interests include applied microeconomics; socioeconomic and racial inequality; wealth and health disparities; and demography and family connections.

Carl E. Van Horn, Distinguished Professor; Director, John J. Heldrich Center for Workforce Development
B.A., Pittsburgh; M.A., Ph.D., Ohio State
Teaching and research interests include employment policy; economic development; education policy; state government and federalism; and policy analysis and evaluation.

Sharifa Z. Williams, Assistant Professor
B.A., Rutgers; M.P.H., Dr.PH., Columbia
Teaching and research interests include identifying health disparities; describing longitudinal trends in psychosocial exposures across the life-course; development of Bayesian modeling approaches for improving inference about psychiatric conditions using survey data; analyzes trends in overdose and suicide attempts in large statewide datasets

Ruth Winecoff, Assistant Professor
B.A., UNC Chapel Hill; M.P.A., Ph.D., Indiana-Bloomington
Teaching and research interests include budget and finance; economics; health disparities; health policy; environmental planning and policy

Nancy Wolff, Distinguished Professor; Director, Bloustein Center for Survey Research
B.A., Ph.D., Iowa State
Teaching and research interests include health economics; public finance; and criminal justice.

Wenwen Zhang, Associate Professor
B.E., Zhejiang (China); M.S., M.S., Ph.D., M.C.R.P., Georgia Institute of Technology
Teaching and research interests include urban land use and transportation interaction; innovative/disruptive transportation technology; urban modeling/simulation; sustainable development; data analytics and visualization in planning.

Associated Faculty (EJB-U)

ASSOCIATED FACULTY

Robert Kopp, Professor, Department of Earth and Planetary Sciences, School of Arts and Sciences; Director, Coastal Climate Risk and Resilience Initiative
S.B., Chicago; Ph.D., California Institute of Technology
Teaching and research interests include past states of the Earth system and modeling future global change; and assessments of the effects of policy on energy, economic, and climate systems.

Lenna Nepomnyaschy, Professor, School of Social Work
Ph.D., Columbia
Teaching and research interests include child and family policy; poverty and inequality; and health disparities.

Edward Ramsamy, Associate Professor of Africana Studies, School of Arts and Sciences
B.A. (Hons), Durban-Westville (South Africa); M.C.R.P., Ph.D., Rutgers
Teaching and research interests include international development planning; geographies of globalization; political economy of transition and nation-building in post-colonial/developing societies; and comparative politics of identity and race relations in South Africa and the United States.

Mark Gregory Robson, Dean, Rutgers School of Graduate Studies; Board of Governors Distinguished Service Professor and Distinguished Professor of Plant Biology
B.S., M.S., Ph.D., Rutgers; M.P.H., UMDNJ/School of Public Health
Teaching and research interests include exposure science and pesticide use, primarily in developing countries and on a global scale; and risk assessment processes as they relate to public health and health policy.

Jennifer Senick, Member, Ph.D. Faculty; Assistant Dean for Research, Edward J. Bloustein School of Planning and Public Policy
A.B., Bowdoin; M.A., UCLA; Ph.D., Urban Planning and Public Policy, Rutgers
Teaching and research interests include sustainable development; energy policy; healthy communities; and green building.

Rachael Shwom, Assistant Professor, Department of Human Ecology, School of Environmental and Biological Sciences
B.A., Syracuse; M.E.M., Duke; Ph.D., Michigan State
Teaching and research interests include energy efficiency policy; reducing greenhouse gas emissions; formation of public opinions on climate change; and media's coverage of climate change.

Fellows (EJB-U)

FELLOWS

Adriana Abizadeh, Senior Policy Fellow
B.S. Rutgers-Camden; M.S Drexel
Teaching and research interests include collective land ownership; community organizing; decommodification; democratic participation; governance.

Hon. Paul W. Armstrong, J.S.C., M.A., J.D., LL.M., Senior Policy Fellow and Judge in Residence, Master of Health Administration Program
A.B., Oxford, Exeter; M.A., Dayton; J.D., Notre Dame Law; L.L.M, NYU School of Law
Teaching and research interests include healthcare law and ethics.

David Artz, MD, MBA, Senior Health Administration Fellow
B.S. Rochester; M.D., West Virginia School of Medicine; M.B.A., Northwestern
Teaching and research interests include healthcare informatics, economics, and precision medicine payment and policy.

Lawrence B. Burrows, Senior Planning Fellow
B.A., Rutgers; M.C.P., Pennsylvania; A.M.P., Wharton School
Teaching and research interests include market analysis; financial feasibility; real estate development; and team building and development.

Henry Coleman, Senior Policy Fellow, Professor Emeritus
B.A., Morehouse, M.A. and Ph.D., Princeton University
Teaching and research interests include state and local public finance, intergovernmental relations and government structure, income (re)distribution, education finance, and urban revitalization.

Bob Gordon, Senior Policy Fellow
B.A., Williams; M.P.P., Goldman School of Public Policy, Cal-Berkeley; M.B.A., Wharton Business School, Pennsylvania; London Business School, International Management Program
Teaching and research interests include transportation policy, corporate management, and the intersection of business and government.

Jeanne Herb, Senior Policy Fellow
B.S., Rutgers; M.A., New York University
Teaching and research interests include the intersection of social and environmental determinants of health; health equity; environmental sustainability; public policy; and inclusive decision-making.

Sanford M. Jaffe, Senior Policy Fellow, Negotiation and Conflict Resolution
B.A. Rutgers; L.L.B. Harvard Law School
Teaching and research interests include decision-making in negotiations and collaborations; barriers to effective negotiations; impact of decision-making processes on the nature of, and compliance with, outcomes.

Richard F. Keevey, Senior Policy Fellow
B.A., LaSalle; M.P.A., Wharton, University of Pennsylvania
Research interests include federal, state, and local fiscal policy; financial management; and education and finance challenges.

Brandon McKoy, Senior Policy Fellow
B.A., The College of New Jersey; M.C.R.P., Rutgers
Teaching and research interests include racial equity; economic justice; public policy; and healthcare.

Russ Molloy, Senior Health Administration Fellow
B.A., Rutgers; J. D. Seton Hall Law
Teaching and research interests include political institutions; politics; advocacy; government relations; regulatory affairs; independent authorities.

Roberto Muniz, Senior Health Administration Fellow
B.S., M.P.A., Rutgers
Teaching and research interests include health and aging services.

Marc Pfeiffer, Senior Policy Fellow; Assistant Director, Bloustein Local Government Research Center
B.S., American; M.P.A., New York
Teaching and research interests include local and state government policy and administration; local government fiscal policy; the legislative process and regulation; use of technology in local government; and training of public administrators in matters of government transparency that intersect with technology.

Eduardo Schur, Senior Health Administration Fellow
Bachelors, Post Graduate, Finance FGV -- Fundação Getulio
Teaching and research interests include market assessments, brand and marketing strategy development, competitive assessment, analysis of patient pathways and buying process, portfolio and franchise strategy, market analytics and customer insights.

Linda Stamato, Senior Policy Fellow, Negotiation and Conflict Resolution
B.A., Rutgers; M.A. Seton Hall; M.A., Rutgers; Ph.D. (ABD), NYU
Teaching and research interests include decision-making in negotiations and collaborations; barriers to effective negotiations; impact of decision-making processes on the nature of, and compliance with, outcomes; theoretical (and practical) concerns having to do with intractable controversies, particularly those that emerge in public policy decision-making.

William Tuttle, Senior Health Administration Fellow
B.A. Memphis; B.H.A. Oklahoma Baptist; M.H.A. Washington School of Medicine. Ds.C. Alabama – Birmingham
Research interests include health administration and health policy.

Nizar Wehbi, M.D., M.P.H., M.B.A., FACHE, CPH, Senior Health Administration Fellow
B.S., American University of Beirut; M.P.H., M.B.A., Nebraska; M.D., Lithuanian University of Health Sciences
Teaching and research interests include healthcare economics, health policy, and health workforce development.

Student Organizations (EJB-U)

STUDENT ORGANIZATIONS

Bloustein Public Service Association (BPSA)

Bloustein Social Justice Committee

EJB|D E S I G N S

Epsilon Beta Chapter of Eta Sigma Gamma (National Health Education Honorary)

New Jersey Public Health Association-Rutgers Student Chapter

Public Informatics Student Group

Rutgers Future Healthcare Administrators

Bloustein Public Service Association (BPSA) (EJB-U)

Bloustein Public Service Association (BPSA)

The Bloustein Public Service Association (BPSA) seeks to provide a network for students interested in public service initiatives and career networking opportunities. Although many of the students interested in this organization may be enrolled as students at the Edward J. Bloustein School of Planning and Public Policy as planning and public policy (762) and public health (832) majors, this organization is open to all Rutgers University-New Brunswick undergraduate students, and is committed to actively supporting their interests through networking opportunities, career development, and service.

The organization was established during the fall 2006 semester to honor Edward J. Bloustein, a former Rutgers University president, scholar, and active citizen during his lifetime. The group provides opportunities for networking, as well as participation in a variety of public service activities. BPSA endeavors may involve local government and community-based and nonprofit organizations in areas of interest that include community development, health, housing, and transportation. Undergraduate students benefit by participating in the BPSA and thereby gaining access to academic and career development activities, as well as mentoring and networking opportunities. Officers for the BPSA are required to be declared planning and public policy (762) majors or declared public health (832) majors at the Bloustein School.

Bloustein Social Justice Committee (EJB-U)

Bloustein Social Justice Committee

The Bloustein Social Justice Committee (BSJC) provides an independent space for students to embody, integrate, and act upon principles of social justice within the Edward J. Bloustein School of Planning and Public Policy and the broader community. We provide opportunities for Bloustein students to voice their ideas and concerns, organize

formal and informal social justice activities for Bloustein students, staff, and faculty, facilitate collaborative engagement between Bloustein and the surrounding community, and support the work of aligned institutional initiatives. For more information or to get involved, email the group at blousteinsjc@gmail.com.

EJB|D E S I G N S (EJB-U)

EJB|D E S I G N S

EJB|D E S I G N S began as a group of planning students and faculty looking to improve their hand-drawing skills and digital graphic methods. A social organization based out of the Bloustein School, the group encourages networking with professionals, faculty, and students interested in learning and teaching digital and hand-drawing techniques. Through practice and social networking its members prepare for the planning and urban design profession. It is open to both undergraduate and graduate students.

Epsilon Beta Chapter of Eta Sigma Gamma (National Health Education Honorary) (EJB-U)

Epsilon Beta Chapter of Eta Sigma Gamma (National Health Education Honorary)

Rutgers installed the Epsilon Beta Chapter of Eta Sigma Gamma, the National Health Education Honorary, in the spring of 2009. The primary purpose of Eta Sigma Gamma is to further the professional competence and dedication of individual members of the health education profession. The mission of the honorary is promotion of the discipline by elevating the standards, ideals, competence, and ethics of professionally prepared men and women in health education. Eta Sigma Gamma also provides grant opportunities, scholarships, and travel assistance as well as a wide network of professionals in health education throughout the country. Students are asked to take an active role in contributing knowledge and skills to the task of providing health promotion and health education services to those in need.

New Jersey Public Health Association-Rutgers Student Chapter (EJB-U)

New Jersey Public Health Association-Rutgers Student Chapter

The New Jersey Public Health Association (NJPHA) - Rutgers Student Chapter seeks to advance and support the cause of public health within the Rutgers community and throughout New Jersey. We host lectures, seminars, and panel discussions to educate students and create a bridge to public health professionals, and offer mentorship, internship, and networking opportunities with the NJPHA professional network. The organization also hosts awareness events on campus and in the surrounding community and hands out contraceptives, pamphlets, and healthy food as we strive to educate the community on how to utilize resources and options.

We are actively involved in Rutgers events such as Winter Wishes and Rutgers Day and also work consistently with community partners in New Brunswick including Dina's Dwellings, Unity Square, and the Robert Wood Johnson University Hospital. Ultimately, our goal is to educate students and support future leaders in the field, functioning as an organization to benefit all future health professionals at Rutgers University.

Public Informatics Student Group (EJB-U)

Public Informatics Student Group

The Public Informatics Student Group (PISG) is an interdisciplinary organization for students interested in topics that bridge the gaps between information technology and public service. Founded in 2019, the organization is open to undergraduate and graduate students with an interest in discovering how governments, education, health care, and social services are learning to be more agile in the age of big data, artificial intelligence, and the internet of things.

Rutgers Future Healthcare Administrators (EJB-U)

Rutgers Future Healthcare Administrators

Rutgers Future Healthcare Administrators is a student-led organization dedicated to developing future health care leaders by promoting networking, academics, and community involvement to the students at Rutgers University.

While affiliated with the Edward J. Bloustein School of Planning and Public Policy, the group encourages all majors from nursing to premed to business to IT to join and learn about this rapidly growing field.

Academic Policies and Procedures (EJB-U)

ACADEMIC POLICIES AND PROCEDURES

Note: See the University Policies and Procedures section in the Rutgers Main catalog for university-wide academic policies and procedures. In addition, Bloustein School students are subject to the academic policies and procedures of both the Edward J. Bloustein School of Planning and Public Policy and, if applicable, the matriculating unit in which they are enrolled.

Academic Credit for Transfer Courses

Academic Advising

Grade Appeals

Grade Appeals Process

Scholastic Standing

Dean's List

Probation and Dismissal

Appeals

Withdrawal from Classes

Degree Requirements

General Information (SMLR-U)

GENERAL INFORMATION

About the School

Academic Policies and Procedures

Mission of the School

Faculty

About the School of Management and Labor Relations (SMLR-U)

ABOUT THE SCHOOL OF MANAGEMENT AND LABOR RELATIONS

The School of Management and Labor Relations (SMLR) seeks to create and disseminate knowledge that fosters a better understanding of the nature of employment and work in modern society; promotes harmony and cooperation between management and labor; helps to improve employment systems and relationships; and encourages understanding among diverse groups.

In pursuit of this mission, SMLR faculty members conduct research, organize credit and noncredit programs, and provide technical assistance to employers and labor organizations.

Faculty

Facilities

Advisory Bodies

Degree Programs

Undergraduate Study

Nondegree and Extension Programs

SMLR Research Centers

Academic Policies and Procedures (SMLR-U)

ACADEMIC POLICIES AND PROCEDURES

Note: See the **University Policies and Procedures** section in the Rutgers Main catalog for university-wide academic policies and procedures.

Registration and Course Information

Mission of the School (SMLR-U)

MISSION OF THE SCHOOL

The School of Management and Labor Relations (SMLR) seeks to create and disseminate knowledge that fosters a better understanding of the nature of employment and work in modern society; promotes harmony and cooperation between management and labor; helps to improve employment systems and relationships; and encourages understanding among diverse groups.

In pursuit of this mission, SMLR faculty members conduct research, organize credit and noncredit programs, and provide technical assistance to employers and labor organizations.

Faculty (SMLR-U)

FACULTY

The School of Management and Labor Relations has an outstanding, internationally known faculty, many of whom are leaders in their respective fields. Faculty members contribute to their disciplines in the following ways: disseminating knowledge by teaching students; offering their service to public, private, professional, and scholarly organizations; and publishing scholarly articles in the top human resource management and industrial relations journals.

Vikrant Advani; M.A., Rutgers University
Labor and employment relations

Mark S. Anner, Dean of Rutgers School of Management and Labor Relations; Ph.D., Cornell University
Government

Scott Bentley; Ph.D., Rutgers University
Industrial relations and human resources

Eric Blanc; Ph.D., New York University
Sociology

Joseph R. Blasi; Ed.D., Harvard University
Sociology of organizations

Dana Britton; Ph.D., University of Texas (Austin)
Sociology

William Brucher; Ph.D., Brown University
History

Nichelle Carpenter; Ph.D., Texas A&M University
Industrial/organizational psychology

William Castellano; Ph.D., Rutgers University
Industrial relations and human resources

Stephanie Chan-Ahuja; Ph.D., London Business School
Organizational behavior

Tracy F.H. Chang, Associate Dean for Academic Affairs; Ph.D., University of Iowa, sociology; M.B.A., New York University

Rosemarie Cipparulo; J.D., Rutgers University

Ashley Conway; M.A., American University
Organizational development and change

James M. Cooney; J.D., University of Miami

Sheri Davis; Ph.D., Emory University
American studies

Lindsay Yasmin Dhanani; Ph.D., University of Central Florida
Industrial/organizational psychology

William Dwyer; M.A., Rutgers University
Labor and industrial relations

Adrienne E. Eaton; Ph.D., University of Wisconsin
Industrial relations

Rania Elanwer, Ph.D., Pennsylvania State University
Human resource and organizational development

Hadi El-Farr; Director, Online Professional Master of Human Resource Management Program; Ph.D., University of Leeds
Human Resource Management

Jie (Jasmine) Feng; Ph.D., University of Wisconsin (Madison)
Management and human resources

David A. Ferio, Director, Master of Human Resource Management Program; A.B.D., M.S. technology management, Stevens Institute of Technology

Janice Fine; Ph.D., Massachusetts Institute of Technology
Political science

Rebecca Kolins Givan; Ph.D., Northwestern University
Political science

Rebecca Greenbaum; Ph.D., University of Central Florida
Business administration

Ryan Greenbaum, Director, Undergraduate Program in Human Resource Management; M.B.A., Oklahoma State
Business administration

Christopher Hayes; Ph.D., Rutgers University
American history

Hazel-Anne M. Johnson-Marcus, Associate Dean for Diversity, Equity and Inclusion; Ph.D., University of South Florida
Industrial-organizational psychology

William Kane; Ph.D., Fielding Graduate University
Organizational development and change

Carla Katz; J.D., Seton Hall University

Douglas Kruse; Ph.D., Harvard University
Economics

David (DK) Kryscynski, Ph.D., Emory University
Organization and management

Sheila Lawrence; Ph.D., Rutgers University
Applied statistics and sociology/demography/quantitative

Barbara A. Lee; Ph.D., Ohio State University, higher education administration; J.D., Georgetown University

Tamara L. Lee; Ph.D., Cornell University, industrial relations; J.D., Chicago-Kent College of Law

Mingwei Liu, Associate Dean for Research; Ph.D., Cornell University
Industrial and labor relations

Xiangmin (Helen) Liu; Ph.D., Cornell University
Human resource studies

Anne-Michelle Marsden; M.S., Florida State University
Human sciences

Carmen Martino; M.A., Rutgers University
Labor studies

Joseph McCune; Ph.D., Michigan State University
Industrial/organizational psychology

Jessica R. Methot, Director, Ph.D. Program in Industrial Relations and Human Resources; Ph.D., University of Florida
Organizational behavior

Christopher Michael, Ph.D., City University of New York, political science; J.D., City University of New York School of Law

Akhila Naik; J.D., City University of New York

Julie Peters, Director, James B. Carey Library; M.L.I.S., Rutgers University

Danielle Phillips-Cunningham; Ph.D., Rutgers University
Women's and gender studies

Michael Beyea Reagan, Ph.D., University of Washington
History

Yana van der Muelen Rodgers, Chair, Department of Labor Studies and Employment Relations; Ph.D., Harvard University
Economics

Ralph Rodriguez; Ph.D., Temple University
Human resource management

Peter Rokkos; J.D., Boston University

Saul Rubinstein; Ph.D., Massachusetts Institute of Technology
Management

Francis Ryan; Director, Master of Labor and Employment Relations Program; Ph.D., University of Pennsylvania
History

Tobias Schulze-Cleven; Ph.D., University of California, Berkeley
Political science

Lisa Schur; Ph.D., University of California, Berkeley, political science; J.D., Northeastern University

Susan J. Schurman; Ph.D., University of Michigan
Higher adult and continuing education

Youjeong Song; Ph.D., University of Minnesota
Business administration

Michael C. Sturman, Chair, Department of Human Resource Management; Ph.D., Cornell University
Industrial and labor relations

Kyra Leigh Sutton; Ph.D., Ohio State University
Labor and human resources

James Terez; M.A., Rutgers University, English; M.B.A., New York University, Accounting

Christopher To; Ph.D., New York University
Management

Todd E. Vachon; Ph.D., University of Connecticut
Sociology

Michelle Van Noy; Ph.D., Columbia University
Sociology and education

Paula B. Voos, Academic Program Director, Labor Studies and Employment Relations; Ph.D., Harvard University
Economics

Naomi R Williams; Ph.D., University of Wisconsin (Madison)
History

Labor Studies and Employment Relations (SMLR-U)

LABOR STUDIES AND EMPLOYMENT RELATIONS

The department offers two undergraduate degrees: the **Bachelor of Arts in Labor Studies and Employment Relations** joint degree from the School of Management and Labor Relations and the School of Arts and Sciences and a **Bachelor of Science in Labor and Employment Relations** granted by the School of Management and Labor Relations. The latter features flexible scheduling opportunities and a student-centered program especially suitable for part-time students or working adults. Both offer great choices for students interested in how work is managed, the problems of working people, and what workers have done as individuals and groups to address these problems. Both types of majors are eligible to apply for a five-year bachelor/master of labor and employment relations degree program.

The undergraduate labor studies and employment relations program's introductory courses offer anyone interested in the world of work (or likely to have a job) the opportunity to develop a realistic view of the dominant institutions, practices, and values of the workforce and to think about how work can be improved.

Intermediate courses enable students to acquire a range of specific competencies useful to employment, labor relations, and human resource specialists. They also allow students to participate in a series of cultural and disciplinary dialogues providing alternative perspectives on work and the wider society.

Advanced courses provide students majoring in labor studies and employment relations with an opportunity to consolidate what they have learned about the nature of work through more in-depth study of a particular topic or topics through either independent work or the senior seminar.

Program Information

Bachelor of Arts in Labor Studies and Employment Relations

Bachelor of Science in Labor and Employment Relations

Off-Campus Labor Studies and Employment Relations Programs

SMLR Honors Program

Program Information (SMLR-U)

PROGRAM INFORMATION

The bachelor of arts in labor studies and employment relations joint degree from the School of Management and Labor Relations and the School of Arts and Sciences or a bachelor of science in labor and employment relations granted by the School of Management and Labor Relations might be a great choice for a student. Both types of majors are eligible to apply for a five-year bachelor/master of labor and employment relations degree program.

Internships and Scholarships

Independent Study

Scholastic Honors

Undergraduate Students in Graduate Courses

Courses

Internships and Scholarships (SMLR-U)

Internships and Scholarships

Internships

Because Labor Studies is a multidisciplinary program, there is a broad array of internships and professional opportunities students may pursue, including those in employment relations; unions or labor relations; organizational management; business and finance; marketing, sales, and outreach; social, professional, and community organizing, among others. Internships must be substantive experiences and may not be exclusively clerical or administrative positions. All internships must be pre-approved by the professor who is in charge of the internship course.

Labor Studies students seeking to apply for an internship must have completed three Labor Studies classes. Students may only apply one internship or teaching assistantship toward their Labor Studies minor and up to two for their major.

Credit for internships through the department is granted to Labor Studies majors or minors only. To receive degree credit for an internship, fill out and submit an internship application form. The internship is one of several possible capstone courses in the B.A. program. It is required in the B.S. program, but students with work experience can waive it and instead enroll in a different course in the major.

For complete internship guidelines, requirements, and the application form, visit here.

Scholarships

A limited number of scholarships are available to provide financial support to undergraduate students in the Department of Labor Studies and Employment Relations.

For further scholarship information, visit here.

Independent Study (SMLR-U)

Independent Study

Credit toward a labor studies and employment relations major may be obtained by independent study. Under most circumstances, the number of independent study credits will not exceed 3 in a single semester. Additional credits would require approval from the program director.

Typically, independent studies culminate in the requirement of a final paper designed by both the student and the faculty sponsor. Students interested in pursuing an independent study are encouraged to contact faculty members with whom they would like to work. Under most circumstances, independent studies will not be granted to students who are neither labor studies and employment relations majors nor minors.

Scholastic Honors (SMLR-U)

Scholastic Honors

Students who achieve a GPA of 3.70 or higher in their coursework for the labor studies major will earn departmental honors. Students who achieve the following final grade-point averages across their overall program of study at Rutgers will earn scholastic honors as follows: cum laude with a grade-point average of 3.500 or better; magna cum laude with an average of 3.700 or better; and summa cum laude with an average of 3.850 or better.

Undergraduate Students in Graduate Courses (SMLR-U)

Undergraduate Students in Graduate Courses

Undergraduate students may receive credit toward the labor studies and employment relations major for courses taken at the graduate level. Courses offered by the graduate program in labor and employment relations and selected courses in the graduate program in human resource management can be treated as courses within the labor studies and employment relations department. In general, the student should be a senior and have a cumulative grade-point average of 3.0 or better. In some instances, the School of Management and Labor Relations will accept petitions from upper-level students who are not yet in their senior year to take and receive credit for graduate courses.

Courses (SMLR-U)

COURSES

37:575:100 ***Introduction to Labor Studies and Employment Relations (3)***
Work, workers, and organizations that represent employees; class, race, gender, and work; legal, labor market, and human resource issues.

37:575:110 ***Work, Society, and the Quality of Life (3)***
Work, social class, diversity, and economic opportunity in the context of globalization; civic engagement and collective action to promote opportunity and social justice for all people.

37:575:191,192,193 ***Short Topics on Work (1,1,1)***
Brief examination of selected issues with regard to work at a level suitable for first-year college students, as well as those at a higher level of academic preparation. Topics to be announced.

37:575:201 ***U.S. Labor and Work before the End of Reconstruction (3)***
History of work, economic organization, and labor in the United States. Free and slave labor. Early labor unions and movements in the American context.

37:575:202 ***History of Labor and Work in the U.S. 1880 to 1945 (3)***
Changes in work, its organization, and the public policy context. History, philosophy, structure, activities, and impact of U.S. labor unions.

37:575:203 ***Work and Labor History from 1940 to the Present in the U.S. (3)***
Developments in work, labor organizations, and related social movements. Relationship of labor movements to the changing economic, social, and public policy context, including increasing globalization.

37:575:207 ***New Jersey Labor History (3)***
Workers movements in New Jersey, both local and statewide; their relationship to U.S. labor and working-class history from the earliest period to today.

37:575:215 ***Youth and Work (3)***
Youth in the U.S. labor market; working students, internships and unpaid work; job-hopping; and other contemporary concerns. Policies and practices to improve outcomes.

37:575:220 ***Law for Business and Nonprofit Organizations (3)***
Overview of legal essentials for organizations: contracts; torts; organizational forms; property rights; cyber-law; bankruptcy; agency; criminal law; basics of employment/labor law.

37:575:230 ***People, Work, and Organizations (3)***
Contemporary organizational transformations forming the context for how people are managed at work: decline of bureaucracy and predictable internal careers; growth of flexible, knowledge-based systems.

37:575:240 ***Sustainability, Jobs, and Justice (3)***
The interconnections between democracy, economy, and the environment; movements for social, economic, and environmental sustainability; the relationship between good jobs and environmental justice.

37:575:250 ***Finance for Personal and Professional Success (3)***
Overview of core financial concepts and techniques useful both at work and in personal life; interest, credit, insurance, investments, present value, and net worth.

37:575:265 ***Introduction to Disability Studies: History, Rights, Justice, and Inclusion (3)***
Introduces perspectives on disability and its relationship to politics, employment, law, media, arts, sports, and built environments, focusing on creating social and economic change.
Previously listed as 37:575:365 Disability, Work, and Society.

37:575:294 ***Avoiding Sexual Harassment (1)***
Legal, organizational, and social dimensions of sexual harassment in the workplace; power, gender roles, homophobia, and failed romance; effective prevention or response.

37:575:295 ***Workplace Violence (1)***
Causes, consequences, and prevention of physical violence in the American workplace. Organizational policies that preserve the rights and well-being of all employees.

37:575:297 ***Religion in the Workplace (1)***
Contemporary workplace issues stemming from employee religious diversity. Employee rights, accommodation, and inclusion; dominate group privilege, prejudice, discrimination, and organizational responses to religious diversity.

37:575:298 ***Social Media in the Workplace (1)***
Issues for organizations and employees stemming from the increased use of social media by individuals. Hiring discrimination, professional image, collective action, ethics, and other concerns.

37:575:300 ***Writing in Labor and Employment Relations (3)***
Construction of a well-written argument in labor studies and employment relations; application of sound writing principles to contemporary labor policy issues; intensive practice.

37:575:301 ***Labor and Democracy (3)***
Labor as a worldwide social and political movement; comparative and historical consideration of how labor can achieve influence in market economies and a better standard of living.

37:575:302 ***Comparative Social and Employment Policy (3)***
Overview of such policy in wealthy democracies; the relationship between state and market; varieties of capitalism and welfare states; social safety nets; family policy; labor movements' role.

37:575:303 ***Black Workers in American Society (3)***
Examination of the historical relationships between Black workers and the American labor movement; analysis of problems facing Black workers at the workplace.

37:575:304 ***Comparative Employment Relations in Wealthy Nations (3)***
Employment relations systems in wealthy nations; corporate governance; social welfare; global and national labor standards; union-management relations; work organization; labor policies.

37:575:305,306 ***Special Topics in Labor & Employment (3)***
Exploration of subjects related to labor and/or work.

37:575:307 ***Latino Workers in the United States (3)***
Role of Latino workers in U.S. society and the U.S. economy; impact of the new migration on the U.S. labor market and social policy.

37:575:308 ***Dynamics of Work and Work Organizations (3)***
Examination of the social dynamics of economic institutions and their corresponding work relations; corporate organization and trade union structure; selected problems of technological change; human relations in industry and industrialization; human relations in industry and the changing bases of managerial authority.
Note: Credit not given for both this course and 37:624:308.

37:624:308 ***Teams and Employee Dynamics (3)***
Functioning of teams, work groups, and various ways of organizing work; skills for successful professional interaction and influence in groups, social networks, and relationships.
Note: Credit not given for both this course and 37:575:308.

37:575:309 ***Working Women in American Society (3)***
Focus on the contemporary experience of working women, including an exploration of current legal strategies and social policies created to address their concerns.

37:575:310 ***Labor Relations in Professional Sports (3)***
Labor relations systems in professional sports in the United States; unique institutional aspects and common features of union-management and employee relations.

37:575:311 ***Organizational Design and Structure (3)***
New and old methods of organizing work and organizations ranging from hierarchical bureaucracy to contemporary models emphasizing teamwork and/or flatter or networked structures.

37:575:312 ***Conflict and Conflict Resolution in the Workplace (3)***
How people resolve work-related grievances: bargaining, grievance procedures, mediation, arbitration, demonstrations, strikes, and industrial violence. Examines union and nonunion workplaces.

37:575:313 ***New Technology and Work (3)***
Impact of new technology on work, workers, and society. Emerging technologies like digital platforms, algorithmic hiring, artificial intelligence, and practices like gig jobs.

37:575:314 ***Collective Bargaining (3)***
Comprehensive study of the development of collective bargaining; the nature and scope of contracts; the changing character of collective bargaining processes through negotiation, legislation, the courts, and arbitration; the substantive issues in bargaining, including the implications for public policy.

37:575:315 ***Employment Law (3)***
Overview of employment at-will and its limitations; wages and hours; medical/family leave; privacy; drug testing; workers' compensation; and fundamental antidiscrimination law.
Required course for the B.S. in labor and employment relations program (not a required course for the B.A. program).

37:575:316 ***Privacy and Equality at Work (3)***
Social media, drug testing, workplace searches, employee monitoring, off-duty conduct, and other privacy legal issues; right to fair treatment without discrimination; bullying, or harassment.

37:575:317 ***Contingent and Nonstandard Work (3)***
Issues arising from employment and relationships that have nonstandard aspects; temporary, leased, or part-time employees; independent contractors and owner-operators.

37:575:319 ***Leadership and Governance of Labor Unions (3)***
Leadership of all types of labor organizations. Internal management; union politics; relationships with other organizations; use of media; and other key leadership issues.
Prerequisite: 37:575:100 or 101, or permission of instructor.

37:575:320 ***Immigration Public Policy (3)***
Immigration and immigrant workers in American society; history; current legal rights; related public policy issues; immigrants in unions and community organizations.

37:575:321 ***Immigration Law and Employment Rights (3)***
Contemporary immigration law in the United States; employer compliance issues; employee rights; immigrant employee representation; and related policy debates.

37:575:322 ***American Labor Unions in Politics (3)***
Role of the labor movement in the political process from the New Deal to the present, including an analysis of its ideology, its legislative agenda, its political action, and its impact on public policy.

37:575:325 ***Economics of the Employment Relationship (3)***
Fundamentals of labor economics presented. Economic dimensions of public policies and human resource administration.

37:575:326 ***Negotiation Concepts and Techniques (3)***
Negotiation strategy and tactics; interests and interest-based bargaining, rights, power, leverage, concessions, commitment; application of theory in various work-life contexts; negotiation skill development.

37:575:330 ***Working Women and the Law (3)***
Survey of laws affecting women as employees: anti-discrimination, OSHA, and other laws. How law relates to advancement opportunities for women, the glass ceiling, and employer behavior.

37:575:335 ***Women and Labor Movements in Global Perspective (3)***
How labor movements around the world are addressing such issues as pay equity, equal opportunity, sexual and racial harassment, work-life balance, and women's leadership.

37:575:336 ***Employment Relations in Emerging Economies (3)***
Changing employment relations systems in nations that are rapidly industrializing; focus on labor movements; labor management relations; labor standards and public policy.

37:575:337 ***Workers and Multinationals in Global Perspective (3)***
Impact of multinationals and global value chains on workers in developing nations. Issue of labor standards; corporate social responsibility; international labor organizations and regulatory approaches.

37:575:338 ***Occupational Safety and Health (3)***
Federal and state regulatory laws and enforcement; the basic issues involved in safety and health at the workplace; and worker, union, and employer response to the issues.

37:575:340 ***American Labor Law (3)***
Examination of the present legal arrangements governing the conduct of labor relations in the United States; historical development and impact of common law, legislative statutes, and court decisions on the growth of the labor movement.

37:624:345 ***Organizational Behavior and Work (3)***
Behavior by individuals and groups in the workplace; group and intergroup dynamics; organizational culture, structure, and change; leadership, employee motivation, job performance, and feedback.
Previously listed as 37:575:345.

37:624:348 ***Leadership in the Workplace (3)***
Leadership in work organizations, including unions, nonprofits, and businesses. Key leadership issues in small groups and large organizations; diversity concerns; leadership development.
Previously listed as 37:575:318 Leadership in Work Organizations

37:575:350 ***Public Sector Collective Bargaining (3)***
Study of employer-employee relations in the public sector; federal executive orders and state and municipal legislation regulating public employers and employee organizations; procedures for bargaining unit certification, representation, and recognition; dispute resolution techniques.

37:575:355 ***Current Labor Problems (3)***
Selected number of labor and employment issues that have particular relevance in contemporary society.

37:575:357 ***Social Movements, Social Change, and Work (3)***
The theory and practice of social movements and social change, particularly those related to work; the prospects for current and future mobilization.

37:575:359 ***Organizing for Social Change (3)***
Theory and practice of community organizing for social change for labor and community groups; membership building; leadership development; strategy development; community power analysis; campaign planning.

37:575:360 ***Union Organizing (3)***
Introduction to and critical analysis of union organizing strategies and tactics.

37:575:361 ***Labor and Corporate Restructuring (3)***
Study of how management efforts to decentralize organizational structures and reduce employment levels affect industrial relations, work and workers, skill levels and training needs, and productivity and the macroeconomy.

37:575:362 ***The Work-Education Connection (3)***
What do workers need to know to be prepared for the jobs being generated by the global economy? How do the American secondary and higher education systems prepare workers for changing jobs?

37:575:363 ***Labor and the Global Economy (3)***
Changes in the global economy and their effects on the living standards and bargaining power of American workers and their unions. Alternative strategies for dealing with globalization.

37:624:364 ***Diversity in the Workplace (3)***
Focuses on how the increasing demographic diversity of American workplaces affects social relations, cultural dynamics, and organizational effectiveness.
Previously listed as 37:575:364

37:575:366 ***Asian American Workers in a Global Context (3)***
Social structures affecting Asian American workers; contemporary and historical immigration policies; stereotypes and other problems; racialized employment; inequality and achievement; differences by nation origin.

37:575:367 ***Emotional Intelligence in the Workplace (3)***
Nature of emotional intelligence and its effects on employee performance and organizational success; research on development of emotional intelligence; self-awareness and self-development.

37:575:368 ***Professional Development Strategies (3)***
Best practices in professional development; organizational strategies for addressing employee retention, work/life balance, wellness, communication, and other matters related to employee development.

37:575:375 ***Benefits and Social Insurance (3)***
Overview of benefits with a focus on social insurance systems, health insurance, and pensions. Relevant issues for employers, employees, unions, and public policy.

37:624:376 ***Corporate Governance, Power, and Control (3)***
Corporate governance and the impact of corporations on society; boards of directors; executive compensation; principal-agent/stakeholder theories; issues for labor and the public.
Previously listed as 37:575:376

37:575:377 ***Democratic Workplaces (3)***
Democracy within the firm, employee ownership, and co-ops; approaches to economic democracy; political and economic theory; case studies; and related career tracks.

37:575:385 ***Finance for Organizational Leadership (3)***
Quantitative financial and accounting techniques in organizations used for cost analysis and performance decisions. The class is for nonfinancial leaders in profit and nonprofit organizations.

37:575:391,392,393,394 ***Issues in Work (1,1,1,1)***
Brief examination of selected issues in labor and employment relations; topics to be announced.

37:575:395 ***Perspectives on Labor Studies (3)***
In-depth study of the classic works on the nature of labor, the relationship of work to other social functions, and the relationship between workers and management.
Prerequisite: Open only to labor studies majors who have completed at least 15 credits of labor studies coursework.

37:575:396,397 ***Concerns at Work (2,2)***
Examination of contemporary issues related to work; topics to be announced.

37:575:401 ***Research Methods in Labor Studies (3)***
Nature and sources of labor statistics; alternative research methods used in the study of labor problems.

37:575:402 ***Research Corporations and Industries (3)***
Overview of methods used to investigate the competitive situation/prognosis of an industry's employers, profitability, sales, employment, wages, and unionization; strategic corporate research.

37:575:403 ***Problem-Solving Tools at Work (3)***
Applied analytical and statistical tools for solving problems at work, surveying employees, and maintaining quality. Projects are individual/group and spreadsheet-intensive.

37:575:404 ***Creating and Administering Surveys (3)***
Issues for online, mail, telephone, and in-person surveys given their intended use. Samples: item construction; scaling; measurement validity and reliability; improving response rates; ethical research.

37:575:407 ***Workers' Movement in New Jersey (3)***
Examination of workers' movements at state and local levels in New Jersey, using library resources, interviews, participant observations, and movement archives. Research results document the development of the New Jersey labor movement.

37:575:450 ***Senior Seminar in Labor Studies (3)***
In-depth study of a labor studies topic. Intensive reading and discussion designed to integrate student experiences in the labor studies major.
Prerequisite: Open only to majors with senior standing.

37:575:470 ***Community Engaged Activity in Labor Studies (1-3)***
Faculty supervised engagement by students in non-profit, government or other community organizations that leads to learning about labor and work.

37:575:480,481,491,492,493 ***Topics in Labor Studies (3,3,3,3,3)***
In-depth examination of particular topics concerning work organization, worker problems, or worker organizations.

37:575:490 ***Internship in Labor Education (BA)***
Students work under the supervision of individual faculty members and other experienced labor educators to develop and/or teach courses and workshops.
Prerequisite: Permission of instructor.

37:575:494,495 ***Independent Study and Research (BA,BA)***
Individual reading and research project under the guidance of a labor studies faculty member on a topic of interest to the student.
Prerequisite: Permission of instructor.

37:575:496,497 ***Internship in Labor Studies (BA,BA)***
Students work as staff members in a labor union or labor-related organization (public or private), in an industrial relations unit in private industry, or as employees in a position that permits observation of and participation in a labor union at the grassroots level. Allows students to apply conceptual knowledge learned in the classroom to actual situations and to acquire new skills and knowledge.
Prerequisite: Permission of instructor.

37:575:498,499 *Honors in Labor Studies (BA,BA)*
Students conduct an in-depth individual research project under the guidance of a member of the LSER department and write a research paper based on that project.
Prerequisite: Permission of department.

37:624:498 *SMLR Honors I (3)*
SMLR Honors class and mentoring that will guide students through the theses process through the first half of the academic year.

37:624:499 *SMLR Honors II (3)*
SMLR Honors class and mentoring that will guide students through the theses process through the second half of the academic year.

Bachelor of Arts in Labor Studies and Employment Relations (SMLR-U)

BACHELOR OF ARTS IN LABOR STUDIES AND EMPLOYMENT RELATIONS

The Bachelor of Arts program in Labor Studies and Employment Relations is a broad social science major offered jointly by SMLR and the School of Arts and Sciences (SAS). Learn how to manage people well whether you work for a corporation, government, or a community organization. Apply knowledge of current issues like work-life balance or employee rights to your workplace. Participants also have the option to earn a master's degree through the joint bachelor's/master's five-year plan.

For further information, please visit the website here.

Admission and Requirements of the Bachelor of Arts in Labor Studies and Employment Relations

Admission and Requirements of the Bachelor of Arts in Labor Studies and Employment Relations

Students seeking to major in labor studies and employment relations must first be admitted to the School of Arts and Sciences. Applicants to the major must have a 2.0 grade-point average or better in their college work in order to major in this multidisciplinary course of study.

Students may be conditionally admitted to the labor studies major by going to the SAS major/minor sign-up at myMajor and logging in with their Net ID and password. Select **578 Labor Studies and Employment Relations** as the major.

Students must take 36 credits of labor studies and employment relations courses with a grade of C or better as part of the total 120 credits required to graduate from Rutgers.

Students must meet all requirements of the School of Arts and Sciences, as well as the labor studies major requirements.

Please contact:
Anuja Rivera, Student Advisor
anujab@smlr.rutgers.edu
Labor Studies and Employment Relations
94 Rockafeller Road
Piscataway, NJ 08854

Bachelor of Arts in Labor Studies and Employment Relations (SMLR-U)

Major Requirements for the Bachelor of Arts Degree

Major Requirements for the Bachelor of Arts Degree

The major consists of 36 credits in labor studies and employment relations. Students must earn a grade of C or better for a course to count toward the major. In place of 6 of these credits, students may substitute related courses from other programs. (A list of these courses is available from the department.)

The following three courses are required in the bachelor of arts program: either 37:575:100 Introduction to Labor Studies and Employment Relations or 37:575:110 Work, Society, and the Quality of Life; 37:575:395 Perspectives on Labor Studies; and one advanced course taken in the senior year, chosen from 37:575:401, 402, 403, 404, 450, 490, 494, 495, 496, 497, 498, or 499.

Concentrations in the major are available but not required. These include:

- Law and the Workplace
- Diversity in the Workplace
- Work Organization and Management
- Labor Unions and Social Movements
- Work, Globalization, and Migration

For more information and courses for each concentration, visit here.

Bachelor of Arts in Labor Studies and Employment Relations (SMLR-U)

Minor in Labor Studies and Employment Relations

Minor in Labor Studies and Employment Relations

The minor in labor studies and employment relations consists of six courses offered by the department, for a total of 18 credits. The department also offers minors focused on one of the five areas of the field including: law and

the workplace; diversity in the workplace; work organization and management; labor unions and social movements; and work, globalization, and immigration. All minors must include Introduction to Labor Studies and Employment Relations (37:575:100) or Work, Society, and the Quality of Life (37:575:110). Students must earn a C or better in a course for it to count toward the minor.

Bachelor of Science in Labor and Employment Relations (SMLR-U)

BACHELOR OF SCIENCE IN LABOR AND EMPLOYMENT RELATIONS

Bachelor of Science in Labor and Employment Relations (SMLR-U)

Admission and Requirements of the Bachelor of Science in Labor and Employment Relations

Admission and Requirements of the Bachelor of Science in Labor and Employment Relations

The Bachelor of Science program in Labor and Employment Relations is designed to accommodate the needs of transfer and nontraditional students. The program is structured so that students with **at least one year of college** can complete their degree through a flexible combination of online, daytime, weekend, evening, and/or off-campus courses. In addition, re-enrollment is made easy for those who must interrupt their studies, and non-matriculated status is available for visiting students who want to try a few courses in the program.

- Transfer up to 60 credits to Rutgers from a county college
- Transfer up to 90 credits from a combination of 2 and 4 year institutions
- Fulfill all your general education requirements with an A.A. or A.S. from a NJ county college (numerous A.A.S. degrees also fulfill many requirements)
- Flexibly combine online and in-person courses
- Attend daytime, evening, and weekend classes in New Brunswick or at off-campus locations

Participants also have the option to earn a master's degree through SMLR's five-year plan.

If you have approximately two years of college credits, it is possible to complete this degree entirely online. Students should be sure your general education requirements are complete before attempting this.

Please apply to the School of Management and Labor Relations via Rutgers Undergraduate Admissions.

Please note that the academic and other regulations established by the faculty and administration of the School of Management and Labor Relations and the Board of Governors of Rutgers University are subject to amendment at any time. Questions related to general student rules that fall under the jurisdiction of the School of Management and Labor Relations may be directed to the appropriate program.

Bachelor of Science in Labor and Employment Relations (SMLR-U)

Major Requirements for the Bachelor of Science Degree

Major Requirements for the Bachelor of Science Degree

The major consists of 36 credits in labor and employment relations. Students must attain a grade of C or better for a class to count toward the major. In place of 6 of these credits, students may substitute related courses from other social science programs; departmental approval is required for courses from other universities; a list of Rutgers University-New Brunswick courses is available from the department.

The following five courses are required in the bachelor of science program:

- 37:575:100 Introduction to Labor Studies or 37:575:110 Work, Society, and the Quality of Life
- 37:575:315 Employment Law
- 37:575:401 Research Methods, 37:575:403, or 37:575:404 in Labor Studies; or an alternative research methods/statistics course from other programs: 01:920:311; 01:830:200; 01:790:300; 10:762:205; 01:220:322; 01:450:319; 01:960:211; 01:960:212; or 01:960:285;
- 37:575:395 Perspectives on Labor Studies; and
- 37:575:490, 496, or 497 an internship; this course will be waived for students with work experience.

A candidate for a bachelor of science degree in the School of Management and Labor Relations (SMLR) must complete a minimum of 120 college credits, including the General Education Requirements, the major program of study, and maintain a minimum cumulative GPA of 2.0. A student may elect to pursue an approved minor or second major from another school within Rutgers–New Brunswick, however additional programs are not required.

Thirty (30) Rutgers credits, including at least 12 credits while enrolled in SMLR, must be completed at Rutgers–New Brunswick for the degree to be granted.

For more information, visit the program website.

Bachelor of Science in Labor and Employment Relations (SMLR-U)

General Education Requirements for the Bachelor of Science Degree

General Education Requirements for the Bachelor of Science Degree

The School of Management and Labor Relations is fully compliant with the Lampitt Law requiring that all individuals who have earned an associate in arts (A.A.) or associate in science (A.S.) degree from a New Jersey county college will have fulfilled its general education requirements. For others, the requirements are:

Writing: 6 credits. Expository writing (01:355:101) and one second-level writing course. See Degree Navigator for a list of approved second-level writing courses.

Quantitative Reasoning: 6 credits. Two courses in mathematics or applied quantitative reasoning. See Degree Navigator for lists of courses in each area.

Natural Sciences: 6 credits. See Degree Navigator for lists of courses in each area.

Arts and Humanities: 3 credits. See Degree Navigator for lists of courses in each area.

History: 3 credits. See Degree Navigator for lists of courses in each area.

Diversity: 3 credits. See Degree Navigator for lists of courses in each area.

Bachelor of Science in Labor and Employment Relations (SMLR-U)

Minors and Dual Majors in the Bachelor of Science Program

Minors and Dual Majors in the Bachelor of Science Program

A minor or second major is not required for graduation. However, students may complete any minor or second major offered by Rutgers University-New Brunswick as long as they meet its requirements. The School of Arts and Sciences has agreed that its minors and majors are open to bachelor of science program students without a separate application to that school; other schools at Rutgers may require admission.

Bachelor of Science in Labor and Employment Relations (SMLR-U)

Online Bachelor of Science Program

Online Bachelor of Science Program

The Rutgers Online Bachelor of Science in Labor and Employment Relations degree-completion program is designed for individuals who have earned two or more years of college credits. Students study how the world of work is changing today and how that affects employees and our society. In the process students gain expertise relevant to successful employment across a wide variety of fields.

This bachelor's program is about the changing world of work, and so it will be particularly useful in advancing an individual's career. Students have considerable choice in what to study: human behavior in organizations, diversity/inclusion issues, employment law, workplace leadership, collective bargaining, using emotional intelligence, labor history, and/or professional development strategies.

Degree completion time depends on how many courses a student takes per semester and how many courses transfer to Rutgers to attain the 120 credits needed. It is possible to transfer up to 60 credits from a 2-year college, and up to 90 credits from a 4-year college, or a combination of 2 and 4-year colleges attended previously.

A total of 36 credits is required to complete the major, which consists of four required courses and eight electives. All our online courses are equivalent in quality and learning objectives to the in-person courses that we teach. The curriculum for the Labor and Employment Relations major has been developed to ensure excellence in instructional design.

For more information on the online program for the B.S. degree in LER, visit the school's website.

Off-Campus Labor Studies and Employment Relations Programs (SMLR-U)

OFF-CAMPUS LABOR STUDIES AND EMPLOYMENT RELATIONS PROGRAMS

Rutgers Statewide allows students with an associate's degree to complete a Rutgers bachelor's degree at one of six different community colleges in the state. Through our partnership with these community colleges, students can complete the B.S. in Labor and Employment Relations with a combination of in-person and online courses without needing to travel to the Rutgers-New Brunswick campus. Our on-site Rutgers advisors are available to assist students with their degree completion plans, please visit our website for more information.

Explore the B.S. in Labor and Employment Relations in partnership with:

- Atlantic Cape Community College
- Brookdale Community College
- Camden County Community College
- County College of Morris
- Mercer County Community College
- Raritan Valley Community College

Contact Professor Paula Voos at pbvoos@smlr.rutgers.edu to discuss options.

SMLR Honors Program (SMLR-U)

SMLR HONORS PROGRAM

School of Management and Labor Relations (SMLR) undergraduate students are eligible to apply for the SMLR Honors Program the year before their senior year, which includes taking a SMLR Honors course that structures the completion of an Honor's Thesis. In addition to taking the SMLR Honors course, students will be paired with a Research Advisor who will serve as a mentor and subject matter expert with respect to the student's thesis topic.

The SMLR Honors Program includes the completion of **two SMLR Honors courses** spread across the Fall and Spring semesters that typically align with the student's senior year.

SMLR undergraduate students are eligible to apply for the SMLR Honor's Program if they have met (or plan to meet) the following criteria:

- Declared a SMLR Undergraduate Major (BA HRM, BA LSER, BS LER)
- A Major GPA of 3.5 or higher
- An Overall GPA of 3.0 or higher
- Currently of "Junior" standing

- Completed a Methods / Statistics Course, such as:
    - Research Methods - 37:575:401 *or* 38:578:501
    - Creating and Administering Surveys - 37:575:404 *or* 38:575:604
    - HRM & Statistics - 37:533:440
    - Basic Statistics for Research - 01:960:401
    - Introduction to Social Research - 01:920:311
    - Other Social Science Statistics or Research Course - check with your academic advisor

Complete information on the SMLR Honors Program including how to apply may be found on the SMLR website.

Human Resource Management (SMLR-U)

HUMAN RESOURCE MANAGEMENT

The human resource management (HRM) undergraduate courses offered through the School of Management and Labor Relations cover a broad range of topics associated with HRM from the perspective of the HR professional, the manager, and the employee. The program prepares students who are interested in a career in human resource management--or hope to become managers or team leaders during their careers--with some of the issues they will have to deal with, such as staffing, motivating, and developing team members.

The bachelor's degree program in human resource management is a multidisciplinary major that draws heavily from business strategy, psychology, economics, and sociology. Students will gain exposure to a broad range of HR topics, gain marketable business skills, and are taught current HR strategies by top faculty in the field with genuine interest in students' success.

More information about the program can be found on the SMLR website here.

About Our Programs (SMLR-U)

ABOUT OUR PROGRAMS

The Department of Human Resource Management of the School of Management and Labor Relations in conjunction with the School of Arts and Sciences offers a bachelor of arts (B.A.) degree in human resource management (HRM) and a minor in human resource management. Human resource management is one path to understanding business that does not require a traditional business degree. Students wishing to pursue the B.A. in HRM do so through admission to the School of Arts and Sciences.

The HRM programs help prepare students for successful corporate, consulting, or governmental careers. The HRM major and minor provide a business perspective that is particularly useful to students who major in psychology, economics, communication, or other social science programs. The B.A. in HRM and the HRM minor also prepare students interested in pursuing the master of business administration (M.B.A.) degree.

Students who successfully complete either the major or the minor program can combine some credits earned with graduate work to earn a master's in human resource management (M.H.R.M.) degree at the School of Management and Labor Relations through a five-year plan. Students may transfer up to 18 credits of human resource

management (37:533) classes with a grade of B or better, enabling them to complete a master's degree in approximately one additional academic year. This is provided the courses are from the published list of transferable courses and is contingent upon acceptance into the M.H.R.M. program.

With the support of one of the nation's largest and most frequently published and cited human resource management faculty, our HRM programs could be the entry to a successful and rewarding career. Rutgers human resources management graduates are currently working in leadership positions in some of the largest companies around the world.

For more information regarding the School of Management and Labor Relations HRM programs, please see our website here.

About Our Programs (SMLR-U)

Declaration

Declaration

Students enter the human resource management (HRM) major or minor programs via declaration from their respective school. Typically, HRM students reside in the School of Arts and Sciences (SAS). Full-time students normally declare their major in the second semester of their second year, although some students may declare earlier in order to facilitate the planning needed for an appropriate sequence of the courses required to complete the major within four years.

Part-time students normally declare their major by the time they have completed 60 credits.

Students within the School of Arts and Sciences may utilize the SAS online declaration system to declare either their major or their minor: here. Some academic departments may have prerequisites and/or require approval by an adviser. For more information regarding the declaration of either a major or a minor, please see the SAS website here.

Students who attend a school within Rutgers outside of SAS should consult with their adviser for information on the declaration process.

About Our Programs (SMLR-U)

Degree and Course Credits: Additional Information

Degree and Course Credits: Additional Information

For both the human resource management (HRM) major and minor, students can count HRM courses taken toward either the major or minor. The HRM major requires 45-48 credits, including Introduction to HRM, 7 required core HRM courses, and 4 HRM elective courses (37:533). The HRM minor requires 18 credits, including Introduction to HRM and 4 required core HRM courses (37:533). While some labor studies courses are incorporated into the HRM major and minor programs, there is a limit to the number that can be applied to each program. Information regarding all requirements can be found on the website.

The Department of Human Resource Management at the School of Management and Labor Relations will determine whether students have sufficiently completed the requirements necessary to receive the HRM minor or major at graduation. To facilitate this verification process, the School of Arts and Sciences (SAS) provides a list of students who have applied for graduation and declared the HRM minor or major. Certification for students from schools outside of SAS (i.e., Rutgers Business School: Undergraduate-New Brunswick, School of Management and Labor Relations, School of Environmental and Biological Sciences, School of Engineering, Edward J. Bloustein School of Planning and Public Policy, Mason Gross School of the Arts, and Ernest Mario School of Pharmacy) is done separately.

About Our Programs (SMLR-U)

Contact Information

Contact Information

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B.A. in Human Resource Management (SMLR-U)

B.A. IN HUMAN RESOURCE MANAGEMENT

The undergraduate human resource management (HRM) programs include a human resources (HR) undergraduate major and an HR undergraduate minor. By covering a broad range of topics, the HRM major or minor will familiarize students with some of the issues they may encounter as a manager or team leader in HR or other areas. These issues include how to staff, motivate, and develop team members – and are taught from the perspective of the HR professional, the manager, and the employee.

The HRM program is a multidisciplinary program that draws heavily from business strategy, psychology, economics, and sociology. Students will gain exposure to a broad range of HR topics, gain marketable business skills without a business degree, and are taught current HR strategies by top faculty in the field with genuine interest in students' success. Participants also have the option to continue their studies at the graduate level through SMLR's Master's Advantage Plan.

Information on the HRM programs may be found on the SMLR website at:

HRM Major
HRM Minor
SMLR Honors Program

Learning Objectives

Admission and Requirements

SMLR Honors Program

Internships and Independent Study

Undergraduate Students in Graduate Courses and Transfer Credits

Courses

Minor in Human Resource Management (SMLR-U)

MINOR IN HUMAN RESOURCE MANAGEMENT

Students who are in good academic standing are eligible to declare the human resource management (HRM) minor through either the School of Arts and Sciences at Rutgers University-New Brunswick or through the school they have been matriculated into. The minor consists of 18 credits in human resource management and must include 37:533:301 Introduction to Human Resource Management, four courses from the concentration, and one elective course from the potential electives offered by the School of Management and Labor Relations. Substitution of courses is not allowed.

Students will be required to complete six undergraduate HR courses, offered by the School of Management and Labor Relations, with a grade of C or better.

For information on the human resource management minor, visit the website.

Courses (SMLR-U)

Courses

37:533:301 ***Introduction to Human Resource Management (3)***
While many of the tasks associated with human resource management are centered in the HR department, all managers have HR responsibilities. This course covers the broad range of topics associated with HR management from the perspective of the HR professional, the manager, and the employee. It serves as the base course in both the undergraduate HRM major and minor. It will also serve to familiarize students who hope to become managers or team leaders during their careers with some of the issues they will have to deal with, such as staffing, motivating, and developing team members.

37:533:311 ***Talent Acquisition (3)***
This course focuses on the effective management of the flow of talent into and through organizations. It covers human resource planning, recruiting and selection, career transitions, and other workforce movement. An important goal of the class will be to provide opportunities to develop hands-on skills that are relevant to effectively managing talent flow.
Prerequisite: 37:533:301.

37:533:312 ***Developing Talent (3)***
This interactive, theoretically anchored, and applied course is aimed at understanding the processes and practices of developing human capital. It covers how organizations train and develop their employees, performance management as an evaluative and developmental tool, and the strategic development of talent framed within the context of talent.
Prerequisite: 37:533:301.

37:533:313 ***Compensation & Total Rewards (3)***
Helps students understand the theoretical basis for compensation and other rewards systems and provides a practical understanding of how compensation and rewards systems work. The economic, psychological, and

strategic aspects of rewards systems are covered. A series of exercises provide hands-on experience with major compensation and rewards practices.
Prerequisite: 37:533:301.

37:533:315 ***Global HRM (3)***
Explores the importance of international business management in the context of international human resource management, including topics on culture, compensation and benefits, international organizations and their structures, international assignment management, and the legal and regulatory considerations that global organizations face.

37:575:315 ***Employment Law - Labor Studies Offering (3)***
Overview of employment at-will and its limitations; wages and hours; medical/family leave; privacy; drug testing; workers' compensation; and fundamental antidiscrimination law.

37:533:317 ***Career Management (3)***
Provides students with the knowledge and skills to help others manage their careers while learning how to manage their own. Topics will include self-assessments, motivation theory, professional skill-development, career ladders, labor market/occupational trends, market research, personal branding, job search techniques, résumé writing, interviewing skills, negotiating, networking, and creating work-life balance.

37:533:318 ***HRM and Benefits (3)***
Employee benefits are complex, expensive, very personal, and many times misunderstood. This course seeks to acquaint students with the type of employee benefits offered in the workplace, the history behind them, and the challenges that benefits present to an organization. Students gain an understanding of benefits strategy, the legal requirements covering benefits, and explore how workforce demographics provide a context for the organization's employee benefits decisions. The course relies on a base knowledge of employment law, tax law, psychology, management, organizational dynamics, and economics.
Note: This course was previously offered under Special Topic numbers 533:322 and 533:324. Students who take this course may not also utilize 37:575:375 Benefits and Social Insurance toward the HRM major.

37:533:321-335 ***Special Topics in Human Resource Management (3)***
Topics offered may include: Artificial Intelligence, HR in the Tech Industry, or others that connect our curriculum to industry.

37:624:345 ***Organizational Behavior and Work (3)***
Covers behavior by individuals and groups in the workplace; group and intergroup dynamics; organizational culture, structure, and change; leadership, employee motivation, job performance, and feedback.
Note: Previously listed under 37:575:345.

37:624:348 ***Leadership in the Workplace (3)***
Leadership in work organizations, including unions, nonprofits, and businesses. Key leadership issues in small groups and large organizations; diversity concerns; leadership development.
Note: Previously listed under 37:575:318 Leadership in Work Organizations

37:533:351 ***Human Resource Management in Health Administration (3)***
Human resource management in the healthcare setting shares common features with HRM in any organization. However, healthcare organizations have a unique history of approaches to HRM. Healthcare organizations are closely regulated entities.

37:533:352 ***Human Resource Management in the Public Sector (3)***
Human Resources Management in the Public Sector will introduce you to human resources policies and processes in government entities.

37:533:353 ***Equity Compensation & Employee Ownership (3)***
This survey course explores the variety of ways that businesses can compensate employees with shares of equity and profits, and the human resource management, employment relations, organizational and individual motivational issues that such practices raise.

37:533:354 ***People Analytics in HRM (3)***
People analytics is a data-driven approach to improving people-related decisions for the purpose of advancing both individual and organizational success. While people have always been critical to the success of organizations, many business leaders still make key decisions about their workforce based on intuition, experience, advice, and guesswork.

37:533:355 ***HRM & Social Media (3)***
Social media has altered our lives in ways we didn't know are possible. The consequences of social media, and how these tools can be in Human Resources. Topics covered will include social networking, the how/why the business world leverages them, sharing corporate culture on social media and technologies, and skills in designing and implementing social media for Human Resources.

37:533:360 ***HRM Financial Decisions (3)***
Successful HR strategies are those that align with and support the firm's business strategy. Successful business strategies are those that create value for the firm and its stakeholders. To be effective in their strategic partner role HR professionals must understand how firms create value and measure value creation. This course will introduce students to the interpretation of financial statements and use of discounted cash flow techniques for planning and evaluating HR and strategic investments. Particular attention will be paid to topics such as selecting the financial measures used to determine incentive pay, paying in stock versus paying in stock options, alternative models for valuing stock options, the financial and HR aspects of pension plans, and the modeling of merger and acquisition opportunities.
Note: This course is designed for students without prior training in accounting or finance.

37:624:364 ***Diversity & Inclusion (3)***
Focuses on how the increasing demographic diversity of American workplaces affects social relations, cultural dynamics, and organizational effectiveness.
Note: Previously listed under 37:575:364

37:624:376 ***Corporate Governance, Power, and Control (3)***
Explores the relationship between corporate governance and the economic, social, and political impact of corporations. Topics include: history of the corporation and stock ownership; boards of directors; principal-agent/ stakeholder theories; executive compensation; profit sharing; employee ownership; stock options; shareholder

rights; takeovers and mergers; labor issues; pension funds; international corporate governance; the relationship between governance, corporate performance, and financial collapses; social and environmental sustainability; corporate social responsibility; and the role of public policy and government regulation.

37:533:440 ***Statistics for HRM (3)***
Addresses basic statistics, covering frequency distributions through regression analysis. Enables students to compile and analyze data used in developing, implementing, and measuring HR outcomes. It will also enable students to interpret HR and government reports.
Prerequisite: 37:533:301

37:533:494,495 ***Independent Study and Research (BA)***
Individual reading and research project under the guidance of a human resource management faculty member on a topic of interest to the student. For HRM majors only.
Prerequisites: Completion of five human resource management courses from the list of core requirements including 37:533:301, with a GPA of 3.5 or better. Advance permission of faculty member or program director required.

37:533:496 ***Internship in Human Resource Management (BA)***
Students work as staff members in an approved public or private organization's human resource management department. The opportunity will allow students to apply conceptual knowledge learned in the classroom to actual situations and to acquire new skills. For HRM majors only.
Prerequisites: Completion of four human resource management courses from the list of core requirements including 37:533:301, with a GPA of 3.2 or better. Permission of program director required.

37:624:498 ***SMLR Honors I (3)***
SMLR Honors class and mentoring that will guide students through the theses process through the first half of the academic year.

37:624:499 ***SMLR Honors II (3)***
SMLR Honors class and mentoring that will guide students through the theses process through the second half of the academic year.

Applicable Labor Studies Courses

In addition to 37:575:315, there are certain courses from the Department of Labor Studies and Employment Relations that are applicable to both the HRM undergraduate minor and major. For the complete list, please consult the checklist document on the HRM undergraduate website here.

Applicable Courses from Other Disciplines

The HRM undergraduate major includes a requirement of three courses from psychology, sociology, and economics as well as two courses from a list of quantitative requirements. Applicable courses from these areas of study can be found on the checklist document on the human resource management undergraduate website here.

Five-Year Programs (SMLR-U)

FIVE-YEAR PROGRAMS

Bachelor/Master of Labor and Employment Relations

Master's Advantage Plan (M.A.P.)

Bachelor/Master of Labor and Employment Relations (SMLR-U)

BACHELOR/MASTER OF LABOR AND EMPLOYMENT RELATIONS

This program allows qualified students to complete both a bachelor of arts (B.A.) degree in labor studies and employment relations, or a bachelor of science (B.S.) degree in labor and employment relations, and a master of labor and employment relations (M.L.E.R.) degree in approximately five years of full-time study. Graduates have been successful in obtaining responsible positions in labor/nonprofit organizations, the public sector, and in corporations in labor relations, human resources, health and safety, training, diversity/equal employment opportunity, and related fields.

Bachelor/Master of Labor and Employment Relations (SMLR-U)

Program

Program

Students who graduate with an undergraduate major in labor studies and employment relations may be able to complete a master's degree in labor and employment relations on an accelerated timetable. When they enter the program, undergraduate majors may waive as many as 9 credits of graduate work normally required for the advanced degree. In addition, they may be able to take two graduate-level courses while they are undergraduate students. If the credits for these two courses are above and beyond the 120 credits needed to obtain the undergraduate degree, they may be counted toward the graduate degree. Students must earn a B or better in a course for it to wave a course requirement for the M.L.E.R. degree.

Students who have declared the labor studies major and are interested in this program should speak to an advisor or the graduate program director about what to take to be ready for the graduate program. The formal application to the five-year version of the master's program should be submitted to Rutgers Graduate Admissions early in the final semester before graduation.

For more information about the joint bachelor’s/master’s program please visit the program website.

Bachelor/Master of Labor and Employment Relations (SMLR-U)

Application

Application

Students seeking to enter the five-year program are generally subject to the same admission requirements as individuals applying to the master of labor and employment relations (M.L.E.R.) degree program. The application is made formally to Rutgers Graduate Admissions early in the final semester of the student's undergraduate career.

Students may apply for fall or spring semester admission, and they may be eligible to take summer courses on a nonmatriculated basis before admission in the fall. The program requires two or three letters of reference, preferably from SMLR or other Rutgers faculty members, a personal statement, and a professional resume. Acceptance is contingent upon successful completion of the bachelor of arts (B.A.) or bachelor of science (B.S.) degree, but the program can make provisional admission decisions as soon as it receives a completed application and transcripts from all higher education institutions attended.

Master's Advantage Plan (M.A.P.) (SMLR-U)

MASTER'S ADVANTAGE PLAN (M.A.P.)

Qualified students have the option to utilize select credits earned from their Bachelor of Arts in Human Resource Management (HRM) toward the Masters' in Human Resource Management. The Master's Advantage Plan uniquely allows students the opportunity to determine if they wish to complete the M.H.R.M. within a year's time or over 2-3 years part-time. The ability to use the undergraduate credits is contingent upon acceptance into the Master's in Human Resource Management Program. Matriculation into the M.H.R.M. program takes place upon completion of the undergraduate degree.

Once accepted into the M.H.R.M. program, students may apply up to 18 credits from their undergraduate human resource management courses (37:533) toward the Masters' in Human Resource Management. This is provided the student receives a "B" or better in each transferable undergraduate course, and provided the student applies for the M.H.R.M. within five years after receiving their undergraduate degree. The M.H.R.M. is a 48-credit degree program which may be reduced to 30 credits if 18 credits are utilized from the undergraduate program. Applicable courses and their graduate course transfer equivalents are listed on the SMLR website here.

Students who have not declared the HRM major or minor may also apply up to 18 credits from applicable human resource management courses to the Master's in Human Resource Management provided they have met the stipulations stated above.

For more information about the Master's Advantage Plan, visit the program website.

Application

Application

Students who wish to utilize course credits from their undergraduate degree toward a master of human resource management (M.H.R.M.) degree **must apply separately to the M.H.R.M. program**. Students may apply for fall, spring, or summer semester admission.

Although acceptance is contingent upon successful completion of the bachelor's degree, the program can grant conditional admission upon receipt of a completed application and official transcripts.

Additional information regarding the application process for the M.H.R.M. may be found here.

Academic Policies and Procedures (SMLR-U)

ACADEMIC POLICIES AND PROCEDURES

Note: See the **University Policies and Procedures** section in the Rutgers Main catalog for university-wide academic policies and procedures.

Registration and Course Information

About the Honors College (HC-NB)

ABOUT THE HONORS COLLEGE

History and Mission

Participating Schools

History and Mission (HC-NB)

History and Mission

The history of honors education at Rutgers goes back more than forty years to the 1980s, and starts with the implementation and evolution of several unique and distinct Honors Programs in the School of Arts & Sciences (which later came to include students from Rutgers Business School), the Engineering Honors Academy, and the School of Environmental and Biological Sciences. With such a broad swath of the University providing an enriched experience, including professional schools as well as liberal arts majors, the evolution of these programs led to great success for the students who commanded scholarships, unique classes, research programs, faculty engagement, and a richness of resources in the classroom, residence halls, and campus programming.

In 2015 the University also launched an interdisciplinary experience, the Honors College, as a coequal entity, focusing on the learning-living experience and expanding the honors approach to two more Schools: Mason Gross School of the Arts and Ernest Mario School of Pharmacy. Ground was broken on a new Honors College facility as part of the Seminary Place Redevelopment Project in September 2013, flanking the new academic building next door completed in September 2016. As the new facility took shape, a broadly representative faculty committee was convened by then-New Brunswick Chancellor Richard Edwards, and charged with developing an innovative curriculum designed to guide students from their introduction to scholarly inquiry, through the development of critical thinking skills, to applied research and the formation of new knowledge.

For a decade the four entities worked side-by-side, evolving both in parallel and independently. As the state of education changed, however, it was decided that the structure of honors education should also change as it was realized that the collective entities would be stronger as one unit, allowing for a greater concentration of effort, a growth in the honors presence across campus, and extending the enriched programs to the full complement of exceptional students. A new committee was formed by Chancellor Francine Conway in 2024 to explore the process and advantages of integration, leading, a year later, to the first fully articulated Honors Council, a shared curricular outcome, the development of mission-based courses, an affirmation of the interdisciplinary approach

and the requirement for a global competency course. In the summer of 2025 the Honors College and the Honors Programs formally integrated by restructuring the curriculum, offering a singular set of co-curricular programs, and allowing for even greater interdisciplinary curricular and extracurricular experiences, all while preserving the mission and values of an honors education. Today it is known as the Honors College.

Following the consolidation in the summer of 2025, along with the consortium of six participating undergraduate schools, the New Brunswick Honors College works in tandem with a student's major course of study in their school of enrollment, exposing students to interdisciplinary inquiry, providing opportunities for research and engagement with Rutgers' world-class faculty, and challenging them to engage with 21st-century issues from their first days on campus. With a new Honors College motto "Inspired. Empowered. Connected." building on the legacy of the previous decade's motto "Curiosity. Knowledge. Purpose.", today's Honors College students are asked to think about how they can serve the world with their dedication to finding inspiration and developing knowledge so that they may ultimately have a life and a career that empowers themselves and others, and remain purposefully connected to their communities, all of which are markers of an exceptional education.

Today, the Honors College offers an unparalleled educational experience to the highest-achieving students from New Jersey, the United States, and across the world, and is focused on interdisciplinary and enriched learning in the context of an innovative and an expansive and comprehensive learning-living community. The College is a powerful academic initiative offering an innovative learning environment and close interaction with faculty from the beginning of students' undergraduate careers. In parallel with the national visibility gained from Rutgers-New Brunswick joining the Big Ten and its related Big Ten Academic Alliance, the founding of the Honors College doubled the number of high-achieving students at New Brunswick with access to honors education, underscoring the role of Rutgers-New Brunswick as the public flagship university of New Jersey.

Participating Schools (HC-NB)

Participating Schools and Honors Leadership & Governance

The Honors College draws its students from six undergraduate schools at Rutgers University-New Brunswick. Every student is admitted into their degree-granting school and then invited to join the Honors College community. The schools that comprise the Honors College are as follows: the School of Arts and Sciences (SAS), the School of Environmental and Biological Sciences (SEBS), the School of Engineering (SoE), the Rutgers Business School: Undergraduate-New Brunswick (RBS), the Ernest Mario School of Pharmacy (EMSOP), and the Mason Gross School of the Arts (MGSA). More information about each school and their individual major/minor offerings and requirements can be found on their websites or in this catalog.

All faculty who teach Honors College students, serve as Residential or Affiliated Faculty Fellows, or collaborate with us in programming and workshops are based within our partner Schools. Information on each faculty member can be located on their School and departmental webpages.

The Honors College has an administrative staff, including deans, academic and student affairs team, and a business and operations team. They, along with partners in Residential Life, Counseling and Psychological Services (CAPS), and the Rutgers University Foundation, coordinate with the advisors, staff, and administration of the Schools through the Honors Council to maintain all Honors College policy, procedural, and curricular matters.

Academic Requirements (HC-NB)

ACADEMIC REQUIREMENTS

School and Major Requirements

Honors College Coursework

Service

Honors Sections and Honors Contract Courses

Academic Standing

Graduation Requirements

School and Major Requirements (HC-NB)

School and Major Requirements

Honors College students must complete all core requirements for their academic school of enrollment along with the requirements of their chosen major(s)/minor(s). For more information about school- and major-specific requirements, please refer to the relevant sections of this catalog or the individual school and departmental websites. Credit granted for previous education and training lies within the purview of our partner schools, which grant degrees.

Honors College Coursework (HC-NB)

Honors College Coursework

The Honors College curriculum is an enriched and fulfilling series of courses and experiences that are integrated into a student's course of study so as not to conflict with their school/major requirements. The curriculum and its classes are designed by faculty to take an interdisciplinary approach to teaching and learning, as well as fuel a student's passions for intellectual growth and challenge.

In order to graduate as an Honors College Scholar or an Honors College Scholar with Distinction, all of the courses below must be completed with a grade of B or better.

Honors Mission Course
The Honors Mission Course provides first-year students with a common academic experience exploring the nature of broad learning in higher education, a School-based framework, and a common reading. Bringing all new Honors College Scholars together students investigate some of the essential questions defining human existence in the 21st century, emphasize interdisciplinary collaboration as a tool for successful student outcomes, and address moral, social, and cultural questions and scientific and economic challenges. Through this course, our primary task is to engage all our first-year Honors College students to develop traits and noncognitive skills--such as critical thinking

skills, problem-solving skills, social skills, persistence, creativity, and introspection--that allow them to contribute meaningfully to society and to succeed in their public lives, workplaces, homes, and other societal contexts. All Honors College students are required to take at least one Mission Course in either their first or second semester.

Interdisciplinary Honors Seminar
These seminars, designed and proposed by faculty members, provide students with an opportunity to work closely with a faculty member and think about complex problems and issues across disciplinary boundaries or outside of traditional disciplinary trajectories. All seminars involve extensive written work, readings, deliberative discussion, and independent work, and they often include research as well as fieldwork opportunities. We offer several thematic or structured seminars, including Cross Cultural Community Seminars with a community-oriented investigative theme such as health care or the environment, embedded study abroad or study away courses which add a short term travel-study component, collaborative online international learning seminars (COIL) which include a side-by-side real-time learning experience with students and faculty from a university abroad, and LGBTQ+ Learning Collaborative courses that are focused on broadening all students' awareness of the contributions and history of the LGBTQ+ communities in global society.

Interdisciplinary Honors Seminars have an enrollment of no more than 18 students. Many Interdisciplinary Honors Seminars offered through SAS, SEBS, and RBS course codes can be used to meet the Undergraduate-New Brunswick Core requirement for Writing and Communication (code WCd). Every Honors College student must take at least one Interdisciplinary Honors Seminar within their first six semesters and additional Interdisciplinary Honors Seminars can be taken to fulfill honors credit requirements.

Global Competency Course
To ensure a broader world view and an understanding of how large our communities of engagement truly are, students must choose to enroll in at least one global competency course from across three different categories: intermediate level (or higher) proficiency in a global language, a global cultural course from an approved list maintained on our website, or six credits of study abroad.

General Honors Courses
Honors College students must also complete a minimum number of additional honors credits from among the full offering of courses across campus that are designed with an honors approach. These include additional Interdisciplinary Honors Seminars, departmental honors courses or sections, SEBS Tutorials I-VI, +Honors contract courses, or Byrne Seminars, the latter of which are only open to first-year students by University policy.

+Honors Contract Courses
Students have the opportunity to design their own honors course by working collaboratively with a faculty member in order to turn a non-Honors course into an approved honors class. Students and faculty must follow a set of guidelines and expectations, spelled out on the Honors College webpage, agree to a contract of substantial alterations, additional out-of-class meetings with the faculty member, and assignments that enrich the student experience and are part of the overall class grade. These courses can count as General Honors courses (see above). This option can be used to enroll in graduate courses (not counting Capstone courses) or study abroad and study away.

Honors College Service Hours
The completion of approved community engagement service hours is a required component of the Honors College curricular program. The details of this are discussed in a separate section. The requirement is for 30 hours if you enter as a freshman and 20 hours if you enter as a sophomore transfer or Rutgers admit, and the same for transfer students admitted in their junior year from a community college or four-year university.

Additional Courses for Honors College Scholar with Distinction
Students who complete all of the above requirements can graduate as an Honors College Scholar. However, for those who wish to graduate as an Honors College Scholar with Distinction you must also apply for and receive approval, and then undertake a Capstone Project of 200 hours over two semesters (some exceptions apply) in order to earn our highest distinction.

Capstone Project
Honors College students who choose to complete an independent capstone project during their senior year will be graduated as an Honors College Scholar with Distinction. Because of the wide range of majors in the Honors College--from the humanities, social sciences, and arts to business, engineering, and the life and physical sciences--a variety of seven distinctive projects can fulfill the capstone requirement. The options are: (1) Departmental honors; (2) School-based honors project; (3) Interdisciplinary honors thesis/project; (4) two inter-related graduate courses; (5) graduate-level program or certificate; (6) experiential program or project; and (7) a global capstone involving study abroad and an associated culture class.

Working closely with and receiving support from a departmental faculty capstone supervisor or supervisors, and guided through the application process by a School-based Honors College Adviser, students propose and gain approval for their capstone project by the end of their junior year (some exceptions can apply). All proposals must be approved by both the Honors College and the designated faculty member(s). Work on the project can begin, in some cases, during the junior year and will comprise at least 6 academic credits over two semesters, unless otherwise designated by the School or department

Service (HC-NB)

Service

As a part of the Honors College's mission to develop service-minded citizens, a minimum of 30 hours of approved service work are required in their first three years. Students can choose from preapproved service projects or gain approval for independent service work. The service requirement can be credit- or noncredit-bearing; paid internships do not fulfill the service requirement.

Honors Sections and Honors Contract Courses (HC-NB)

Honors Sections and Honors Contract Courses

Honors College students have the opportunity to take honors sections of traditional courses during their time at Rutgers. These include general courses that often meet core school or major requirements, such as Honors Calculus and Honors Microeconomics, and provide a smaller, more intensive experience than the traditional, nonhonors

sections of these courses. Honors College students also have access to special departmental honors seminars that can fulfill major requirements and offer greater opportunities for high-achieving students to go in-depth into a faculty member's area of interest. Finally, Honors College students can take Honors contract courses. With the prior approval of the course instructor and the Honors College dean, students can take sections of traditional courses with an honors contract to perform additional assignments: research, independent study, and more. Graduate courses can also potentially be taken as contract courses.

Academic Standing (HC-NB)

Academic Standing

Grades and GPA

In order to remain in good standing in the Honors College, students must earn at least a B in all honors courses taken.

Students must maintain a minimum grade-point average of 3.25 GPA overall and a 3.25 GPA each semester, to sustain their good standing in the Honors College. Students who fall below this overall and/or semester-based GPA requirement will be placed on academic probation, during which time they will have the opportunity to raise their GPA back to Honors College standards. Failure to return to honors standing after a probationary period (up to three semesters, depending upon the GPA and the progress made) will result in dismissal from the Honors College (but not necessarily the student's academic school of enrollment).

Academic Integrity and Student Conduct

The Honors College expects that its students will exhibit the highest level of integrity in all matters: academic, co-curricular, residential, and personal. Faculty and staff in the Honors College will assess student actions and activity on these expectations that are aligned with those of the broader University community. See the University Policies and Procedures section in the Rutgers Main catalog for university-wide academic integrity policy and the student code of conduct. Students can be dismissed from the Honors College as a result of University action taken in the wake of any reported incident that puts them in violation of either the policy or code.

Graduation Requirements (HC-NB)

Graduation Requirements

Students who graduate from the Honors College will have the achievement noted on both their transcripts and their diplomas.

To graduate as an Honors College Scholar or an Honors College Scholar with Distinction, students must complete the following:

- Core requirements in their academic school of enrollment.
- All requirements for their major(s).
- All requirements for their minor(s), if applicable.

- Good academic standing in their school of enrollment and the Honors College.
- Honors College core requirements (Honors College Mission-based Course, Interdisciplinary Honors Seminar, additional honors courses and credits (see below), one Global Competence requirement, and community service hours) with a grade of B or better.
- Students who complete the above will graduate as an Honors College Scholar.
- By adding and completing an Honors College Capstone Project and meeting the requirements as specified by the type and structure of one of seven options, a student can graduate as an Honors College Scholar with Distinction.

Student Life and Extracurricular Opportunities (HC-NB)

STUDENT LIFE AND EXTRACURRICULAR OPPORTUNITIES

Numerous academic and social opportunities are available to students throughout their four-year membership at the Honors College.

Housing

Academic Advising

Professional Development

Mentoring Program

Student Life

Housing and Residential Programming (HC-NB)

Housing and Residential Programming

Residence within designated Honors College housing on campus is entirely optional for all honors students.

Throughout a student's entire period of enrollment, Honors College students have the opportunity to live in special honors cohort housing on the five campuses in New Brunswick and Piscataway: College Avenue, Busch, Livingston, Douglass, and G.H. Cook. This arrangement allows students to reside among and with a cohort of fellow honors students. Typically, students choose to live on the campus where the majority of their major coursework is based, but students can live in any campus honors community of their choosing. All Honors housing is restricted to Honors students, so roommates must also be Honors students.

Honors College students are given the opportunity to participate in the full-spectrum of our learning-living community by choosing to live in the dedicated housing of the Honors College community, where they will live alongside other honors students as well as dedicated resident assistants (RAs), Honors community mentors in residence (upper-level students), and Residential Faculty Fellows (in certain, designated residence halls). These designated residence areas will engage in enriched and enhanced programming, provide dedicated workshops and information sessions, and provide structured social and extra-curricular activities.

Students who choose to live elsewhere (including non-honors Rutgers housing) are assigned to our non-resident and commuter cohorts for purposes of also participating in our co- and extracurricular as well as our social programming and student development opportunities.

The Honors College will announce which halls are designated for assignment and will be considered Honors Housing each February for the following year.

Academic Advising (HC-NB)

Academic Advising

The Honors College follows a School-based Honors College Advisor model. When a student joins the Honors College, they will be connected to the designated Honors College advisor or advising team in their School. A list of School-based advisors and the means of contacting them is maintained on the Honors College website.

Students are encouraged to seek out the assistance and contributions of the advisors, and to consider them an essential member of their student success team. Designated School-based Honors College advisors are a student's primary resource for discussing their Honors College requirements and how they integrate with their course of study. They also guide students to other resources and opportunities within the Honors College and across Rutgers, including professional development, scholarships, research, study abroad, distinguished fellowships, graduate school, and more. They are among the most well-informed professionals on campus and will have knowledge and information that will benefit you, and enhance your outcomes, no matter what the circumstances.

The Honors College sets the academic policies and practices governing enrollment, programs, and operations, and will, at various times, be the means of communication to students about various policies, procedures, deadlines, and expectations, all of which will, however, also be conveyed to and monitored by a student's School-based advisor.

Professional Development (HC-NB)

Professional Development

Honors College students also have access to the assistant dean of professional development for more in-depth support in pursuing professional and research opportunities in their field of study. Students receive support through résumé writing, interview preparation, networking events, internship opportunities, and mentoring programs.

Mentoring Programs (HC-NB)

Mentoring Programs

The Honors College provides a number of different mentoring programs, all designed to connect students with a range of mentors from their first days on campus.

From Peer Mentoring (open to all Honors College students) to our Generation HC (for first-generation students) the Honors College mentoring programs draw on many different mentoring resources: Rutgers' distinguished faculty; graduate students from programs across the New Brunswick and Piscataway campuses; undergraduate Honors College students from upper classes; the deans of the Honors College; and Rutgers alumni working in business, law, medicine, government, scientific or engineering research, publishing, education, military service, technology and AI, art and music, and numerous other professions.

Our goals are to work with students in formal and informal ways so that they can develop their soft-skills, enrich and expand their networks, and find pathways to making strides in their fields or by discovering aligned interests that were previously unknown to them. Through mentoring programs we aim to help students develop the academic, social, and experiential capital that will help them succeed.

Students should be sure to read the weekly *Inside Honors* and *Opportunities* e-newsletters for more information on mentoring programs, deadlines to participate, networking sessions, resume and cover letter reviews, professional development and leadership workshops, and social programs designed to bring together mentors and mentees.

Student Life (HC-NB)

Student Life

In addition to academics and professional development, the Honors College community offers students many engaging opportunities in the areas of co- and extracurricular activities and programs, community service opportunities, and social interaction and engagement, all part of our comprehensive learning-living community approach.

Co-curricular and Extra-Curricular Programs

With more than fifty unique co- and extracurricular programs, the Honors College offers students the chance to become leaders and act on their own enrichment opportunities through formal workshops and working groups, organizations, community activities, clubs, annual events, student advisory councils, and recognized groups. All of our organizations and programs are open to every student in the College as well as their guests, and are often co-sponsored by other University-wide clubs, organizations, academic departments, and community groups.

Service Hours

Although service hours are part of the required curriculum and Honors College program, they are also an important component of our learning-living community. With over 100,000 hours of community service performed over the past decade, our students have served others on campus, in New Brunswick, throughout New Jersey, up and down the Atlantic seaboard region, throughout the United States, and even abroad. Students can meet their required service hours through external groups and organizations, but also through several Honors College-sponsored events throughout the year, including food insecurity projects, environmental cleanup days, participation in the Rutgers Dance Marathon, school supply packaging for elementary school children, and working with sheltered animals, among many other projects.

Social Life

While members of the Honors College, students also enjoy planned and sponsored social activities such as monthly coffeehouse performances, semi-formals, cookouts, "team" activities, informal clubs, get togethers, snack nights, game nights, and more. Our events are both educational and fun, including our annual Geek Week events--with Star Wars, Harry Potter, and Barbie serving as past themes--where speakers give lectures in their areas of expertise (e.g., potions chemistry, religion in Harry Potter, etc.) as related to the event's theme, or cookouts with competitions, and movie nights with games and events alongside epic and popular films. We also sponsor many floor-based activities so that students who reside in Honors College housing, as well as our commuter students who are their own cohort, are able to get to know and socialize with their fellow students who have similar goals, expectations, and personal missions.

Administration (HC-NB)

ADMINISTRATION

Honors College Deans

- J.D. Bowers, Dean
- Krista Klein, Associate Dean
- Andrea Rydel, Assistant Dean

Academic & Student Affairs

- Ariel Chun, Program Director
- Domenic Nalbandian, Assistant Director for Programming
- Ashley Polselli, Program Director
- Talia Robbins, Assistant Teaching Professor and Program Coordinator
- Marline Souffrant, DRC-HC Program Coordinator

Business and Administration

- Kamini Chopra, Administrative Coordinator
- Donel Young, Executive Director for Marketing and Communications
- Anna Witek, Director Digital Experience & Technology
- Janet Zhan, Business Manager

Faculty Fellows

- Nicole Burrowes, Residential Faculty Fellow, History
- Doug Cantor, Affiliate Faculty Fellow, Political Science
- Trip McCrossin, Residential Faculty Fellow, Philosophy
- Kristen Springer, Affiliate Faculty Fellow, Sociology
- Kristen Syrett, Affiliate Faculty Fellow, Linguistics

Collaborating Partners

- Justin Campanella, Residence Life Coordinator

- Sharon Cocuzza, Associate Vice President for Development, RUF
- Gabrielle Ignotis, Development Assistant, RUF
- Shan Reeves, CAPS Community-Based Counselor