Biological Sciences

NJIT's Department of Biological Sciences is federated with Rutgers University-Newark, an affiliation that offers comprehensive opportunities for study and research, with diplomas issued jointly by NJIT and Rutgers. Students thus benefit from the best of both universities. NJIT emphasizes the quantitative and technical aspects of biology, while the focus at Rutgers is on the cellular and molecular aspects of biology, as well as ecology and evolution. Ample opportunities to participate in research at the undergraduate and graduate levels include neural-network function, neuro-immunology, waves and diffusion of ions in the brain, respiratory physiology, population dynamics, and global climate and ecosystem change.

NJIT Faculty

B

Barden, Phillip M, Assistant Professor

Bucher, Dirk M., Associate Professor

Bunker, Daniel E., Assistant Professor

D

Devan, Caroline M, University Lecturer

F

Flammang-Lockyer, Brooke E., University Lecturer

Fortune, Eric S., Associate Professor

G

Garnier, Simon J., Assistant Professor

Golowasch, Jorge P., Professor

H

Haspel, Gal, Assistant Professor

K

Konsolaki, Mary, University Lecturer

N

Nadim, Farzan, Professor

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Russell, Gareth J., Associate Professor

S

Severi, Kristen E, Assistant Professor

Soares, Daphne F., Assistant Professor

Stanko, Maria L., University Lecturer

T

Tai, Xiaonan

Y

Yarotsky, John J., University Lecturer

Programs

- Biology - B.A. (http://catalog.njit.edu/undergraduate/science-liberal-arts/biology/ba/)
- Biology - B.S. (http://catalog.njit.edu/undergraduate/science-liberal-arts/biology/bs/)

Accelerated Programs (http://catalog.njit.edu/undergraduate/academic-policies-procedures/special-degree-options/)

- Biology - B.A./M.D. (http://catalog.njit.edu/undergraduate/science-liberal-arts/biology/ba-md-dmd-dds-od/)
- Biology - B.A./D.M.D., O.D. (http://catalog.njit.edu/undergraduate/science-liberal-arts/biology/md/)
- Biology - B. A. in Biology/Doctor in Physical Therapy (DPT) - Ph.D. (http://catalog.njit.edu/undergraduate/science-liberal-arts/biology/ba-physical-therapy-phd/)
- Biology - B.A./Physician Assistant (http://catalog.njit.edu/undergraduate/science-liberal-arts/biology/biology-physician-assistant-ba/)

Double Majors (http://catalog.njit.edu/undergraduate/academic-policies-procedures/special-degree-options/)

- Biology & Mathematical Sciences - B.S.
- Biology & Law, Technology and Culture - B.A (http://catalog.njit.edu/undergraduate/science-liberal-arts/history/biology-ltc/)
- Biological Sciences Minor (http://catalog.njit.edu/undergraduate/science-liberal-arts/biology/biological-sciences-minor/)
- Cell Biology Concentration (B.A. in Biology) (http://catalog.njit.edu/undergraduate/science-liberal-arts/biology/ba/cell-biology-concentration/)
- Ecology and Evolution Concentration (B.A. in Biology) (http://catalog.njit.edu/undergraduate/science-liberal-arts/biology/ba/ecology-evolution-concentration/)
- Neurobiology Concentration (B.A. in Biology) (http://catalog.njit.edu/undergraduate/science-liberal-arts/biology/ba/neurobiology-concentration/)

Biological Sciences Courses

BIOL 115. Evolution and Biology of Sex. 3 credits, 3 contact hours (3;0;0).
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 (& often change) their gender, and what selection pressures shape mating systems and mate selection. In addition, we will examine how gender-specific selection influences offspring care and attachment, aggression and friendship. Throughout the course, we will evaluate which principals can and cannot be extrapolated to human behavior as well as how we as humans project our ideas of gender onto our study of the natural world. We will critically discuss contemporary articles concerning gender in the popular media.

BIOL 150. Living in a Variable Universe. 4 credits, 6 contact hours (3;3;0).
This laboratory course uses real-world case studies and dramatic experimental examples from across the natural sciences to explore the origin, structure, perception and regulation of variability in the world. Why do we so often misunderstand the nature and consequences of variability? Why do our efforts to manage environment variability often fail? What are the benefits of variability? How can we plan more effectively for an uncertain future? Students will leave the course with a better understanding of how variability affects both themselves as individuals, and society at large. They will also be exposed to a broad sampling of different disciplines within the natural sciences, including physics, statistics, neuroscience, psychology, ecology, and geography.

BIOL 200. Concepts in Biology. 4 credits, 4 contact hours (4;0;0).
Prerequisites: MATH 107 or MATH 108 or Co-requisites: MATH 110, or MATH 111 or MATH 138. This course will introduce student to the study of biology at the beginning of their course of study. Central ideas in the biological sciences will be highlighted, with an emphasis on the process of scientific discovery and investigation. The course will provide the basis for more advanced coursework and learning experiences in the biological sciences as students delve into the curriculum of study.

BIOL 201. Found of Biol: Cell & Molecula. 3 credits, 3 contact hours (3;0;0).
Prerequisites: BIOL 200 or R120 200 and CHEM 121 or CHEM 125. This course will expose students to an in-depth examination of the structure and function of cells; methods of study; thermodynamics and metabolism; membrane biology, energy utilization and transfer; protein and nucleic acid structure and function; transcription, translation, and genetic regulation. The laboratory course BIOL 202 must be taken concurrently, although they are separate courses.

BIOL 202. Found of Biol: Cell & Molecula. 1 credit, 3 contact hours (0;3;0).
Prerequisites: BIOL 200 or R120 200 and CHEM 121 or CHEM 125. Corequisite: BIOL 201. This course is a complement to the corresponding lecture course BIOL 201. The laboratory course will give students the opportunity to apply, in an experimental setting, the concepts that they are exploring in the accompanying lecture course and will offer them a hands-on experience that will enhance their learning of the Cellular and Molecular Biology content. Both courses (BIOL 201 and BIOL 202) must be taken concurrently.

BIOL 205. Foundations of Biology: Ecology and Evolution Lecture. 3 credits, 3 contact hours (3;0;0).
Prerequisite: BIOL 200 with a C or better, co-requisite BIOL 206. This introductory course considers the population level of biological organizations. Topics include Mendelian and population genetics, evolution, and ecology of populations and communities.

BIOL 206. Foundations of Biology: Ecology and Evolution Lab. 1 credit, 3 contact hours (0;3;0).
Prerequisite: BIOL 200 with a C or better, Co-requisite BIOL 205. The laboratory reinforces the topics covered in Foundations of Ecology and Evolution Lecture (Biol 205) lecture with hands-on activities and exposes students to current methods of research and analysis in these areas.

BIOL 222. Evolution. 3 credits, 3 contact hours (3;0;0).
Prerequisites: (BIOL 201 and BIOL 202 or R120 201 and R120 202) and (BIOL 205 and BIOL 206 or R120 205 and R120 206) with grade of C or better. This course will provide a comprehensive introduction to the field of evolutionary biology. Topics will include: the development of evolutionary theory, the history of the evolution of life on Earth, the genetic basis of variation and heredity, natural selection, evolution and development, and speciation.

BIOL 250. Biology of Neotropical Habitats: Ecuador and Galapagos Islands. 3 credits, 4 contact hours (2;2;0).
This course is an introduction to tropical biology and evolution held in Ecuador's Highlands, Rain Forest, and in the Galapagos islands. The course uses a hands-on approach to study the flora and fauna of these unique habitats. The course also addresses the history, politics, and culture of Ecuador, with emphasis on how these issues influence the management and sustainability of Ecuadorian natural resources.

BIOL 280. Ecology. 3 credits, 3 contact hours (3;0;0).
Prerequisites: BIOL 205 and BIOL 201. Overview of the science of ecology, which aims to understand interactions among biological species and among species and the abiotic environment. Topics include population ecology, species interactions, communities, and ecosystems. Topics will be addressed in light of global change including climate change, biodiversity loss, and impacts on human health and wellbeing.

BIOL 310. Work Experience I. 3 credits, 3 contact hours (0;0;3).
Prerequisites: Departmental approval and permission of the Office of Cooperative Education and Internships. Students gain major-related work experience and reinforcement of their academic program. Work assignments facilitated and approved by the co-op office. Mandatory participation in seminars and completion of a report.Note: Normal grading applies to this COOP Experience.

BIOL 315. Principles of Neurobiology. 3 credits, 3 contact hours (3;0;0).
Prerequisites: (BIOL 201 and BIOL 202 or R120 201 and R120 202) and (BIOL 205 and BIOL 206 or R120 205 and R120 206) with grade of C or better. This course will review neuroscience concepts at a basic level. It will cover basics of cellular physiology, molecular biology and developmental biology of nerve cells, network physiology, behavior, cognition and memory and learning. This course will prepare students who are interested in a neuroscience sequence for their major.

BIOL 320. Discovering Biological Research. 3 credits, 3 contact hours (3;0;0).
Prerequisites: ENGL 102, (BIOL 201 and BIOL 202 or R120 201 and R120 202) and (BIOL 205 and BIOL 206 or R120 205 and R120 206) with grade of C or better. Success in the constantly evolving field of biology necessitates staying current in scientific literature. This requires competency in skills such as analysis of primary sources, synthesis of information from multiple sources, and oral and written communication skills. This course focuses on these competencies. Students will develop skills need to read and analyze scientific literature, and to communicate science. Each semester the content theme of the course will change depending on the expertise of the faculty member teaching the course.

BIOL 321. Comp Vertebrate Anatomy. 4 credits, 6 contact hours (3;3;0).
Prerequisites: (BIOL 201 and BIOL 202 or R120 201 and R120 202) and (BIOL 205 and BIOL 206 or R120 205 and R120 206) and (PHYS 102 and PHYS 102A or PHYS 111 and PHYS 111A) with grade of C or better. This course introduces students to the groups of vertebrates and explores the anatomical evolution of vertebrates within the context of the functional interrelationships of organs and the changing environments to which vertebrates have adapted. An ideal entry point into the ways living creatures interact with their immediate physical world, we examine how the forms and activities of animals reflect the materials available to nature and consider rules for structural design under environmental forces.

BIOL 328. Ornithology - The Life of Birds. 3 credits, 5 contact hours (1;4;0).
Prerequisites: BIOL 205, BIOL 201. Ornithology is the study of birds and bird biology. Topics include bird observation and identification, evolutionary origins and biodiversity, form and function, behavior, reproduction, ecology, and conservation. This field/lab course will include numerous field trips to natural areas in New Jersey.

BIOL 337. Collective Intel in Biol Syst. 3 credits, 3 contact hours (3;0;0).
Prerequisites: (BIOL 201 and BIOL 202 or R120 201 and R120 202) and (BIOL 205 and BIOL 206 or R120 205 and R120 206) with grade of C or better. This course will provide an overview of the fundamental principles underlying the organization of animal and human societies. It will include detailed consideration of behavioral, social, and physical processes that are responsible for the coordination of activities in large animal and human groups and social.

BIOL 338. Ecology of the Dining Hall. 3 credits, 3 contact hours (3;0;0).
Prerequisites: (BIOL 201 and BIOL 202 or R120 201 and R120 202) and (BIOL 205 and BIOL 206 or R120 205 and R120 206) with grade of C or better. This course will use the examination of an on-campus ecosystem, the dining hall, as a framework for learning about a number of applied ecological concepts. We will investigate topics such as food webs, nutrient cycling, microbial ecology, and agroecology as they apply to the organisms and biological processes, present in our dining hall. Course work will involve extensive reading and discussion of scientific and popular literature, supplemented by regular class trips to the dining hall and related on-campus facilities.

BIOL 340. Mammalian Physiology. 4 credits, 6 contact hours (3;3;0).
Prerequisites: (BIOL 201 and BIOL 202 or R120 201 and R120 202) and (BIOL 205 and BIOL 206 or R120 205 and R120 206) with grade of C or better. This course will review general principles of the function of the human body as a mammal, with emphasis on the function and regulation of neuromuscular, cardiovascular, respiratory, endocrine, digestive, and excretory systems. The goal is to provide students with the basic knowledge to understand how their own bodies operate.

BIOL 342. Developmental Biology (Embryology). 3 credits, 3 contact hours (3;0;0).
Prerequisites: (BIOL 201 and BIOL 202 or R120 201 and R120 202) and (BIOL 205 and BIOL 206 or R120 205 and R120 206) with grade of C or better. Descriptive and experimental approaches to molecular, cellular and organismal changes during embryonic development; mechanisms of cell differentiation, organogenesis, morphogenesis, and pattern formation.

BIOL 347. Lab Approaches in Neuroscience. 4 credits, 6 contact hours (3;3;0).
Prerequisite: BIOL 315 Students will perform neurophysiological experiments, including assembling neurophysiological equipment, preparing neural tissues, selecting and presenting stimuli, recording, analyzing, and interpreting data. Students will perform experiments of increasing technical complexity. Each will reinforce theoretical and practical concepts related to the amplification and sampling of biopotentials. A lecture part will prepare the students for the concepts relevant to the lab day, and a data discussion meeting will aid the students in analyzing and presenting the data.

BIOL 350. Immunology. 3 credits, 3 contact hours (3;0;0).
Prerequisites: (BIOL 201 and BIOL 202 or R120 201 and R120 202) and (BIOL 205 and BIOL 206 or R120 205 and R120 206) with grade of C or better. The objective of this course is to facilitate an understanding of preliminary knowledge of the immune system in humans and other mammals. Students will be able to translate a basic understanding of the immune system and how that knowledge translates to further understanding medicine, research topics in cell biology, and broad topics in public health policy.

BIOL 352. Genetics. 3 credits, 3 contact hours (3;0;0).
Prerequisites: (BIOL 201 and BIOL 202 or R120 201 and R120 202) and (BIOL 205 and BIOL 206 or R120 205 and R120 206) with grade of C or better.

BIOL 375. Conservation Biology. 3 credits, 3 contact hours (3;0;0).
Prerequisites: (BIOL 201 and BIOL 202 or R120 201 and R120 202) and (BIOL 205 and BIOL 206 or R120 205 and R120 206) with grade of C or better. This course will provide a comprehensive introduction to the field of conservation biology, as well as philosophical and economic concerns.

BIOL 376. Biological Applications of Geographic Information Systems. 3 credits, 3 contact hours (3;0;0).
Prerequisites: BIOL 205, BIOL 201. This course offers an introduction to concepts underlying geographic information systems (GIS) and methods of managing and processing geographic information. The course is designed for students who have little background but want to learn the fundamentals and applications of GIS. The nature of geographic information, data models and structures for geographic information, geographic data input, data manipulation and data storage, spatial analytic and modeling techniques will be discussed. Students will be exposed to both theoretical knowledge and technical skills in this course. Assignments and a course project will promote students' application of concepts and skills in solving real-world problems.

BIOL 382. Animal Behavior. 3 credits, 3 contact hours (3;0;0).
Prerequisites: (BIOL 205 and BIOL 206 or R120 205 and R120 206) and (BIOL 201 and BIOL 202 or R120 201 and R120 202). The objective of this course is to expose students to the broad field of animal behavior. The course will include the historical underpinnings of the field as well as the contemporary theories for a wide variety of behaviors. Behavioral ecology and the evolution of animal behaviors as adaptations will be intertwined throughout the course, as well potential applications of knowledge about animal behavior. Students will be able to analyze existing evidence and investigate modern practices in order to evaluate existing theories and consider potential future directions of animal behavior. Using current scientific literature, as well as case-studies, students will be able to come up with their own hypotheses and determine how different hypotheses related to animal behavior can be tested experimentally. Students will also gain hands-on experience in trying out some of the fundamental techniques.

BIOL 383. Neural Basis of Behavior. 3 credits, 3 contact hours (3;0;0).
Prerequisite (BIOL 201 and BIOL 202 or R120 201 and R120 202) and (BIOL 205 and BIOL 206 or R120 205 and R120 206) with grade of C or better. This lecture course explores the neural mechanisms underlying animal behavior. This course is intended for upper-level undergraduate students who have some background in biology, hence the prerequisite for Foundation of Biology. This courses would also be of interest to graduate students interested in neuroscience, such as, students in the Quantitative Neuroscience (QNS) program, students in the Integrative Neuroscience (INS) program, and students at the Center for Molecular and Behavioral Neuroscience (CMB). It is unnecessary for the students to have taken animal behavior or neurobiology; however, these courses would be helpful.

BIOL 400. Biology in Science Fiction. 3 credits, 3 contact hours (3;0;0).
Prerequisites: (R120 340 or BIOL 340) and (R120 355 or R120 356 or BIOL 352 or R120 352). Popular science fiction media will be utilized to initiate thinking critically and creatively about the biological sciences; from the molecular level to whole organism physiology. Students will explore the potential biology of fictitious organisms, and determine real-life analogues. These topics will be used as a vehicle to improve scientific writing and to apply biological knowledge in a new and unique way.

BIOL 410. Work Experience II. 3 credits, 3 contact hours (0;0;3).
Prerequisite: BIOL 310. Restriction: departmental approval and permission of the Office of Cooperative Education and Internships. Students gain major-related work experience and reinforcement of their academic progam. Work assignments facilitated and approved by the co-op office. Mandatory participation in seminars and completion of a report.Note: Normal grading applies to this COOP Experience.

BIOL 423. Physiological Mechanisms. 3 credits, 3 contact hours (3;0;0).
Prerequisites: BIOL 340 or R120 340 with a grade of C or better. This course will utilize clinical (pathological) case studies to reinforce physiologic knowledge and provide students a strong basis for future studies in biomedical and health related fields.

BIOL 424. Comparative Physiology. 3 credits, 3 contact hours (3;0;0).
Prerequisites: BIOL 340 or R120 340 or (R120 141 and R120 142) with grades of C or better. We will use a comparative approach to examine the physiology of animals including major physiological systems, with an emphasis on vertebrates. Topics to be covered include metabolic, temperature, osmotic and ionic regulation; respiration and circulatory transport, digestive, muscle, nervous, and locomotor systems; endocrine regulation and biological rhythms. We will further examine how physiological systems are integrated and thus allow animals to respond, physiologically, in different environment.

BIOL 432. Intro to Comp Neuroscience. 3 credits, 3 contact hours (3;0;0).
Prerequisites: MATH 222; BIOL 315; BNFO 135 or CS 101 or CS 100 or CS 115 (grade C or better in all prerequisites), or permission by instructor. Introduction to the modeling, computational and analysis techniques for single neurons and small neuronal networks. This course will approach cellular and small network neuroscience beginning with a review and understanding of outstanding problems in neuroscience. The course work will then focus on students developing an independent modeling/computational project around which neuroscience concepts will be discussed. The required knowledge of electric circuits and numerical tools for the solution of differential equations will be introduced as needed.

BIOL 436. Advanced Neuroscience Modeling. 3 credits, 3 contact hours (3;0;0).
Prerequisites: BIOL 432 or MATH 430 or permission by instructor. Modeling and computational analysis of biological neuronal networks. The course consists of lectures, and scientific paper presentations aimed at acquiring a clear understanding of the biological issues in systems neuroscience. Students will work on developing an independent modeling/computational project during the duration of the semester around which biological topics will be discussed.

BIOL 440. Cell Biology of Disease: Cells gone Bad!. 3 credits, 3 contact hours (3;0;0).
Prerequisites: (BIOL 340 or R120 340) and (R120 355 or R120 356) with a grade of C or better. This course will briefly review the normal physiology of mammals and humans and will then extensively explore the basis of many human diseases at the cellular level. The goal is to understand how alterations in normal functions of cells affect the function of the whole system by reviewing current research in the field of cell biology abnormalities.

BIOL 441. Neurophysiology. 3 credits, 3 contact hours (3;0;0).
Prerequisites: R120 201 and R120 202 with a grade of C or better. This course will examine the physiology of neurons such as excitability, impulse conduction, synaptic communication and neural and synaptic plasticity. The objective is to provide students with a basic understanding of neural signaling and communication.

BIOL 443. Biology of Addiction. 3 credits, 3 contact hours (3;0;0).
Prerequisites: BIOL 201 and BIOL 202 (or R120 201 and R120 202), and BIOL 205 and BIOL 206 (or R120 205 and R120 206) with grade of C or better, or Permission of Instructor. This course will explore Substance Use Disorder from a biological viewpoint. The psychological, epidemiological, social and economical aspects of addiction will be touched upon as needed. The course will consist of several Modules that would be taught in parallel. The Modules include: ‘Psychopharmacology’, ‘The Structure and Function of the Nervous System’, ‘Neurotransmitters and Neuromodulators’, ‘Substances of Abuse’, and ‘What is Addiction?’ The goal is to provide students with a comprehensive understanding of biological mechanisms, both in the body and in the brain, that lead to and underlie Substance Use Disorder.

BIOL 445. Endocrinology. 3 credits, 3 contact hours (3;0;0).
Prerequisites:(BIOL 340 or R120 340)and (R120 355 or R120 356) with a grade of C or better. This course will discuss endocrinology from both an enatomical and physicologic view. We will discuss synthesis, distribution and regulation of the entire human endocrine system. The goal is to provide students with a basic knowledge of the complex endocrine system.

BIOL 447. Systems Neurobiology. 3 credits, 3 contact hours (3;0;0).
Prerequisite: BIOL 315 with a grade of C or better. This course will examine, from a systems perspective, phenomena that relate to neuronal network activity and behavior. Neuronal systems will be studied in detail. The overall goal of the course is to provide students with the basic knowledge of the neurobiological basis of behavior.

BIOL 448. Neuropathophysiology: Nervous System Gone Bad!. 3 credits, 3 contact hours (3;0;0).
Prerequisites: BIOL 315 or BIOL 340 or R120 340 or BIOL 341 or R120 444 or BIOL 447 with a grade of C or better. This course will briefly examine the normal physiology of the nervous system and then would extensively explore the basis of many neuronal diseases. The goal is to understand how any alteration in normal functions of the nervous system affects the function of the whole system by reviewing current research in the field of nervous system abnormalities.

BIOL 451. Cell Physiology and Imaging. 4 credits, 4 contact hours (1;3;0).
Prerequisites: PHYS 111, PHYS 121 and R120 455. This course will examine celluar phenomena, such as subcellular structure, secretion, intracellular calcium regulation, etc., from a physiological perspective and using imaging techniques as a tool to understand them. Cell biology, and optics and the user of microscopes, will be discussed in detail.

BIOL 453. Applied Genetics & Genomics. 3 credits, 4 contact hours (3;1;0).
Prerequisites: BIOL 352 or R120 352. This is an advanced course in modern genetics and genomics. It offers students a class that presents a modern understanding of Genetic and genomic applications, given the ongoing explosion of technological developments in this field. An understanding of state-of-the-art genetics and genomics is indispensable for continuing education in fields that include but are not limited to: cell and molecular biology, clinical lab science, bio-mechanical engineering, biotechnology, agriculture, and medicine.

BIOL 462. Comparative Biomechanics. 3 credits, 3 contact hours (3;0;0).
Prerequisites: R120 201, R120 202, BIOL 205 and BIOL 206 all with a C or better. This course takes a comprehensive look at the mechanical aspects of life. We will examine how the forms and activities of animals and plants reflect the materials available to nature, consider rules for fluid flow and structural design, and explore how organisms contend with environmental forces. Drawing on physics, we look at how animals swim and fly, modes of terrestrial locomotion, organism responses to winds and water currents, circulatory and suspension-feeding systems, the relationship between size and mechanical design, and the links between the properties of biological materials (eg spider silk, jellyfish jelly, and muscle) and their structural and functional roles.

BIOL 468. Disease Ecology & Evolution. 3 credits, 3 contact hours (3;0;0).
Prerequisites: (BIOL 201 and BIOL 202 or R120 201 and R120 202) and (BIOL 205 and BIOL 206 or R120 205 and R120 206) and (MATH 111 or MATH 238) with grade of C or better. This course addresses those aspects of ecology and evolutionary biology most relevant to understanding the origin, dynamics and treatment of disease (both infectious and hereditary/genetic). The class will be a mixture of lecture and discussion of case studies. Material covered will include biology, mathematical models, and some aspects of human behavior.

BIOL 470. Dynamic Princ in Systems BIOL. 3 credits, 3 contact hours (3;0;0).
Prerequisites: MATH 222, and BNFO 135 or CS 100 or CS 115 grade C or better, or permission by instructor. Introduction to the dynamic and computational modeling of biological systems, including chemical, biochemical, metabolic and genetic networks. The course includes the description of basic principles and case studies and provides the necessary mathematical and computational tools to understand the mechanisms underlying the dynamics of this type of networks. The necessary knowledge on the biology will be introduced during the course.

BIOL 475. Ecological Field Methods and Analysis. 3 credits, 3 contact hours (3;0;0).
Prerequisites: R120 280 or R120 370 with a C or better and permission of instructor. This field-orientated class will study animal and plant communities using a combination of field, laboratory and theory work. The goal of this course is to understand ecological principles and to introduce students to modern methodology for field work, the techniques and instruments used, as well as the theoretical basis for their application. Students will collect data, analyze them and report the results in written and oral format.

BIOL 484. Evolution of Animal Behavior Laboratory. 3 credits, 4 contact hours (2;2;0).
Prerequisites: (BIOL 201 and BIOL 202 or R120 201 and R120 202) and (BIOL 205 and BIOL 206 or R120 205 and R120 206) with grade of C or better. A lab course focusing on research in Animal Behavior. This course will cover foraging, predator avoidance, territoriality, and mate choice. Labs will be inquiry based with students designing experiments to test hypotheses concerning aspects of animal behavior.

BIOL 491. Research and Independent Study. 3 credits, 3 contact hours (0;0;3).
Restriction: Departmental approval required. Research in Biology. Each student works under the supervision of a Biology or associated faculty member. A research paper and poster are required.

BIOL 492. Research and Independent Study. 3 credits, 3 contact hours (0;0;3).
Restriction: Departmental approval required. Research in Biology. Each student works under the supervision of a Biology or associated faculty member.

BIOL 495. Honors Seminar in Biology. 3 credits, 3 contact hours (3;0;0).
Prerequisite: BIOL 320 with a grade of C or better. The honors seminar allows students the opportunity to work closely with an instructor in a specific area of the instructor's expertise. Students will be required to bring together interests and skills developed in previous courses. Students make in-depth oral and written presentations. This course satisfies NJIT's Honors Capstone requirement.

BIOL 498. Special Topics in Biology. 3 credits, 3 contact hours (3;0;0).
Prerequisites: Permission by instructor. This course explores a special topic in biology.

Rutgers-Newark Courses

100-level courses do not apply to biology majors

R120 101. General Biology. 4 credits, 0 contact hours (0;0;0).

R120 101L. General Biology I. 0 credits, 0 contact hours (0;0;0).

R120 102. General Biology II. 4 credits, 4 contact hours (4;0;0).

R120 102L. General Biology II-Lecture. 0 credits, 0 contact hours (0;0;0).

R120 104. Human Health & Disease. 3 credits, 3 contact hours (3;0;0).

R120 105. Environ Issues. 3 credits, 3 contact hours (3;0;0).

R120 106. General Horticulture. 3 credits, 3 contact hours (3;0;0).

R120 107. Horticulture Lab. 1 credit, 1 contact hour (0;1;0).

R120 108. Human Sexuality. 3 credits, 3 contact hours (3;0;0).

R120 109. Basic Plant Science. 3 credits, 3 contact hours (3;0;0).

R120 110. Basic Plant Sci Lab. 1 credit, 0 contact hours (0;0;0).

R120 111. Human Biology. 3 credits, 3 contact hours (3;0;0).

R120 141. Anatomy & Physiology. 4 credits, 4 contact hours (4;0;0).

R120 142. Anatomy & Physiology. 4 credits, 4 contact hours (4;0;0).

R120 171. Human Ecology. 3 credits, 3 contact hours (3;0;0).

R120 201. Foundations Of Biology. 3 credits, 3 contact hours (3;0;0).

R120 202. Foundations Of Biology Lab. 1 credit, 1 contact hour (1;0;0).

R120 203. Plant Bio. 3 credits, 0 contact hours (0;0;0).

R120 204. Economic Botany. 3 credits, 3 contact hours (3;0;0).

R120 205. Environmental Issues. 3 credits, 3 contact hours (3;0;0).

R120 206. General Horticulture. 3 credits, 3 contact hours (3;0;0).

R120 207. Horticulture Lab. 1 credit, 1 contact hour (1;0;0).

R120 208. Human Sexuality. 3 credits, 1 contact hour (1;0;0).

R120 211. Plant Kingdom. 4 credits, 4 contact hours (4;0;0).

R120 214. Microbiology. 3 credits, 3 contact hours (3;0;0).

R120 222. Evolution. 3 credits, 3 contact hours (3;0;0).

R120 227. Biol Invertebrates. 4 credits, 4 contact hours (4;0;0).

R120 230. Biology Of Seed Plants. 4 credits, 4 contact hours (4;0;0).

R120 235. Microbiology. 4 credits, 4 contact hours (4;0;0).

R120 237. Environmental Microbiology. 4 credits, 6 contact hours (3;3;0).

R120 240. Human Physiology. 3 credits, 3 contact hours (3;0;0).

R120 241. Anatomy & Physiology. 4 credits, 4 contact hours (4;0;0).

R120 242. Anatomy & Physiology. 4 credits, 4 contact hours (4;0;0).

R120 245. Pathophysiology. 3 credits, 3 contact hours (3;0;0).

R120 280. Ecology. 3 credits, 3 contact hours (3;0;0).

R120 282. Animal Behavior. 3 credits, 3 contact hours (3;0;0).

R120 285. Comparative Vertebrate Anatomy. 4 credits, 4 contact hours (4;0;0).

R120 303. Molecular Biology. 3 credits, 3 contact hours (3;0;0).

R120 305. Vertebrate Evolution. 3 credits, 3 contact hours (3;0;0).

R120 311. Flora of New Jersey. 4 credits, 4 contact hours (4;0;0).

R120 313. Mycology. 4 credits, 4 contact hours (4;0;0).

R120 320. Comp Vert Anatomy. 4 credits, 4 contact hours (4;0;0).

R120 322. Evolution. 3 credits, 0 contact hours (0;0;0).

R120 323. Developmental Psychology. 3 credits, 3 contact hours (3;0;0).

R120 325. Animal Parasites. 3 credits, 3 contact hours (3;0;0).

R120 326. Parasitology Lab. 1 credit, 1 contact hour (1;0;0).

R120 327. Biol Invertebrates. 4 credits, 4 contact hours (4;0;0).

R120 328. Ornithology. 3 credits, 3 contact hours (3;0;0).