BIOLOGY 141, 141L, 142, AND 142L ARE PREREQUISITES FOR
MOST UPPER-LEVEL COURSES.

One cross-listed course that originates in another department may be taken for the Biology major.

BIOL 120. Concepts in Biology, with Laboratory (4 credit hours) (SNTL). This course reviews the principles of genetics, physiology, ecology, taxonomy, and evolution with special reference to contemporary life situations. Intended for non-science majors. Prerequisites: None. This course does NOT fulfill the requirements for medical and dental schools or for a biology major, but will fulfill the GER for Natural Science and Math.

BIOL 141. Foundations of Modern Biology I (Cell Biology and Genetics) LECTURE (3 credit hours) (SNT). The Biology 141 and 142 courses will provide a topic-driven overview of molecular, cellular, and developmental biology, along with genetics. The topics covered in class (cell structure and function, cell reproduction, and Mendelian genetics) will address major issues in research and medicine, emphasizing critical thinking involved in modern biological discovery. Prerequisites: None; Corequisite: Biology 141L. Biology 141, Biology 141L, Biology 142, and Biology 142L are required of all biology majors and should be taken during the freshman year, along with Chemistry 150 + 150L and 202/202Z + 202L/202ZL. If scheduling or advising precludes taking both, it is recommended that you take Chemistry 150 + 150L and 202/202Z + 202L/202ZL before taking Biology 141 + 141L and Biology 142 + 142L.

BIOL 141L. Foundations of Modern Biology I LAB (2 credit hours) (SNTL). This is the laboratory component of Biology 141. Students will design and perform experiments using several important model systems. Pre- or corequisite: Biology 141.

BIOL 142. Foundations of Modern Biology II (Molecular Biology and Developmental Genetics) LECTURE (3 credit hours) (SNT). This course expands on the fundamentals learned in Biology 141, providing a continuation of the topic-driven overview of molecular, cellular, and developmental biology, along with genetics. The topics covered in class (molecular genetics, population genetics and evolution, cellular metabolism and photosynthesis, signal transduction and development) will address major issues in research and medicine, emphasizing critical thinking involved in modern biological discovery. Prerequisites: Biology 141 and Biology 141L; Corequisite: Biology 142L. Biology 141, Biology 141L, Biology 142, and Biology 142L are required of all biology majors and should be taken during freshman year, along with Chemistry 150 + 150L and 202/202Z + 202L/202ZL. If scheduling precludes taking both, it is recommended that you take Chemistry 150 + 150L and 202/202Z + 202L/202ZL before taking Biology 141 + 141L and 142 + 142L.

BIOL 142L. Foundations of Modern Biology II LAB (2 credit hours) (SNTL). This is the laboratory component of Biology 142. Students will design and perform experiments using several important model systems. Prerequisites: Biology 141 and Biology 141L; pre- or corequisite: Biology 142.
BIOL 151. Introductory Experimental Biology I, with Lab. This course will cover biochemistry and cell biology, mitosis, meiosis, genetics, and evolution, as does Biology 141; however, additional readings, discussion format, and guided laboratory explorations will challenge the honors student. The laboratory component will focus on scientific reasoning, experimental design, and exploration of biological phenomena. Prerequisites: None. (This course is currently not being taught.)

BIOL 152. Introductory Experimental Biology II, with Lab. Following from Biology 151, this course will cover complex systems of biology, such as evolution, ecological communities, development, and behavior. These systems will be addressed from genetic and biochemical perspectives, as well as from the standpoint of their relationship to society. The course is designed for honors students and, using labs, discussion, and intensive writing and reading assignments, will focus on the development of critical thinking and experimental design skills. Prerequisite: Biology 151. (This course is currently not being taught.)

BIOL 160. Biology for The People (3 credit hours) (SNT). This non-majors course is designed to provide undergraduate students that are not biology majors (as well as interested majors) with an understanding of those elements of the biological and biomedical sciences, ecology, evolutionary biology, and applied statistics that are of direct importance to their lives as individuals and citizens. For Freshmen and above. Prerequisites: None. The course will meet three times per week and will consist of lectures, discussion sections, and occasional workshops. This course will fulfill the GER for Natural Science and Math, but does NOT count for the biology major.

BIOL 185/185W. Special Topics in Biology (1 to 4 credit hours). A lecture series or special course designed for first year students on topics of special biological concern. May be repeated for a total of 8 credit hours when topic varies. Prerequisites: None. See current course atlas. This course does NOT count toward the biology major.

BIOL 186/186W. Special Topics in Biology, with Laboratory (1 to 4 credit hours). A lecture series or special course with a laboratory component designed for first year students on topics of special biological concern. May be repeated for a total of 8 credit hours when topic varies. Prerequisites: None. See current course atlas. This course does NOT count toward the biology major.

BIOL 190. Freshman Seminar (3 credit hours) (FSEM). Variable topics. For Freshmen only. Prerequisites: None. See current course atlas. This course does NOT count toward the biology major.

BIOL 200. Introduction to Biological Research (3 credit hours). This course is designed to provide freshman science majors with a general introduction to the scientific research process and current research being done at Emory University, with the intent of preparing science majors for a future laboratory research experience and preparing students who plan to apply to graduate programs at some future date. In this course, students will be introduced to the scientific research process and to the basic tools that they will need to become successful researchers. Students will give presentations and participate in discussions in the classroom, as well as be engaged in the laboratory on a variety of different topics in biotechnology that affect all our lives. Prerequisites: None. This course may be taken as elective and upper-level laboratory credit for the biology major.
BIOL 205. Comparative Vertebrate Anatomy, with Laboratory (5 credit hours). This course provides comparative studies of phylogeny and anatomy of vertebrates from both an evolutionary and functional perspective. Cat and shark are dissected in laboratory. Prerequisites: Biology 142 and Biology 142L. This course fulfills the Column B (for students declared prior to Fall 2020) (or elective) and upper-level laboratory requirements for the biology major. (This course is currently not being taught.)

BIOL 206. Biology of Parasites, with Laboratory (4 credit hours). This course will introduce students to modern and classical parasitology (protozoan, helminthic, and arthropod parasites of medical significance) using microscopic evaluation, digital images, and preserved specimen dissections. Topics addressed include basic principles of parasitology, evolutionary trends, host-parasite ecological considerations, therapeutic measures, and control programs. Prerequisites: Biology 142 and Biology 142L. This course may be taken as elective credit and fulfills the upper-level laboratory requirement for the biology major. (This course is currently not being taught.)

BIOL 210. Plant Biology, with Lab (4 credit hours). Topics in this class will include plant structure, function, growth, development, physiology, and systematics. Evolutionary relationships within the plant kingdom will be emphasized. This course is intended for biology/science majors. Prerequisites: Biology 142 and Biology 142L. This course may be taken as elective credit and fulfills the upper-level laboratory requirement for the biology major. (This course is currently not being taught.)

BIOL 212. Computational Modeling for Scientists and Engineers (3 credit hours). (Same as PHYS 212). Computation is one of the pillars of modern science, in addition to experiment and theory. In this course, various computational modeling methods will be introduced to study specific examples derived from physical, biological, chemical, and social systems. Prerequisites: Biology 142 and Biology 142L (for Biology 212); Physics 141 or 151 and Math 112 or 116. This course is SHARED by the Physics and Biology Departments and may be taken as elective credit for the Biology major.

BIOL 223. Developmental Biology (3 credit hours). This course studies the fundamental principles that govern vertebrate and invertebrate development at the cellular, molecular, and organismal levels. Prerequisites: Biology 142 and Biology 142L. This course fulfills the Column A (or elective) requirement for the biology major.

BIOL 224. Advanced Developmental Biology and Embryology, with Laboratory (3 credit hours). This course will be a more in-depth continuation of Biology 223, with a laboratory component. Prerequisite: Biology 223. This course may be taken as elective credit and fulfills the upper-level laboratory requirement for the biology major.

BIOL 240. Organismal Form and Function (3 credit hours). For Sophomores. Major topics include the biology of animals and plants, physiology, evolution, and ecology. Prerequisites: Biology 141 and Biology 141L. This course fulfills the Column B (or elective) requirement for the biology major.

BIOL 241. Evolutionary Biology (4 credit hours). This course is a study of factors that cause genetic change and of the evolutionary consequences of such changes. Topics include population genetics, adaptation and natural selection, evolution of genes, proteins, and genomes, sexual selection, kin selection, speciation, and diversification of taxa. Emphasis will be on molecular,
genetic, ecological, and evolutionary factors related to variation and adaptation to environment, and constraints on adaptation. Attendance at a mandatory discussion section is required. Prerequisites: Biology 142 and Biology 142L. This course fulfills the Column C (or elective) requirement for the biology major.

BIOL 247. Ecology (3 credit hours). (Same as ENVS 247.) This course provides an overview of the principles of ecology and the study of relationships between organisms and their environments, ecosystems, communities, and populations. Prerequisites: Biology 142 and Biology 142L. This course originates in the Biology Department and fulfills the Column C (or elective) requirement for the biology major.

BIOL 247LW. Ecology Laboratory (3 credit hours) (WRITING REQUIREMENT (WRT)). (Same as ENVS 247LW.) This is the optional laboratory portion of the Ecology class (Biology 247/ENVS 247). Field studies will be conducted in various natural areas in Georgia, including a week-end trip to the mountains. Prerequisites: Biology 142 and Biology 142L. This course originates in the Biology Department, may be taken as elective credit, fulfills the upper-level laboratory requirement for the biology major, and fulfills a writing requirement for the GERs.

BIOL 250. Cell Biology (3 credit hours). This course covers advanced topics on the structure and function of cells at the molecular level. Topics include the relationship between structure and function, integration of cellular functions, compartmentalization of cellular functions, nuclear and cytoplasmic interactions, and intracellular and intercellular communications. Prerequisites: Biology 142 and Biology 142L. This course fulfills the Column A (or elective) requirement for the biology major.

BIOL 260. Insect Biology (3 credit hours). This course offers students hands-on experience to develop an understanding of insect biology. Through lectures, labs, and fieldwork, students will develop the skills to distinguish the major groups of insects and to analyze the importance of insects for ecology, human food production, and health. Prerequisites: Biology 142 and Biology 142L or Biology 240. This course may be taken as elective credit and fulfills the upper-level laboratory requirement for the biology major. For Biology 261-SAF, contact the Emory College Office of International and Summer Programs (OISP) for more information.

BIOL 261-SAF. Biology of Insects (4 credit hours). Summer Study Abroad-Australia. This course offers students hands-on experience to develop an understanding of insect biology. Through lectures, labs, and fieldwork, students will develop the skills to distinguish the major groups of insects and to analyze the importance of insects for ecology, human food production, and health. Prerequisites: Biology 142 and Biology 142L or Biology 240. This course may be taken as elective credit and fulfills the upper-level laboratory requirement for the biology major. Contact the Emory College Office of International and Summer Programs (OISP) for more information.

BIOL 264. Genetics: A Human Perspective (4 credit hours). Topics include population genetics, genetics of behavior, human origins, the genetics of immunity and of cancer, stem cell research, and human genomics. Attendance at a mandatory discussion section is required. Prerequisites: Biology 142 and Biology 142L. This course fulfills the Column A (or elective) requirement for the biology major.
BIOL 285/285W. Special Topics in Biology. (1 to 4 credit hours). A lecture series or special course designed for second year students on topics of special biological concern. May be repeated for a total of 8 credit hours when topic varies. Prerequisites: Biology 142 and Biology 142L. See current course atlas. This course may be taken as elective credit for the biology major.

BIOL 286/286W. Special Topics in Biology, with Laboratory. (1 to 4 credit hours). A lecture series or special course with a laboratory component designed for second year students on topics of special biological concern. May be repeated for a total of 8 credit hours when topic varies. Prerequisites: Biology 142 and Biology 142L. See current course atlas. This course may be taken as elective credit for the biology major.

BIOL 301. Introductory Biochemistry (3 credit hours) (SNT). This course gives an integrated approach to the synthesis, structure, and function of macromolecular biomolecules, including proteins, carbohydrates, DNA, and RNA. The evolution of structural and catalytic diversity at a molecular level will provide a theme that underpins specific examples that will include: the energetics of catalysis, protein structure and folding, enzyme kinetics and mechanisms, protein engineering, DNA structure and synthesis, RNA structure and synthesis, and genomic organization and regulation. Prerequisites: Biology 142, Biology 142L, and Chemistry 203. This course may be taken as elective credit for the biology major.

BIOL 315. Ancient DNA and Human Evolution (3 credit hours) (SNT). (Same as ANTH 315). The course focuses on the key methods adopted in the study of ancient DNA, such as next generation sequencing and population genetics, as well as a thematic approach to the major evolutionary questions. Topics include human migrations, archaic humans, domestication, and ancient pathogens. This course ORIGINATES in the ANTHROPOLOGY Department and may be taken as elective credit for the biology major.

BIOL 320. Animal Behavior (3 credit hours) (SNT). (Same as PSYC 320.) This course provides an overview of major research areas in the field of animal behavior. The behavior of animals will be analyzed from an evolutionary and comparative perspective. Some of the topics included are orientation and migration, genetic and environmental influences on behavior, population regulation, courtship and mating strategies, and parental behavior. Prerequisites: Biology 142 and Biology 142L (for Biol 320). This course ORIGINATES in the PSYCHOLOGY Department and may be taken as elective credit for the biology major.

BIOL 325. Primate Social Psychology (3 credit hours) (SNT). (Same as PSYC 325/ANTH 304.) Following a general introduction to primatology, the course will cover recent progress in the growing field of primate social behavior. Topics range from aggression and dominance to affiliation, sex, and peaceful coexistence. Prerequisites: Biology 142 and Biology 142L (for Biology 325). PSYC/BIOL 320 is recommended. This course ORIGINATES in the PSYCHOLOGY Department and may be taken as elective credit for the biology major.

BIOL 329. Coastal Biology, with Laboratory (4 credit hours). This is a lecture course emphasizing the basic principles of coastal ecology, the human impact on coastal ecosystems, and the diversity of invertebrates living in these ecosystems. Students will also attend a mandatory laboratory/field trip to St. Simon’s Island during Spring Break. A laboratory fee will be required for the laboratory/field portion of this course. See the Course Atlas for additional information. Prerequisites: Biology 142 and Biology 142L and permission of instructor. This course will
fulfill the Column C (or elective) and upper-level laboratory requirements for the biology major.

BIOL 330. Chemistry, Biology, and Molecular Modeling (3 credit hours) (SNT). (Same as Chemistry 330.) This course is designed to put to use what you already know about chemistry and biology and to extend it in two directions. On the one hand, we will examine the world around us as reflected by the media, the web, and encounters in your own lives. Thus, we will examine issues around ‘natural and unnatural molecules’, the environment, disease, and society in the context of topics such as drugs, molecules from mars, aging, AIDS, bioterrorism, and crime in the courtroom. On the other hand, we will examine these ideas by means of computer graphics, the molecular structure of small molecules and proteins, and energy. **Prerequisites:** Biology 142, Biology 142L, and Chemistry 203/203Z. This course ORIGINATES in the CHEMISTRY Department and may be taken as elective credit for the biology major.

BIOL 336. Human Physiology (3 credit hours). This course is a study of human physiology emphasizing integrated body functions. Topics include respiration, circulation, contractility, osmoregulation, endocrinology, and neurophysiology. **Prerequisites:** Biology 142 and Biology 142L. This course may be taken as elective credit for the biology major.

BIOL 340. Food, Health, and Society (3 credit hours). (Same as HLTH 340.) Human health is intrinsically linked to dietary practices. The pharmacological properties of foods will be examined and case studies of dietary complexes will be examined in order to better understand the food-medicine continuum as a determinant of health and well-being. This course ORIGINATES in the Human Health Department and may be taken as elective credit for the biology major.

CHEM 340. Biochemistry (3 credit hours) (formerly CHEM 301). This course focuses on the chemical principles underlying the processes that allow living systems to function: metabolism, bioenergetics, regulation, signaling, and transport. Building on concepts from Chemistry 204, it emphasizes how chemical insights lead to the development of new drugs and diagnostics. This course originates in the CHEMISTRY Department and may be taken as elective credit form the Biology major. (This course will be cross-listed with Biology in the near future.)

BIOL 341LW. Experimental Evolution Lab (4 credit hours). Students will learn evolutionary biology through the use of experimental evolution, real-time evolution in the laboratory. In addition to exploring primary literature, this is a laboratory course in which students will design and execute projects to actively test evolutionary theory in the lab. **Prerequisites:** Biology 142 and Biology 142L. This course will fulfill elective and upper-level lab requirements for the biology major and a writing requirement for the GERs.

CHEM 343: Chemical Biology (3 credit hours). Chemical Biology applies the tools of organic chemistry to manipulate and study biomolecules. This class explores foundational knowledge and breakthrough technologies enabling advances in nucleic acid engineering, high-throughput sequencing, biomolecular imaging, gene editing, and pharmacology. This course ORIGINATES in the Chemistry Department and may be taken as elective credit for the Biology major.

BIOL 345. Conservation Biology (3 credit hours). (Same as ENVS 345.) This course focuses on the conservation of biodiversity and introduces students to ways that ecological and evolutionary principles can be used to conserve and protect species and ecosystems at risk. Specific topics include the causes and consequences of biodiversity, systematics, and
endangered species, the demography and genetics of small populations, invasive species, habitat loss and fragmentation, design of reserves, and restoration ecology. Prerequisites: Biology 142 and Biology 142L (for Biol 345) or ENVS 131. This course ORIGINATES in the ENVIRONMENTAL SCIENCE DEPARTMENT and may be taken as elective credit for the biology major.

BIOL 346L. Biomolecular Chemistry Lab (2 credit hours). (Same as Chemistry 346L: Bioanalytical Chemistry Lab.) Experiments in this course involve analysis and characterization of the major classes of biological compounds. There will be one three-hour laboratory and one lecture per week. An additional laboratory training option is available for two additional credits. Prerequisites: Biology 142, Biology 142L, and Biology/Chemistry 340 (for BIOL 346L). This course ORIGINATES in the CHEMISTRY Department and may be taken as elective and upper-level laboratory credit for the biology major.

BIOL 347. Disease Ecology (3 credit hours). This course will study parasitism and will introduce major issues and advances in the ecology of infectious diseases. Specific focus will be on the functional and taxonomic diversity of parasites, transmission routes of parasites, strategies of host defense and parasite virulence, mathematical models for the population dynamics of disease, the effects of parasitism on individual hosts and populations, disease in complex communities, co-evolution between hosts and parasites, emerging, and resurging diseases, and human impacts on disease emergence. Prerequisites: Biology 142, Biology 142L, and QTM 100. This course may be taken as elective credit for the Biology major.

BIOL 348. Mechanisms of Animal Behavior (3 credit hours). This course is a survey of current topics in neural development and neural basis of behavior. Emphasis is on research work that uses a combination of physiological, genetic, cellular, and molecular techniques to understand neural systems and their evolution and development. Prerequisites: Biology 142, Biology 142L, and Chem 150. This course may be taken as elective credit for the biology major. (This course is currently not being taught.)

BIOL 349. Ecology of Invasions (4 credit hours). (Same as ENVS 349.) This course will familiarize students with principles of ecological invasions and methods for assessing the spread and impacts of invasive species on a global scale. Students will also become familiar with major sources of exotic species and methods available for prevention and control. Prerequisites: Biology 141 and Biology 141L (for Biol 349). This course ORIGINATES in the ENVIRONMENTAL SCIENCE Department and may be taken as elective credit for the Biology major.

BIOL 349-SAF. Ecology of Invasions (4 credit hours). Summer Study Abroad-Australia. (Same as ENVS 349-SAF.) The Departments of Biology and Environmental Studies offer a five-week summer study abroad program of classroom and field study in ecology and evolutionary biology in AUSTRALIA. The course will use a combination of in-class meetings and out of class field experience. There will be a one week field excursion to sites near Cairns, including the Great Barrier Reef, Magnetic Island, Kurana Rainforest, and other sites. Prerequisites: Biology 142 and Biology 142L (for Biol 349SAF) or ENVS 131. Contact the Emory College Office of International and Summer Programs (OISP) for more information. This course is SHARED by the Biology and Environmental Studies Departments and may be taken as elective credit for the biology major.
BIOL 352. Epigenetics and Human Disease (3 credit hours). Epigenetics is the area of research that studies heritable characteristics that are not caused by changes in the DNA sequence of an organism. It is the study of non-genetic factors that cause the organism's genes to behave (or "express themselves") differently in different cells and different tissues. Epigenetics can also explain why identical twins that have exactly the same DNA sequence may display differences in behavior or in susceptibility to disease. New evidence suggests that the first steps in the development of many cancers may be epigenetic rather than genetic (i.e., caused by mutations). This course will discuss the nature of epigenetic inheritance and its relation to stem cell differentiation, normal development, and disease. Prerequisites: Biology 142, Biology 142L, and Biology 264. This course may be taken as elective credit for the biology major.

BIOL 353. Genetics of Complex Traits (3 credit hours). Many traits of biological importance are often "complex" in that they are controlled by more than one single gene and genetic analyses of these complex traits are often sophisticated. This course will study the fundamental principles and methodology of quantitative genetics and expose students to current primary literature on current genetic analyses of complex traits such as human diseases. Prerequisites: Biology 241. Math 111 and 116 are recommended. This course may be taken as elective credit for the biology major. (This course is currently not being taught.)

BIOL 354. The Origin and Evolution of the Immune System (3 credit hours). This course will study the origins and evolution of the immune system from different fields such as immunology, molecular biology, and evolution. Prerequisites: Biology 142 and Biology 142L. This course may be taken as elective credit for the biology major. (This course is currently not being taught.)

BIOL 355. Introduction to Time Series Analysis (3 credit hours). (Same as QTM 355.) This course covers the fundamentals of time series analysis in both the natural and social sciences, utilizing analytical, statistical, and numerical approaches. We will focus on the application of these methods to complex, real world data from medicine, economics, geology, and other fields. Prerequisite: QTM 220. This class is SHARED by the Biology and QTM Departments and may be taken as elective credit for the Biology major.

BIOL 360. Introduction to Neurobiology (3 credit hours). (Same as NBB 301.) This course provides an introduction to cellular and integrative neurobiology. Topics include the electrochemical mechanisms for neuronal signaling, synaptic transmission, and the neural basis of behavior in invertebrates and vertebrates. Prerequisites: Biology 142, Biology 142L, and Chemistry 142 or Chemistry 202/202Z + 202L/202LZ. Math 116 and Introductory Physics are strongly recommended. This course is SHARED by the Biology and NBB Departments and fulfills the Column B (or elective) requirement for the biology major. There is also an optional 2 credit hour lab associated with this course (Biology 360L/NBB 301L).

BIOL 360L. Introduction to Neurobiology Lab (2 credit hours). (Same as NBB 301L.) This is the OPTIONAL LAB associated with Biology 360/NBB 301 and will explore topics in cellular and small network neuroscience by performing virtual electrophysiology experiments on the computer. The content of the course matches material covered in Biology 360/NBB 301 and will help students understand neurons and neuronal networks in greater depth. Pre- or corequisite: Biology 360 or NBB 301. This course originates in the Biology Department and may be taken as elective and upper-level laboratory credit for the biology major.
BIOL 361. Ecosystems Through Time (3 credit hours). (Same as ENVS 361.) This course provides an overview of paleoecology and paleoecological methods, which will be accomplished by examining the geological and paleontological evidence for ecosystems (marine, estuarine, freshwater, terrestrial) from the last 600 million years of earth history. Common themes will be a better understanding of the evolution of ecosystems, as well as how ancient ecosystems compare to modern analogues. Prerequisites: Biology 142 and Biology 142L (for Biology 361), or ENVS 131, or BIOL_OX 111/113. This course ORIGINATES in the ENVIRONMENTAL SCIENCE DEPARTMENT and may be taken as elective credit for the biology major.

NBB 361W. Neurophysiology Laboratory (4 credit hours) (SNTLW). Record intracellularly and extracellularly from invertebrates to examine sensory and motor circuits, synaptic plasticity, and ionic bases of potentials. Part of the semester is devoted to studentdesigned projects. Special attention is given to scientific writing and presentation of data. Prerequisites: Biology 360 or NBB 301. This course ORIGINATES in the NBB Department and may be taken as elective and upper-level laboratory credit for the biology major.

BIOL 365. Controversial Science (3 credit hours). This course addresses aspects of science and technology that stir controversy in society. Prerequisites: Biology 142 and Biology 142L. This course may be taken as elective credit for the biology major.

BIOL 370. Intro to Microbiology (4 credit hours). This course provides an introduction to the concepts of microbial physiology, biochemistry, genetics, and evolution. Attendance at a mandatory discussion section is required. Prerequisites: Biology 142 and Biology 142L. This class will fulfill the Column B (or elective) credit for the biology major. There is also an optional 3-credit hour lab (Biology 370LW) associated with this class.

BIOL 370LW. Introduction to Microbiology Laboratory (3 credit hours). This course is the optional lab associated with Biology 370. This lab will provide students with an introduction to basic laboratory techniques in microbiology. Experiments dealing with the physiology, biochemistry, genetics, and molecular biology of microbes will be included. Prerequisites: Biology 142 and Biology 142L; pre- or corequisite: Biology 370. This course may be taken as elective and upper-level laboratory credit for the biology major and also fulfills a WRITING REQUIREMENT for the GERs.

BIOL 371. Ecology of the Tropics (2 credit hours). (Same as ENVS 371.) This lecture course will explore the diverse biomes of the tropics. The focus will be on tropical forests and grasslands, with an emphasis on ecological processes, biodiversity, human impact on the tropics, indigenous peoples, and ethnobotany. Prerequisites: Biology 142 and Biology 142L (for Biology 371). This course is taught by Dr. Larry Wilson (adjunct faculty), is SHARED by the Biology and Environmental Science Departments, and may be taken as elective credit for the biology major.

BIOL 372-SAF. Ecology of the Tropics - Field Course in Peru (2 credit hours) (Same as ENVS 372-SAF.) This field course is part of the Office of International and Summer Programs (OISP) and will be taught during Spring Break week in the Amazon River lowland rainforests of southern Peru (Tambopata Research Station), famous for its huge flocks of colorful Macaws. This field course will give the student a real hands-on rainforest experience complete with bromeliads, toucans, sloths, and the sounds of the night. Cost for the trip is approximately $3000 (depending on airfare prices). Prerequisites: Biology 142 and Biology 142L; pre- or corequisite:
Biology 371 or ENVS 371. Permission of instructor is required. This course is taught by Dr. Larry Wilson (adjunct faculty), is SHARED by the Biology and Environmental Science Departments, and may be taken as elective and upper-level laboratory credit for the biology major. See the Biology Department Spring Course Atlas for additional information.

BIOL 373. Marine Ecology (3 credit hours). (Same as ENVS 373.) Lectures and readings focus on the diversity, structure, and conservation of marine ecosystems, including experimental and analytic approaches to their study. Discussions of primary literature cover current topics such as biological invasions, disease, climate change, and marine protected areas. Prerequisites: ENVS 232 or 240 and Biology 247/ENVS 247. This course ORIGINATES in the ENVIRONMENTAL SCIENCE DEPARTMENT and may be taken as elective credit for the biology major.

BIOL 375. Tropical Marine Ecosystems (4 credit hours). (Same as ENVS 375.) This course will explore coastal and near-shore tropical marine ecosystems including mangroves and coral reefs. Readings will review key concepts of marine ecology with a focus on local ecosystems. Field excursions to local sites will provide opportunities to learn from researchers and managers. Prerequisites: Biology 142 and Biology 142L or ENVS 131. This course ORIGINATES in the ENVIRONMENTAL SCIENCE DEPARTMENT and may be taken as elective credit for the biology major.

BIOL 380. Herpetology, with Lab (4 credit hours). (Same as ENVS 380.) This lecture/field course is designed to give the student a broad view of these two classes of vertebrates (Amphibia and Reptilia). Class topics will include taxonomy, conservation, life histories, special senses and pheromones, biogeography, reproductive strategies, physiology, and behavior. Prerequisite: Biology 142. This course is taught by Dr. Larry Wilson (adjunct faculty), is SHARED by the Biology and Environmental Science Departments, and may be taken as elective and upper-level laboratory credit for the biology major.

BIOL 385/385W. Special Topics in Biology (1 to 4 credit hours). A lecture series or special course designed for advanced students on topics of special biological concern. May be repeated for a total of 8 credit hours when topic varies. Prerequisites: Biology 142 and Biology 142L. See current course atlas. This course may be taken as elective credit for the biology major.

BIOL 386/386W. Special Topics in Biology, with Lab (1 to 5 credit hours). A lecture or special course with a laboratory component designed for advanced students on topics of special biological concern. May be repeated for a total of 8 credit hours when topic varies. Prerequisites: Biology 142 and Biology 142L. See current course atlas. This course may be taken as elective and upper-level laboratory credit for the biology major.

BIOL 402W. Neuroscience Live (4 credit hours). WRITING REQUIREMENT (WRT). This advanced seminar covers current topics of neuroscience research and the intellectual and experimental challenges involved. In this hands-on, writing intensive seminar course, students will learn how to read and critique research papers and how to write and prepare a research grant proposal. Students will also interact in a ‘live’ format with authors of the research papers. Prerequisites: Biology 142 and Biology 142L; pre- or corequisite: Biology 360 or NBB 301. This course may be taken as elective credit for the biology major and also fulfills a WRITING REQUIREMENT for the GERs.
BIOL 410. Perception and Consciousness (3 credit hours). This course will focus on the neurobiology supporting subjective experience, but also consider concepts from cognitive science and philosophy of mind. Students will study high-density scans of the human brain to analyze the neural architecture believed to yield visual experiences. Prerequisites: Biology 250 and Biology 360/NBB 301. This course may be taken as elective credit for the biology major.

BIOL 415. Cancer Biology and Oncogenes (3 credit hours). This course will examine the biological mechanisms regulating cell growth, differentiation, and migration through a focus on the mechanisms by which cancers grow and spread. Prerequisites: Biology 141 and Biology 142L. Math 111 is highly recommended. This course may be taken as elective credit for the biology major. (This course is currently not being taught.)

BIOL 430. Human Genome Project and Disease (3 credit hours). This course covers human genome projects and is geared toward developing independent thinking through solving human genetic problems and critically reviewing literature on human diseases. Prerequisites: Biology 142 and Biology 142L. This course may be taken as elective credit for the biology major. (This course is currently not being taught.)

BIOL 434. Physical Biology (3 credit hours). (Same as PHYS 434.) This course explores the physical and statistical constraints on strategies used by biological systems, from bacteria to large organisms and to entire populations, to sense external environmental signals, process them, and shape a response. Prerequisites: Physics/Biology 212 and Physics 220. This course is SHARED by the Physics and Biology Departments and may be taken as elective credit for the biology major.

BIOL 440/440W. Animal Communication (3 or 4 credit hours) (WRITING REQUIREMENT (WRT)). (Same as PSYC 440/440W.) This course will study the functions, evolution, and significance of animal communication systems in a wide taxonomic range from insects to primates. Prerequisites: Biology 142 and Biology 142L (for Biology 440/440W). This course ORIGINATES in the PSYCHOLOGY Department, may be taken as elective credit for the biology major, and fulfills a WRITING REQUIREMENT for the GERs.

BIOL 441. Molecular Biology and Evolutionary Genetics (4 credit hours). (Also offered as IBS 541.) This course covers population genetics, molecular evolution, and genomics and is geared toward developing independent thinking by solving molecular biology and evolutionary genetics problems in natural populations. Attendance at a mandatory discussion section is required. Prerequisites: Biology 142 and Biology 142L. This class may be taken as elective credit for the Biology major. (This course is currently not being taught.)

BIOL 442. Botanical Medicine and Health (3 credit hours). (Same as HLTH 440). Mankind has long recognized that plants are extremely useful as a source of medicine. Medical traditions based on botanical sources are found in all human cultures and date back to prehistory. In this course, both ancient and modern day botanical traditions across many cultures will be examined. This course ORIGINATES in the Human Health department and may be taken as elective credit for the biology major.

BIOL 446-SAF. Field Studies in South Africa (6 credit hours). (Same as ENVS 446-SAF). This summer field course will provide students with a hands-on experience in the southern African countries of Namibia and Botswana. Within a conservation biology perspective, students have the opportunity to learn about the unique habitats and conservation issues. See the Emory
This course is shared by the Biology and ENVS Departments and will fulfill elective credit for the biology major.

**BIOL 447. Microbial Ecology with Lab.** *(4 credit hours).* Microbes shape the world we live in! Come research fungal microbes and their interactions with the environment. Students will propose and carry out the experiment while learning aspects of research, such as data analysis and presenting results to other scientists and to the public. *Prerequisites: Biology 142 and 142L.* This course may be taken for elective and upper-level laboratory credit for the biology major.

**BIOL 450. Computational Neuroscience** *(3 credit hours).* *(Also offered as IBS 534).* This course will look at the exploration of single neurons and biological neural networks with computer simulations. Each class consists of an introductory lecture followed by computer tutorials using the GENESIS software under UNIX. Specific topics include passive cable theory, compartmental modeling, voltage-gated and synaptic conductances, motor pattern generation, and cortical networks. *Prerequisites: Biology 360 or NBB 301 (or IBS 514 or equivalent).* Permission of instructor is required. This course may be taken as elective credit for the biology major.

**BIOL 455. Immunology and Disease** *(4 credit hours).* This course will explore the fundamental concepts of immunology and disease. The course will cover the basic principles of immunology and will use this knowledge to better understand the causes of pathogenesis during the course of infection with microparasites. We will consider the limitations of our current understanding of infectious diseases caused by viruses, bacteria, and unicellular eukaryotes by discussing recent articles from the literature on infections such as HIV/AIDS, tuberculosis, and malaria. *Attendance at a mandatory discussion section is required.* *Prerequisites: Biology 142 and Biology 142L.* This course may be taken as elective credit for the biology major.

**BIOL 460. Building Brains** *(3 credit hours).* *(Same as NBB 460.)* This course will examine the experimental foundations underlying our understanding of the mechanisms regulating development of the nervous system. Topics will include neurogenesis, migration of neuronal precursors, axon guidance, programmed cell death, and the formation of synaptic connections. Through study of primary literature and texts, students will develop skills in identifying hypotheses and analyzing the logic of the experiments used to test these hypotheses. *Prerequisites: Biology 142 and Biology 142L.* This course originates in the Biology Department and may be taken as elective credit for the biology major.

**BIOL 463. Population Biology and Evolution of Disease** *(4 credit hours).* *(Also offered as IBS 591.)* This course will look at the immune response, infectious diseases, and cancers that will be treated as population dynamical and evolutionary phenomena. Primary consideration will be given to four topics: (1) the within-host population dynamics of micro parasites (viruses, bacteria, and protozoa) and the immune defenses, (2) the population biology of infectious disease transmission and its control by vaccination and chemotherapy, (3) theories of the evolution of parasite virulence, and (4) the somatic cell population biology and evolution of neoplasms and their metastasis. *Attendance at a mandatory discussion section is required.* *Prerequisites: Biology 142, Biology 142L, and an intense interest in this subject.* College level mathematics and calculus are highly recommended. This course may be taken as elective credit for the biology major.
BIOL 465. RNA and Biotechnology (3 credit hours). The purpose of this course is to introduce students (upper level undergraduates) to the fundamental concepts of RNA biology and to state-of-the-art biotechnologies that use RNA for medical and industrial applications. **Prerequisites:** Biology 142 and Biology 142L. This course may be taken as elective credit for the biology major.

BIOL 470W. Microbiome Community Ecology (4 credit hours). (Also offered as IBS 539.) This course covers ecology and systems biology of species interactions, with a focus on microbial and microbiome ecology, including interactions between microbes and their hosts. This course relies heavily on the primary literature, and a basic familiarity with college-level calculus is recommended. **Prerequisites:** Biology 142, Biology 142L, and Biology 370. This course may be taken as elective credit for the biology major and fulfills a WRITING REQUIREMENT for the GERs.

BIOL 475. Biology of the Eye (3 credit hours). (Also offered as IBS 548.) This course is for juniors, seniors, and graduate students who may be interested in a basic understanding of the eye. This course will review basic principles and state-of-the-art information on ocular anatomy, embryology, biochemistry, physiology, genetics, immunology, microbiology, pharmacology, and pathology. **Prerequisites:** Biology 142 and Biology 142L. This course ORIGINATES in the Department of OPHTHALMOLOGY (taught by Dr. P.M. Iuvone and Dr. John Nickerson) and may be taken as elective credit for the biology major.

BIOL 480. Modeling Biological Systems (3 credit hours). This course will cover the construction and analysis of mathematical models of cellular and population processes in biology. **Prerequisites:** Biology 142 and Biology 142L. There is also an optional lab associated with this course – Biology 480L. This course may be taken as elective credit for the biology major.

BIOL 480L. Modeling Biological Systems Laboratory (1 credit hour). This is the optional laboratory course to accompany Biology 480 and, if taken, must be taken concurrently with the lecture course – Biology 480. **Prerequisites:** Biology 142 and Biology 142L; co-requisite: Biology 480. This course may be taken as elective credit and fulfills the upper level laboratory requirement for the biology major.

BIOL 485/485W. Special Topics in Biology (1 to 4 credit hours). A lecture series or special course designed for advanced students on topics of special biological concern. May be repeated for a total of 8 credit hours when topic varies. **Prerequisites:** Biology 142 and Biology 142L. See current course atlas. This course may be taken for elective credit for the biology major.

BIOL 486/486W. Special Topics in Biology, with Laboratory (1 to 4 credit hours). A lecture series or special course with a laboratory component designed for advanced students on topics of special biological concern. May be repeated for a total of 8 credit hours when topic varies. **Prerequisites:** Biology 142 and Biology 142L. See current course atlas. This course may be taken as elective and upper-level laboratory credit for the biology major.

BIOL 495A. Honors Research - 1st semester (4 credit hours). This is the first semester of a two semester, independent research course for students invited to participate in the Biology Department Honors Program. Senior Biology majors (with a 3.5 GPA in both the biology major and overall) should take Biology 495A in the Fall semester and 495BW in the Spring semester. Students graduating in a Fall semester should take 495A in their last Spring semester and Biology
495BW in the Fall of their senior year (the last two semesters at Emory). For more information, visit the Biology Department Website and the current course atlas. **Prerequisites: Biology 142, Biology 142L, and permission of instructor.** A maximum of 4 credit hours of Honors Research may be counted as elective credit and as an upper-level lab only after successful completion of the second semester of Honors.

**BIOL 495BW. Honors Research - 2nd semester (Variable credit - 1 to 4 hours) (WRITING REQUIREMENT (WR)).** This is the second semester of the two semester, independent research course for students invited to participate in the Biology Department Honors Program. **Biology 495BW fulfills a college writing requirement upon submission and acceptance of a completed honors thesis** based on the student’s research. Please visit the Biology Department website for further information. **Prerequisites: Biology 142, Biology 142L, Biology 495A, and permission of instructor.** A maximum of 4 credit hours of Honors Research may be counted as elective credit and as an upper-level lab only after successful completion of the second semester of Honors. This course also fulfills a writing requirement for the GERs.

**BIOL 497R. Supervised Reading (1 to 4 hours).** For this course, readings are done in conjunction with a Biology Department faculty member. Interested students should communicate with appropriate Biology faculty and obtain their permission in advance of registration. **Prerequisites: Biology 142, Biology 142L, and permission of instructor.** Contact Tonya Woolcock at tdavis6@emory.edu or at 404-727-6292 to obtain a permission number. This course does NOT count for the biology major and does NOT fulfill a writing requirement, but may be taken for college credit hours.

**BIOL 499R. Undergraduate Research (4 hours each semester).** This is a **two- semester research participation course open to sophomores, juniors, and seniors, by permission only.** The student must find a faculty member to supervise the research and **SUBMIT AN ON-LINE APPLICATION FORM to Dr. Nicole Gerardo** (Director of Undergraduate Research) via the Biology Department Website. Upon approval of the application, the student will then receive a permission number from Dr. Gerardo and will need to register on OPUS through normal procedures before the end of add/drop/swap. Students will also be required to participate in the annual **Undergraduate Research Symposium** at the end of the spring semester, where they will present a poster describing their research. The application form and other detailed information regarding Biology 499R requirements can be obtained from the Undergraduate Education page of the Biology Department website. **Prerequisites: Biology 142, Biology 142L, second-semester Freshman standing or higher, and a declared major in Biology.** A maximum of 4 credit hours of Undergraduate Research may be counted as elective credit and as an upper-level lab only after successful completion of the second semester of 499R. All 8 hours will count toward the student’s college credit hours.

**Notes:**

Biology 185/185W, 186/186W, 285/285W, 286/286W, 385/385W, 386/386W, 485/485W, and 486/486W courses may be taught twice as a “special topics” course and will then be assigned a permanent course number for later semesters. The name of the course will normally remain the same.