BIOLOGY (BIOL)

BIOL 1220. Biology of Sex & Death. 4 Credit Hours.
Students learn biology through the lens of the formation and collapse of biological systems, organized around questions pertaining to life, sex, and death.

BIOL 1510. Biological Principles. 4 Credit Hours.
An introduction to the basic principles of modern biology, including biomacromolecules, bioenergetics, cell structure, genetics, homeostasis, evolution, and ecological relationships.

BIOL 1510R. BIOL 1510 Recitation. 0 Credit Hours.
A recitation period for BIOL 1510, an introduction to the basic principles of modern biology, including biomacromolecules, bioenergetics, cell structure, genetics, evolution, and ecological relationships.

BIOL 1511. Honors Biological Principles. 4 Credit Hours.
An advanced introduction to the principles of modern biology, including biomacromolecules, bioenergetics, cell structure, genetics, homeostasis, evolution, and ecological relationships.

BIOL 1520. Introduction to Organismal Biology. 4 Credit Hours.
An introduction to biology at the organ and organismal levels, with emphasis on physiological processes and integration of growth and development.

BIOL 1521. Honors Introduction to Organismal Biology. 4 Credit Hours.
Introduction to biology at the organ and organismal levels, with emphasis on biodiversity, physiological processes, and integration of growth, reproduction and development.

BIOL 1XXX. Biology Elective. 1-21 Credit Hours.

BIOL 2100. Island Biogeography of New Zealand. 3 Credit Hours.
Introduction to theory of island biogeography focused on New Zealand's geological history and unique biota.

BIOL 2335. General Ecology. 3 Credit Hours.
Introduction to ecological processes at individual, population, and community levels that occur in plant, animal, and microbial taxa, and their relevance to current environmental problems.

BIOL 2336. General Ecology Laboratory. 1 Credit Hour.
The companion laboratory for BIOL 2335 (Ecology). This course stresses understanding ecological concepts through a combination of lab and field experiments, and computer simulations. 0.

BIOL 2337. Honors Ecology. 3 Credit Hours.
A problem-based learning course in ecology. Student teams will do research and solve challenges typically faced by ecologists and environmental scientists.

BIOL 2338. Honors Ecology Laboratory. 1 Credit Hour.
Companion course to Honors Ecology. Student teams will explore solutions to ecological challenges using experiments and mathematical models.

BIOL 2344. Genetics. 3 Credit Hours.
Mendelian and molecular genetics; principles of inheritance, gene structure and function, foundations of recombinant DNA technology, genetic basis of variation and evolution.

BIOL 2345. Genetics Laboratory. 1 Credit Hour.
A laboratory course in the fundamental techniques of genetic analysis.

BIOL 2354. Honors Genetics. 3 Credit Hours.
A comprehensive genetics course incorporating discussions of primary literature. Topics include molecular genetics and gene action, transfer systems and mapping, cytological, quantitative and population genetics. Credit not allowed for both BIOL 2354 and BIOL 2344.

BIOL 2355. Honors Genetics Laboratory. 1 Credit Hour.
Hands-on introduction to practical techniques, critical thinking, and important concepts in genetics. Students carry out laboratory experiments that explore transmission, population, and molecular genetics.

BIOL 2695. Undergraduate Internship(Undergraduate Internship for Academic Credit). 1-21 Credit Hours.
Biology Undergraduate Internship for credit freshmen and sophomores, by permit only. The internship experience must be at a unit or agency approved by the School of Biology.

BIOL 2698. Undergraduate Research Assistantship. 1-12 Credit Hours.
Independent research conducted under the guidance of a faculty member.

BIOL 2699. Undergraduate Research. 1-12 Credit Hours.
Independent research conducted under the guidance of a faculty member.

BIOL 2801. Special Topics. 1 Credit Hour.
This designation enables the School of Biology to provide new lecture courses dealing with areas of current interest in biological sciences.

BIOL 2802. Special Topics. 2 Credit Hours.
This designation enables the School of Biology to provide new lecture courses dealing with areas of current interest in biological sciences.

BIOL 2803. Special Topics. 3 Credit Hours.
This designation enables the School of Biology to provide new lecture courses dealing with areas of current interest in biological sciences.

BIOL 2804. Special Topics. 4 Credit Hours.
This designation enables the School of Biology to provide new lecture courses dealing with areas of current interest in biological sciences.

BIOL 2805. Special Topics. 5 Credit Hours.
This designation enables the School of Biology to provide new lecture courses dealing with areas of current interest in biological sciences.

BIOL 2901. Special Problems. 1-21 Credit Hours.
Research problems in biology under the supervision of a faculty member.

BIOL 2902. Special Problems. 1-21 Credit Hours.
Research problems in biology under the supervision of a faculty member.

BIOL 2903. Special Problems. 1-21 Credit Hours.
Research problems in biology under the supervision of a faculty member.

BIOL 2904. Special Problems. 1-21 Credit Hours.
Research problems in biology under the supervision of a faculty member.

BIOL 2905. Special Problems. 1-21 Credit Hours.
Research problems in biology under the supervision of a faculty member.

BIOL 2XXX. Biology Elective. 1-21 Credit Hours.

BIOL 3100. Ecology and Evolution: An Australian Perspective. 3 Credit Hours.
Evolution and ecology of Australian ecosystems, including rainforests, open woodlands, coastal habitats; conservation of endangered ecosystems. Earns Biology technical credit. Research project required.

BIOL 3300. Tropical Ecology. 3 Credit Hours.
Ecological processes in the tropics including community organizations, biotic interactions, biodiversity, coevolution. Students perform research projects in rain forest, cloud forest, and seashore.

BIOL 3380. Introductory Microbiology. 3 Credit Hours.
Basic biology of bacteria, fungi, algae, and viruses, with emphasis on bacteriology.

BIOL 3381. Introductory Microbiology Laboratory. 1 Credit Hour.
Fundamental laboratory techniques in microbiology.

BIOL 3450. Cell and Molecular Biology. 3 Credit Hours.
An introduction to the structure and function of cells and their organelles with emphasis on eucaryotic cellular and molecular processes. Credit not allowed for both BIOL 3450 and BIOL 3340.

BIOL 3451. Cell and Molecular Biology Lab. 1 Credit Hour.
An introduction to experimental methods of cell and molecular biology research that will cover some fundamental topics of cell biology. Credit not allowed for both BIOL 3451 and BIOL 3341.

BIOL 3600. Introduction to Evolutionary Biology. 3 Credit Hours.
Comprehensive introduction to evolutionary biology. Includes focus on processes (natural selection, genetic drift) and resulting patterns (genome organization, phylogeny) illustrated with prokaryote and eukaryote examples.

BIOL 3754. Laboratory in Human Anatomy. 1 Credit Hour.
A detailed hands-on study of human structure using high-resolution models, specialized specimens and dissection of selected mammalian organs and tissues.

BIOL 3756. Laboratory in Human Physiology. 1 Credit Hour.
A laboratory application of concepts in Physiology, providing hands-on experience focusing on primarily on non-invasive human experiments supplemented with in vitro tissues experiments.

BIOL 3813. Special Topics. 3 Credit Hours.
Topics of current interest not covered in other courses in the department.

BIOL 3XXX. Biology Elective. 1-21 Credit Hours.

BIOL 4012. Protein Biology. 3 Credit Hours.
Biological view of proteins, including protein biosynthesis, processing, modification, folding, trafficking, interactions, degradation, natural and directed evolution, assembly diseases, amyloids, prions and protein-based inheritance.

BIOL 4015. Cancer Biology and Biotechnology. 3 Credit Hours.
This course covers basic concepts of cancer biology and new technologies that are being developed to understand, detect, treat, and prevent cancer. Credit not allowed for both BIOL 4015 and BIOL 7015.

BIOL 4150. Genomics and Applied Bioinformatics. 3 Credit Hours.
Retrieval and analysis of biological sequence, gene expression, and proteomics data from public databases and other sources; applying standard bioinformatics tools to investigate biological questions. Credit not allowed for both BIOL 4150 and BIOL 6150.

BIOL 4225. Molecular Evolution. 3 Credit Hours.
Evolutionary processes at molecular level, organizations of genomes and genetic systems. Students will read and present up-to-date research articles in various topics in molecular evolution.

BIOL 4340. Medical Microbiology. 3 Credit Hours.
Advanced study of bacteria, protozoa, fungi, and viruses that cause human diseases; emphasis on epidemiology, mechanisms of disease causation, prevention, and treatment.

BIOL 4401. Experimental Design and Statistical Methods in Biology. 3 Credit Hours.
Introductory course on experimental design, hypothesis testing and basic statistical techniques commonly applied in biological research. Exercises based on computer statistical software packages.

BIOL 4410. Microbial Ecology. 3 Credit Hours.
Advanced studies of microbial ecosystems, the specific roles of bacteria in maintaining ecological balance, and the evolution of the ecosystem in response to changing environments.

BIOL 4417. Marine Ecology. 3 Credit Hours.
An overview of the physical forces and biotic interactions structuring marine communities and of the major threats to these communities. Credit not allowed for both BIOL 4417 and BIOL 6417.

BIOL 4418. Microbial Physiology. 3 Credit Hours.
Study of the physiology of growth and metabolic activities of microorganisms.

BIOL 4428. Population Dynamics. 3 Credit Hours.
Students will examine the ecological factors that affect dynamics, regulation, and evolution of natural populations, emphasizing the connections with mathematical models, genetics, and ecology. Credit will not be awarded for both BIOL 4428 and BIOL 6428.

BIOL 4460. Communicating Biological Research. 1 Credit Hour.
Students learn to convey the importance of research findings in the biological sciences and to critically evaluate research results through discussions and scientific presentations. Credit will not be awarded for both BIOL 4450 and BIOL 4460.

BIOL 4464. Developmental Biology. 3 Credit Hours.
Investigations of cell differentiation and development using the tools of molecular genetics and cell biology.

BIOL 4471. Behavioral Biology. 3 Credit Hours.
An introduction to the study of the principles of behavior of all kinds of organisms, from microbes to mammals.

BIOL 4545. Genetics of Complex Human Traits and Diseases. 3 Credit Hours.
Introduction to the genetics and evolution of complex human traits, focusing on contemporary approaches to understanding susceptibility to malignant, metabolic, immune and psychological diseases.

BIOL 4570. Immunology and Immunochemistry. 3 Credit Hours.
A survey of modern immunology and its applications.

BIOL 4590. Research Project Lab. 3 Credit Hours.
Experience in designing, implementing, and communicating a biology research project, and practical training in modern approaches for biological research.

BIOL 4607. Molecular Biology of Microbes: Disease, Nature, and Biotechnology. 3 Credit Hours.
Molecular genetics of bacteria with an emphasis on experimental approaches, regulatory mechanisms in disease-causing and environmental bacteria, and biotechnology applications derived from microbes. Credit not awarded for both BIOL 4607 and BIOL 4608 or BIOL 4607 and BIOL 6608 or BIOL 4607 and BIOL 6607.

BIOL 4651. Foundations of Bioethics. 3 Credit Hours.
This course examines important bioethical issues in research, policy, medicine, and the environment in light of ethical theory and the process of scientific inquiry. Credit not awarded for both BIOL 4651 and BIOL 4650.

BIOL 4690. Independent Research Project. 3 Credit Hours.
Independent research with proposal and manuscript writing, conducted with the guidance of a faculty member.

BIOL 4694. Intern Assistantship(Undergraduate Internship for Pay). 1-21 Credit Hours.
Biology Undergraduate Internship for pay for juniors and seniors, by permit only. The internship experience must at a unit or agency approved by the School of Biology.

BIOL 4695. Undergraduate Internship(Undergraduate Internship for Academic Credit). 1-21 Credit Hours.
Biology Undergraduate Internship for credit for juniors and seniors, by permit only. The internship experience must be at a unit or agency approved by the School of Biology.

BIOL 4696. Biology Undergraduate Teaching Assistantship. 3 Credit Hours.
Biology teaching carried out under the guidance of a faculty member. Credit not allowed for both BIOL 4696 and BIOL 4697.

BIOL 4697. Biology Undergraduate Teaching Experience. 3 Credit Hours.
An introduction to teaching biology for undergraduate teaching assistants, with a focus on effective teaching active engagement of students, and development of innovative classroom activities. Credit not allowed for both BIOL 4696 and BIOL 4697.

BIOL 4698. Undergraduate Research Assistantship. 1-12 Credit Hours.
Independent research conducted under the guidance of a faculty member.

BIOL 4699. Undergraduate Research. 1-12 Credit Hours.
Independent research conducted under the guidance of a faculty member.

BIOL 4740. Biologically Inspired Design. 3 Credit Hours.
We examine evolutionary adaptation as a source for engineering design inspiration, utilizing principles of scaling, adaptability, and robust multifunctionality that characterize biological systems. Credit not allowed for both BIOL 4740 and (ISYE 4740 or PTFE 4740 or MSE 4740 or ME 4740).

BIOL 4744. Microbial Symbiosis & Microbiomes. 3 Credit Hours.
This course explores how symbiotic interactions with microbes affect the biology of other organisms, focusing extensively on the beneficial microbes native to the human body.

BIOL 4746. Signaling Molecules. 3 Credit Hours.
The diversity of chemical signals between organisms and their structural specifications will be presented along with chemical and biological methods for isolating signaling molecules.

BIOL 4801. Special Topics. 1 Credit Hour.
This designation enables the School of Biology to provide new lecture courses dealing with areas of current interest in biological science.

BIOL 4802. Special Topics. 2 Credit Hours.
This designation enables the School of Biology to provide new lecture courses dealing with areas of current interest in biological science.

BIOL 4803. Special Topics. 3 Credit Hours.
This designation enables the School of Biology to provide new lecture courses dealing with areas of current interest in biological science.

BIOL 4804. Special Topics. 4 Credit Hours.
This designation enables the School of Biology to provide new lecture courses dealing with areas of current interest in biological science.

BIOL 4805. Special Topics. 5 Credit Hours.
This designation enables the School of Biology to provide new lecture courses dealing with areas of current interest in biological science.

BIOL 4813. Special Topics. 3 Credit Hours.
Special Topics in BIOS.

BIOL 4823. Special Topics. 3 Credit Hours.
Special Topics in BIOS.

BIOL 4833. Special Topics. 3 Credit Hours.
Special Topics in BIOS.

BIOL 4901. Special Problems. 1-21 Credit Hours.
Research problem in biology under supervision of a faculty member. To be offered any term with credit to be arranged. Seven hours (four hours technical electives + three hours free elective) are the maximum credits allowed toward the Bachelor of Science in Biology degree.

BIOL 4902. Special Problems. 1-21 Credit Hours.
Research problem in biology under supervision of a faculty member. To be offered any quarter with credit to be arranged. Seven hours (four hours technical electives + three hours free electives) are the maximum credits allowed toward the Bachelor of Science in Biology degree.

BIOL 4903. Special Problems. 1-21 Credit Hours.
Research problem in biology under supervision of a faculty member. To be offered any quarter with credit to be arranged. Seven hours (four hours technical electives + three hours free electives) are the maximum credits allowed toward the Bachelor of Science in Biology degree.

BIOL 4904. Special Problems. 1-21 Credit Hours.
Research problem in biology under supervision of a faculty member. To be offered any quarter with credit to be arranged. Seven hours (four hours technical electives + three hours free electives) are the maximum credits allowed toward the Bachelor of Science in Biology degree.

BIOL 4905. Special Problems. 1-21 Credit Hours.
Special problem in biology under supervision of a faculty member. To be offered any quarter with credit to be arranged. Seven hours (four hours technical electives + three hours free electives) are the maximum credits allowed toward the Bachelor of Science in Biology degree.

BIOL 4910. Honors Undergraduate Research Thesis. 3 Credit Hours.
Writing and submission of an Undergraduate Research Thesis describing research accomplishments with a Georgia Tech faculty member. For a thesis conducted without a Biological Sciences faculty member, the instructor of record and a second reader from the School must both approve the thesis contains sufficient biological content.

BIOL 4XXX. Biology Elective. 1-21 Credit Hours.