

Course Descriptions for BIOS Project Labs (BIOS 4590) and Special Topics (BIOS 48X1, 48X2, 48X3)

Spring 2026 Special Topics and Project Lab Descriptions

BIOS 4801 MN1 Biology of the Amphibians (Mendelson)

Prerequisite: BIOS 1107 or BIOS 1207 or BIOS 1108 or BIOS 1208

Credits: 1 (Minimester course)

Description: This course considers the diversity of amphibians and their special conservation needs. These topics are considered in an explicitly phylogenetic context. As such, this approach is a direct response to the commonly held and untenable view that amphibians are evolutionary intermediates between fishes and reptiles. This course will direct students toward the more diverse and unexpected, or under-appreciated, aspects of amphibians e.g., their sheer taxonomic, morphological, and ecological diversity, focusing especially on their extraordinary diversity of reproductive strategies, including complex polyploid parthenogenetic lineages. As well, amphibians were the first vertebrate group to signal the onset of the 6th Global Mass Extinction and we will cover the history of that scientific realization, the threats of emerging infectious diseases in wildlife, and the conservation actions at hand.

BIOS 4801 MN2 Biology of Reptiles (Mendelson)

Prerequisite: BIOS 1107 or BIOS 1207 or BIOS 1108 or BIOS 1208

Credits: 1 (Minimester course)

Description: This course considers the diversity of reptiles, with an emphasis on the non-avian groups. The evolution and ecology of the groups are considered and compared in an explicitly phylogenetic context. As such, this approach is a direct response to the commonly held and untenable view that reptiles are evolutionary intermediates between amphibians and birds/mammals and the widespread misinformation that birds are a distinct group that is separate from reptiles. This course will direct students toward the more diverse and unexpected, or under-appreciated, aspects of reptiles—e.g., their considerable taxonomic, morphological, and ecological diversity, and with a focus especially on their extraordinary diversity of body forms. As well, reptiles face considerable conservation challenges. and we will endeavor to understand the biological bases for their endangerment and the realities of the challenges faced in mitigating those threats.

BIOS 4802 ROS Seminal Papers in Astrobiology (Rosenzweig)

Prerequisites: (BIOS 1107 or BIOS 1207) and (BIOS 1108 or BIOS 1208) and CHEM 1212K

Credits: 2

Description: Astrobiology integrates astronomy, physics, Earth and atmospheric sciences, chemistry and biology in seeking to understand the origin, evolution, and possible distribution of life throughout the universe. Georgia Tech has expertise in all these disciplines and is recognized internationally for excellence in astrobiology research. The goal of BIOS 4802 is to foster cross-disciplinary understanding and discussion between and within Astrobiology-relevant disciplines across the Colleges of Science and Engineering. BIOS 4802 will meet for 2 hours each week to discuss a different highly cited paper in astrobiology; we anticipate spanning all the disciplines above by the end of term. Each week one or more students will lead the discussion, presenting sufficient background for everyone to understand the advance that the paper represented, and any significant work that has followed it. Student discussion leaders will consult with designated local experts as well as with guest experts from other institutions, including NASA Spaceflight Centers. Presentations will consist of formal PowerPoint presentations, developed in consultation with the instructor and with the topic expert. Students will submit this presentation as well as a Word.doc providing a 2-page synopsis of the seminal paper and a suggested reading list.

BIOS 4803 A and AL Ornithology (Freeman)

Prerequisite: BIOS 1107 or BIOS 1207 or BIOS 1108 or BIOS 1208 or permission of instructor

Credits: 3

Description: Birds are beautiful and inextricably intertwined to human cultures: they provide an excellent study system for understanding the natural world and how biodiversity is changing in the Anthropocene. This course is designed to familiarize students with all aspects of bird biology, including taxonomy, anatomy, behavior, and identification. Classes will provide a foundation in major ornithological topics: each topic will be further explored

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in student-led discussions of peer-reviewed journal articles. Labs will introduce students to the diversity of birds that live on and around Georgia Tech's campus. Students will complete a group research project.

This course is equivalent to BIOS 4803 Evolutionary Ornithology. Students cannot receive credit for both courses. If both are taken, then one instance will be discounted by the registrar on the student record.

BIOS 4083 BAL Neuromotor Physiology (Balog)

Prerequisites: BIOS 3755 or BME 3100

Credits: 3

Description: This course focuses on basic mechanisms, function and adaptations of the skeletal, nervous and muscular systems. Students will gain an understanding of the normal physiological responses of these systems and how each adapts to perturbations such as altered loading and pathology. Interactions among the various systems and their plasticity will be emphasized.

BIOS 4803 ES Nutrition (Rosbruck)

ASYN

Prerequisite: APPH 1040/1050/1060

Credits: 3

Description: The course is a study of human nutrition as an applied science and covers nutrition physiology: metabolism, energy production, biochemical aspects, role of nutrients, weight control mechanisms, fitness and consumerism.

BIOS 4590 Research Project Lab section C and CL (Green) –

Permit should be requested ASAP and no later than the Tuesday before the close of phase II:

<https://forms.office.com/r/pVsQwqPwVU>

Prerequisite: SR standing

Corequisite: BIOS 4460 Communicating Biological Research

Credits: 3

Description: This course provides hands-on experience in ecological field research and environmental assessment. Students will investigate sites in the Atlanta area, collecting and analyzing data on soil, water, and biotic factors to evaluate the ecological impacts of different land-use practices. Fieldwork will take place during off-campus trips, some of which will necessitate data collection outside regular class hours and on weekends. Students will develop skills in experimental design, field methods, and data analysis. Open to ENVS and BIOL majors.

BIOS 4590 Research Project Lab section B and BL (Hu) – Biomechanics Experimental Lab

Permit should be requested ASAP and no later than the Tuesday before the close of phase II:

<https://forms.office.com/r/pVsQwqPwVU>

Prerequisite: SR standing

Corequisite: BIOS 4460 Communicating Biological Research

Credits: 3

Description: In this course, we will follow our curiosity to ask questions about movement, form, and function of plants and animals. For example: how do eyelashes protect the eyes, how do cats clean themselves, and what sets the size of the largest pumpkin? We will learn a few ideas from fluid and solid mechanics and apply them to research a problem of the student's choice. We will emphasize learning physical intuition rather than any mathematics. The goal is to formulate an original question and find a surprising answer. Measurements may be done in the lab or off-campus. Herbariums at Emory and Botanical Garden, collections at Fernbank or other natural history museums are available. YouTube and literature search can provide further data. Experiments on plants or invertebrates are possible in the lab, coupled with observations at the Atlanta Zoo. Students will present results in context of previous literature and practice science communication using photography, videography, and live demonstrations.

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BIOS 4590 Research Project Lab section A and AL (Schmidt-Krey) – Molecular and Structural Biology Research Using Bioinformatics and Computational Biology Approaches

Permit should be requested ASAP and no later than the Tuesday before the close of phase II:

<https://forms.office.com/r/pVsQwqPwVU>

Prerequisite: SR standing

Corequisite: BIOS 4460 Communicating Biological Research

Credits: 3

Description: Students will gain experience in designing, implementing, and communicating a biology research project, and practical training in modern approaches for biological research. This section will have a scientific theme of Molecular and Structural Biology Research Using Bioinformatics and Computational Biology Approaches. Following initial experiments to obtain hands-on knowledge and training in methods, students will design and carry out a research project, communicating the overall goal and results in an end-of-semester manuscript and poster presentation, as well as in the Communicating Biological Research class.