Fall 2017 - Course Atlas

Updated 3/1/2017

Please Note: The information contained in the Course Atlas is subject to change. For final schedule information, please refer to OPUS or contact the Biology Department.

Attention Biology Majors: An enrollment hold will be placed on your OPUS account during the fall and spring preregistration/advising periods. You must make an appointment to meet with your Biology advisor BEFORE your pre-registration appointment time on OPUS.

New Requirements for the Biology majors (Math changes) will be in effect at the beginning of the Fall 2015 semester.

One upper-level laboratory is required for the Biology major. 4 credit hours of Biology 495A/B or 499R (or OX_399R for Oxford Continuees) may be counted as elective credit and as an upper-level lab only after the completion of the second semester of Biology OX_399R, Biology 495, or Biology 499R. (3/25/2009)

Introductory Courses
Biology 141, 141L, 142, and 142L are prerequisites for most upper level biology courses. These courses meet the requirements for the biology major, premed, and the life sciences laboratory GER requirements. Biology 120 meets the GER requirement for a life science laboratory course, but not the requirements for the biology major, and is recommended for students who are not science majors or premed.

**The Biology 141 and 142 Labs (Biol 141L and Biol 142L) are now separate, 2-credit hour courses (effective Fall 2017).**

AP Credit
Biology AP scores of 4 or 5 will earn Biology 141 LECTURE credit only for students entering Emory Fall 2014 and later. Students with AP credit for Biology 141 will be required to take Biology 141 Lab before taking Biology 142 and 142L. Students who have taken Biology 141/142 prior to Fall 2014 will remain under the Fall 2008 or Fall 2013 requirements, as applicable.

Biology Major
The Biology major also requires one course in each of three areas of biology (listed under Column A - Cell and Molecular, Column B - Organismal, and Column C - Ecology and Evolution), and 12 credit hours (minimum) of elective courses (4 or more courses). These courses must include one upper-level laboratory course (effective Fall 2006).

Additional Requirements
The BA and BS degrees in Biology have additional required courses from other departments (or AP equivalents). The BA and BS require Chemistry 141 and 142, w/Lab. The BS also requires Chemistry 221, Chemistry 221 Lab, Math 111, Math 116 (effective Fall 2015, Math 112 and Math 115 will no longer be accepted for the biology major), and Physics 141 or 151, w/Lab.

***QTM 100 (Intro to Stat Inference) will also be required for the BS degree (for all students entering Emory Fall 2014 or later and for those declaring a biology major after Summer 2014), in addition to two semesters of Calculus.***

BIOLOGY 120 (1): Concepts in Biology w/Lab
TBD, Tu Th, 8:30-9:45, MAX: 90, 1462 Clifton Road, Room 230
NOTE: This course does NOT count toward the Biology major.

NOTE: STUDENTS MUST ALSO REGISTER FOR A BIOLOGY 120 LABORATORY. Dr. Megan Cole is the lab director. Dates and times are as follows:

LABs:
120 (2) Tu, 2:30-5:30; MAX: 24; 1462 Clifton Road, Room 119
120 (3) Tu, 6:00-9:00; MAX: 21; 1462 Clifton Road, Room 119
120 (4) Th, 2:30-5:30; MAX: 24; 1462 Clifton Road, Room 119
120 (5) Th, 2:30-5:30; MAX: 21; 1462 Clifton Road, Room 119

Content: The lecture and laboratory portions of this course will be organized around modules that relate biology to current issues such as evolution, global warming, cloning, stem cell research, and more. This course is designed to have you think critically about biological subjects and to help you seek out reliable sources.

Text: Scientific carbonless-copy, bound notebook.

Particulars: This course is NOT applicable to a science major, including biology majors and the premedical program (but does meet the GER requirements for a life science laboratory). Science majors should NOT take this course.

Prerequisites: None.
**BIOLOGY 141L (1-8): Foundations of Modern Biology I LAB [Cell Biology and Classical Genetics LAB I (SNTL) (2 Credit Hours)]**  
*Cole, Megan*

This is the laboratory component of Biology 141 and is required for all Biology majors taking Biology 141 Fall 2014 and later.

Students with AP credit for the Biology 141 lecture MUST ALSO TAKE Biology 141L. AP credit may NOT be used to placed out of the laboratory course.

Biology 141L will teach students skills in experimental design, critical thinking, data analysis, scientific communication, and collaboration.

Biology 141, Biology 141L, Biology 142, and Biology 142L meet the requirements for medical and dental schools and for the Biology major.

**LAB:**

- 141L (1), M, 2:30-5:30, MAX: 96, 1462 Clifton Road, Rooms 106-120
- 141L (2), M, 6:00-9:00, MAX: 96, 1462 Clifton Road, Rooms 106-120
- 141L (3), Tu, 2:30-5:30, MAX: 96, 1462 Clifton Road, Rooms 106-120
- 141L (4), Tu, 6:00-9:00, MAX: 96, 1462 Clifton Road, Room 106-120
- 141L (5), W, 2:30-5:30, MAX: 96, 1462 Clifton Road, Rooms 106-120
- 141L (6), W, 6:00-9:00, MAX: 96, 1462 Clifton Road, Room 106-120
- 141L (7), Th, 2:30-5:30, MAX: 96, 1462 Clifton Road, Rooms 106-120
- 141L (8), Th, 6:00-9:00, MAX: 24, 1462 Clifton Road, Rooms 106-120

**Text:** Scientific carbonless-copy bound notebook. **(LAB-REQUIRED)**

**Pre-or Corequisite:** Biology 141 (or AP credit).
**BIOLOGY 190 (2): Freshman Seminar: Biology of Elite Sport (FSEM)**

*Callery, MW, 10:00-11:15, MAX: 15, 1462 Clifton Road, Room 100A*

**NOTE:** This course does NOT count toward the Biology major.

**MORE INFORMATION WILL BE AVAILABLE SOON!**

**Texts:** TBD.

**Prerequisites:** None. For Freshmen only.

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**BIOLOGY 200 (1): Introduction to Research (2 credit hours)**

*Marsteller, MWF, 1:00-1:50, MAX: 45, PAIS 230*

**NOTE:** This 2 credit-hour course may be taken as elective credit but DOES NOT FULFILL the upper-level laboratory requirement for the Biology major.

Working in a research lab? Planning on it next semester? Make the most of your experience with Entering Research (Introduction to Research--Biology 200). This 2-credit seminar course for freshmen, sophomores, and transfer students supports and enhances your independent research experience. Advanced students may take it alongside 1-3 independent research credits in a science, technology, engineering, or math (STEM) field, and have an experience that is tailored to your interests and goals. This course is open to students interested in biology, NBB, Psychology, Human Health, Physics, or Chemistry research.

- Get help finding a lab and mentor doing research that matches your interests.
- Define an independent research project with your mentor.
- Learn about the roles, responsibilities, and relationships that make for a successful research experience.
- Share your research experience with your peers.
- Improve your ability to read and understand science literature.
- Learn more about peer review.
- Understand how data supports a hypothesis.

The main objective/purpose of this class is to prepare biology majors for a future laboratory or field research experience as a participant in SURE (Summer Undergraduate Research Experience), SIRE (Scholarly Inquiry and Research Experience), Biology 499R (Undergraduate Research), or other research options. This course will also be useful for other students desiring an overview of the scientific research processes as well as students planning to enter a graduate program at some future date.

In this course, students will be introduced to the scientific research process and to all of the basic tools that they will need to become successful researchers. Much of the emphasis will be on using scientific literature, planning a research project (including experimental design and statistical design), preparation of a proposal, and scientific writing/rewriting. Graduate and postdoctorate fellows will introduce research questions from 4-5 different labs on campus and will host lab visits and rotations.

Students will prepare a research proposal in this class, which is open to first and second year students.

**Text:** None.

**Prerequisites:** None.
**BIOLOGY 205 (1): Comparative Vertebrate Anatomy w/Lab (5 Credit Hours)**
*Starnes, MWF, 9:00-9:50, MAX: 70, 1462 Clifton Road, Room 308*

**NOTE:** **STUDENTS MUST ALSO REGISTER FOR A 205 LABORATORY**  Dates and times are as follows:

**LAB:**
205 (2), M, 2:30-5:30, MAX: 24, 1462 Clifton Road, Room 124  
205 (3), W, 2:30-5:30, MAX: 24, 1462 Clifton Road, Room 124  
205 (4), Th, 2:30-5:30, MAX: 22, 1462 Clifton Road, Room 124

This course is centered on comparative studies of phylogeny and anatomy of vertebrates from a functional, developmental, and evolutionary perspective. Cats and sharks are dissected in the laboratory portion of this course.

This course will fulfill the **Column B and upper level laboratory requirements for the Biology major.**

**Texts:**
- *Comparative Anatomy: Manual of Vertebrate Dissection, 3rd Edition,* by Fishbeck and Sebastiani (Morton; 9781617310423)  (*LAB - OPTIONAL*).

Course grades will be determined by two lecture exams (midterm and final) and two laboratory exams. **Lecture and lab are both taught by Dr. Starnes.**

**Prerequisites:** Biology 142 and Biology 142L.

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**BIOLOGY 223 (1): Developmental Biology (3 Credit Hours)**
*Fritz, MWF, 11:00-11:50, MAX: 70, 1462 Clifton Road, Room 308*

How does a single cell embryo develop into a fully functional adult organism? In this course we will examine the basic principles underlying development at the cellular, molecular, and organismal levels. Topics covered will include body plan development, limb development, nervous system development, sex determination and germ cell development, development, and cancer.

There will be three exams and a cumulative final exam (4 exams total), plus six quizzes.

**This course will fulfill the Column A requirement for the Biology major.**

**Text:** *Developmental Biology, 10th Edition,* by Gilbert, et al. (Sinauer; 9780878939787)  (*REQUIRED*)

**Prerequisites:** Biology 142 and Biology 142L.

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**BIOLOGY 240 (1): Organismal Form & Function (3 Credit Hours)**
*Beck, Tu Th, 1:00-2:15, MAX: 70, 1462 Clifton Road, Room 308*

**Recommended for second-year Biology majors.**

Major topics include the biology of animals and plants, physiology, evolution, and ecology.

There will be reading quizzes, 3 exams, and a final exam. Students also will be evaluated based on a species account.

**This course will fulfill the Column B requirement for the Biology major.**
BIOLOGY 241 (1): Evolutionary Biology (4 Credit Hours)
Morrin, MW, 2:30-3:45; MAX: 70, 1462 CR 308

NOTE: STUDENTS MUST ALSO REGISTER FOR A 241 000 DISCUSSION SECTION.

DISCUSSION SECTIONS:
241 (2) M, 10:00-10:50, MAX: 18, 1462 Clifton Road, Room 109
241 (3) M, 11:00-11:50; MAX: 18, 1462 Clifton Road, Room 109
241 (4), M, 12:00-12:50; MAX: 17, 1462 Clifton Road, Room 109
241 (5), M, 1:00-1:50; MAX: 17, 1462 Clifton Road, Room 109

This course will study of the factors that cause genetic change and of the evolutionary consequences of such changes. Topics include evidence for evolution, phylogenetics, population genetics, adaptation and natural selection, sexual selection, kin selection, speciation, human evolution, disease evolution, and diversification of taxa. Emphasis on molecular, genetic, ecological, and evolutionary factors related to variation and adaptation to environment.

There will be three exams, writing assignments, discussion participation, and a final paper. Discussion of current and classic literature and group presentations will be required.

This class will fulfill the Column C requirement for the Biology major.

Texts:
* Evolutionary Analysis 5th Edition, by Scott Freeman and Jon C. Herron (Prentice-Hall; 9780321616678) (REQUIRED)

Prerequisites: Biology 142 and Biology 142L.
Biology 142 and Biology 142L or permission of instructor.

BIOLOGY 247LW (1): Ecology Lab (3 Credit Hours)
*Beck, Tu Th, 2:30-5:30, MAX: 6, 1462 Clifton Road, Room 119 (Tuesdays) and Room 109 (Thursdays) (3 CREDIT HOURS)*

(Same as ENVS 247L 008; MAX: 6)

This is the optional laboratory portion of Biology 247 (Ecology). The course involves sampling and analysis of field and laboratory data. The last half of the semester will be spent on group research projects. There is a required weekend trip to the mountains of North Carolina.

This course may be taken for elective credit, fulfills the upper-level laboratory requirement for the Biology major, and fulfills a WRITING REQUIREMENT for the GERs.

There will be multiple writing assignments, including two full length scientific papers, and a final presentation.

Text: None.

Prerequisites: Biology 142 and Biology 142L; pre or co-requisite: Biology 247 or ENVS 247.

BIOLOGY 250 (1): Cell Biology (3 Credit Hours)
*Yedvobnick, Tu Th, 10:00-11:15, MAX: 70, 1462 Clifton Road, Room 308*

In this class, we will explore the structure and function of cells at the molecular level. Major themes to be explored include membrane organization, protein trafficking and targeting, membrane transport, cytoskeleton structure and cell motility, cell adhesion, cell signaling, and the cell cycle. Where relevant, current medical issues associated with cellular dysfunction will be presented.

There will be three exams and in-class exercises.

This course will fulfill Column A for the Biology major.

Text: Molecular Cell Biology, 7th (or 6th) Edition, by Harvey Lodish et al. (W.H. Freeman; 9781429234139)

Prerequisites: Biology 142 and Biology 142L.

BIOLOGY 264 (1): Genetics: A Human Perspective (4 Credit Hours)
*Deal, Tu Th, 1:00-2:15, MAX: 90, 1462 Clifton Road, Room 230*

NOTE: STUDENTS MUST ALSO REGISTER FOR A DISCUSSION SECTION.

Discussion Sections:
- 264 (2), M, 3:00-3:50, MAX: 23, 1462 CR 100A
- 264 (3), M, 4:00-4:50, MAX: 23, 1462 CR 100A
- 264 (4), Tu, 4:00-4:50, MAX: 22, 1462 CR 126
- 265 (5), Tu, 5:00-5:50, MAX: 22, 1462 CR 126

This course will provide a fundamental understanding of genetics. We will study the origin, development, and advances of important genetic concepts, methods, and technologies. With an emphasis on aspects related to human health, we will study the genetic approaches that are applied to the understanding of genetic disorders and how better treatment of these disorders can be invented. In addition to a focus on single-gene human diseases, we will also introduce methods designed to understand genetic disorders that are caused by multiple genes. We will introduce genomic research and the related emerging new technologies developed along or after the human genome.
project. Topics include classic Mendelain genetics, molecular genetics, population genetics, human origin and evolution, and gene therapy.

There will be three in-class exams.

This course fulfills the Column A requirement for the Biology major.

**Texts**: Students will need to purchase **ONE of the options** below:
- **OR**

**Prerequisites**: Biology 142 and Biology 142L.

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**BIOLOGY 285 (1): Special Topics in Biology: Great Books **NEW**

*Eisen, Tu Th, 11:00-12:15, MAX: ____, Center for Ethics 162*

(Same as IDS 285.)

MORE INFORMATION COMING SOON!

This course originates in the Institute for Liberal Arts (ILA) and may be taken as elective credit for the Biology major.

Text: To be determined.

Prerequisites: Biology 142 and Biology 142L.

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**BIOLOGY 301 (1 & 2): Biochemistry (3 Credit Hours) (SNT)

*Escobar (1), Tu Th, 10:00-11:15, MAX: 90, 1462 CR 230
Kelly (2), Tu Th, 2:30-3:45, MAX: 90, White Hall 208*

Students may also take CHEMISTRY 301 for the Biology major.

The cell is an amazing network of self-organizing machinery that drives life in all its forms. This course begins by defining the molecular wheels and cogs of the cell's machines and how their capabilities are defined by their chemistries. The chemistries of each component are then explored to understand how they contribute to the operation and control of the cellular machinery. We will further explore how all of the cellular components are governed, by kinetic and non-kinetic controls, to produce a coherent and responsive metabolism that efficiently creates and utilizes the energy stored in chemical compounds, such as glucose and fats. Human metabolic disorders such as diabetes will provide models of how metabolism is controlled at the systematic level in complex organisms using biochemical signaling pathways to coordinate metabolic pathways in different tissues.

This course will fulfill elective credit for the Biology major and should provide students with a firm foundation in Biochemistry.


Prerequisites: Biology 142 and Biology 142L; Chemistry 221 and Chemistry 221L.
BIOLOGY 320 (1): Animal Behavior (SNT) (3 Credit Hours)
Gouzoules (Psychology), Tu Th, 2:30-3:45, MAX: 50, New Psychology Building 290

(Same as PSYC 320; MAX: 50)

This course originates in the Psychology Department and may be taken as a biology elective.

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. Specific topics include orientation and migration, genetic and environmental influences on behavior, aggression, courtship and mating strategies, parental behavior, foraging, predatory-prey relationships, and social organization.

There will be two one hour exams and a final exam. The three exams are weighted so that your best score represents 40% of the course grade, the lowest score 25%, and the middle score 35%.


Prerequisites: Biology 142 and Biology 142L (for Biol 320).

BIOLOGY 336 (1 & 2): Human Physiology (3 Credit Hours)
Cafferty (1), MWF, 2:00-2:50, MAX: 100, White Hall 205
Shepherd (2), MWF, 10:00-10:50, MAX: 70, 1462 Clifton Road, Room 308

This course is a study of human physiology emphasizing homeostatic mechanisms of integrated body functions. Topics covered in this class include cellular communication, endocrinology, neurophysiology, muscle physiology, circulation, respiration, and renal physiology.

There will be weekly assignments, 2 midterm exams, and a final exam.

This course may be taken as elective credit for the Biology major.


Prerequisites: Biology 142 and Biology 142L.

BIOLOGY 345 (1): Conservation Biology (SNT) (3 Credit Hours)
Gillespie (ENVS), Tu Th, 10:00-11:15, MAX: 10, Math & Science N306

(Same as ENVS 345; MAX: 10)

This course originates in the ENVS Department and may be taken as a Biology elective.

The natural and social sciences perform a critical role in 1) understanding how the natural world operates and how human societies and actions can both positively and negatively affect the natural world and 2) informing policy and management decisions affecting biodiversity. This course focuses on phenomena that affect the maintenance, loss, and restoration of biological diversity and introduces students to the multidisciplinary problems and solutions of conserving and protecting species and ecosystems at risk.


Prerequisites: ENVS 120 or 131, or Biology 142 and Biology 142L (for Biology 345), or permission of instructor.
**BIOLOGY 352 (1): Epigenetics and Human Disease**

*Eisen, Tu Th, 2:30-3:45, MAX: 45, 1462 Clifton Road, Room 126*

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). During the semester, we will discuss the nature of epigenetic inheritance and its relation to stem cell differentiation, normal development, and disease.

The class is structured around student-led discussions and posters on the primary literature and discussions led by Emory epigeneticists at the cutting-edge of their field.

*This class may be taken as elective credit for the Biology major.*

**Text:** Primary research articles and reviews.

**Prerequisites:** Biology 142 and Biology 142L.

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**BIOLOGY 360 (1): Introduction to Neurobiology (3 Credit Hours)**

*Prinz and Sober (1), Tu Th, 11:30-12:45, MAX: 50, 1462 Clifton Road, Room 230*

(Same as NBB 301, MAX: 100)

This course is shared by the Biology Department and the NBB Program and fulfills the Column B requirement for the Biology major.

This course will provide students with an introduction to cellular and integrative neurobiology. Topics include the electrochemical and biophysical mechanisms for neuronal signaling and synaptic transmission, and the neural bases of behavior and perception.

There will be two or three 1-1/4 hour long exams during the semester and a final exam. There will also be a one hour review session each week.

*There is an optional 2-credit hour lab practicum* (see Biology 360L / NBB 301L) associated with the course (M, 3:00-5:00, 1462 Clifton Road, Room 109).

**Text:** Neuroscience, 5th Edition, by Purves et al. (Sinauer, 9780878936953) *(REQUIRED)*

**Prerequisites:** Completion of Biology 142, Biology 142L, and Chemistry 142 is required; completion of Math 116 and completion or concurrent enrollment in Introductory Physics is strongly recommended.

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**BIOLOGY 360L (000): Neurobiology Simulation Laboratory (2 Credit Hours)**

*Liu, M, 3:00-5:00, MAX: 10, 1462 Clifton Road, Room 109 (2 CREDIT HOURS)*

(Same as NBB 301L; MAX: 10)

This is the optional 2-credit hour lab to accompany Biology 360 / NBB 301, Introduction to Neurobiology.

In this lab, students will explore topics in cellular and systems neuroscience by performing virtual electrophysiology experiments on the computer. The content of the course matches material covered in the introductory Neurobiology course, Biology 36 / NBB 301, and will help students understand neurons and neuronal networks in greater depth. To be taken concurrently with or after Biology 360 / NBB 301. Grades will be based on homework assignments.
This course originates in the Biology Department and may be taken as elective credit for the Biology and NBB majors. This course also fulfills the upper level laboratory requirement for the Biology major.


Prerequisites: Biology 142 and Biology 142L, Chemistry 142; *pre- or corequisite*: Biology 360 or NBB 301.

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**BIOLOGY 370 (1): Introduction to Microbiology (4 Credit Hours)**  
*Campbell, MWF, 9:00-9:50, MAX: 100, 1462 Clifton Road, Room 230*

**NOTE:** STUDENTS MUST ALSO REGISTER FOR A DISCUSSION SECTION.

**DISCUSSION SECTIONS:**  
370 (2), M, 5:00-5:50, MAX: 25, 1462 CR 113  
370 (3), M, 6:00-6:50, MAX: 25, 1462 CR 113  
370 (4), Tu, 5:00-5:50, MAX: 25, 1462 CR 113  
370 (5), W, 6:00-6:50, MAX: 25, 1462 CR 113

This course will present the basic elements of microbiology, including the study of viruses but emphasizing bacteriology. Topics to be covered will include: the tools of microbiology, microbial taxonomy and evolution, microbial physiology, microbial biochemistry, microbial genetics, and microbial pathogenesis. The implications of microbiology on medicine, environment, basic research, and biotechnology will be discussed.

This course may be taken as elective credit for the Biology major.

There is also an optional 2-credit hour lab associated with the course (Biology 370L-Introduction to Microbiology Laboratory, W, 2:30-5:30 or Th, 2:30-5:30).

**Text:** *Microbiology: An Evolving Science, 3rd Edition, by Slonczewski and Foster* (W.W. Norton; 9780393919295) *(REQUIRED)*

**Assessment:** There will be three exams and four assignments.

Prerequisites: Biology 142 and Biology 142L.

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**BIOLOGY 370L* (1 & 2): Laboratory in Microbiology (2 Credit Hours)**  
*Campbell (1), W, 2:30-5:30, MAX: 24, 1462 Clifton Road, Room 117  
or  
Campbell (2), Th, 2:30-5:30, MAX: 24, 1462 Clifton Road, Room 117*

This is the 2-credit hour optional laboratory to accompany Biology 370 (Introduction to Microbiology) and will introduce students to some of the basic techniques used in the study of physiology, biochemistry, and genetics of microorganisms. Students will isolate a soil microorganism at the beginning of the term and study its properties in subsequent periods. The organisms will also be examined for the presence of plasmids and for their susceptibility to bacterial viruses.

Students will be graded on the basis of their performance in the lab, on two quizzes, and on a major report of their analysis of the organisms they isolate that will be due at the end of the term.

This course may be taken as elective credit and fulfills the upper level laboratory requirement for the Biology major.

**Text:** None.

Prerequisites: Biology 142 and Biology 142L. *Pre or Co-requisite*: Biology 370.

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BIOLOGY 385 (1): Special Topics in Biology: Herpetology, w/LAB ***NEW***

Wilson, L., MW, 2:00-2:50 (LECTURE), MAX: 6, 1462 Clifton Road, Room 100C
and
W, 3:00-5:30 (LAB), MAX: 6, 1462 Clifton Road TBD

MORE INFORMATION COMING SOON!

(Same as ENVS 385.)

This course may be taken as elective and upper-level laboratory credit for the Biology major.

Text: To be determined.

Prerequisites: Biology 142 and Biology 142L.

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BIOLOGY 434 (1): Physical Biology (3 Credit Hours)

Finzi, MW, 10:00-11:15; MAX: 9, Math and Science Center N215

This course originates in the Physics Departments and may be taken as elective credit for the Biology major.

(Same as PHYS 434 000; MAX: 9)

This course explores 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.

Text: Physical Models of Living Systems, by Phillip Nelson (9781464140297)

Prerequisites: Biology 142, Biology 142L, Physics 212, and Physics 220, or consent of instructor. (CS 170 and Phys 151/152 may also be accepted as prerequisites in lieu of Phys 212 and 220.)

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BIOLOGY 441 (1): Molecular Biology and Evolutionary Genetics (4 Credit Hours)

Yokoyama, MWF, 9:00-9:50, MAX: 30, 1462 Clifton Road, Room 101

NOTE: STUDENTS MUST ALSO REGISTER FOR A DISCUSSION SECTION.

DISCUSSION SECTION:
441 (2), W. 4:00-4:50, 1462 CR 126

Content: Technological innovation in molecular biology has allowed us to generate an enormous amount of DNA sequence data from various groups of organisms. In 2001, the nucleotide sequence of the entire human genome was completed; the genomic sequencing of many additional organisms will be completed in the future. The challenging task for biologists now is how to extract information from these data. In order to understand the dynamics of genome evolution, we will learn a wide range of topics, including population genetics, molecular evolution, human genome projects, bioinformatics, and functional genomics.

This course may be taken as elective credit for the Biology majors.

Text: None.

Assessment: Lecture notes will be provided. Two midterms and a final are all take-home exams.

Prerequisites: Biology 142 and 142L. A strong interest in quantitative methods is recommended.

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BIOLOGY 463 (1): Population Biology & Evolution of Disease (4 Credit Hours)
Antia, Tu Th, 1:00-2:15, MAX: 15; 1462 Clifton Road, Room 109

(Same as IBS 591; MAX: 5.)

NOTE: STUDENTS MUST ALSO REGISTER FOR A DISCUSSION SECTION.

DISCUSSION SECTION:
463 (2), Th, 1:00-2:15, 1462 CR 126

Content: Infectious diseases as well as cancers and coronary artery diseases will be treated as population dynamic and evolutionary phenomena. Primary consideration will be given to five topics: (1) the within-host population and evolutionary dynamics of micro-parasite (viruses, bacteria, and protozoa) infections, the immune defenses, and the treatment of these infections with antibiotics and other chemotherapeutic agents; (2) the epidemiology of infectious diseases and their control by vaccination, prophylaxis, and chemotherapy, with a particular emphasis on influenza, HIV/AIDS, and malaria, (3) the evolution of parasite virulence (why parasites harm their hosts), (4) the somatic cell population biology and evolution of neoplasms (cancers) and their metastasis, and (5) the evolution of senescence and its implication for the extending human life span.

This course may be taken as elective credit for the Biology majors.

Texts:
- Wilson, E.O. and W.H. Bossert. A Primer of Population Biology. (Sinauer)
- Assorted original, review, and popular articles.

Assessment: The course will include lectures, discussion, and oral reports by students. Each student will be responsible for at least one report that will be presented both orally and in writing. Grades will be based on the quality of these reports and the magnitude and enthusiasm of participation in discussions.

Prerequisites: Biology 142 and Biology 142L. College level mathematics and calculus and an intense interest in this subject are highly recommended.

Berman, TBD

(This course is also taught as PHYS 741R.)

This seminar will provide a survey of modern methods for quantitatively measuring and modeling animal behavior, focusing primarily on the scientific literature. Readings will be composed of a combination of experimental, theoretical, and computational studies, with the overall goals of outlining the current state of our knowledge and highlighting areas of recent investigation. Covered topics will include: measuring behavior from images and time series, analyzing patterns and sequences of behavior, biomechanics and control, collective and social behavior, and aspects of genetic and neurobiological mechanisms. All students will be responsible for reading and presenting articles and for completing a final project. Graduate enrollees will also be required to complete approximately bi-weekly assignments.

This course may be taken as elective credit for the Biology major.

Text: Selected readings.

Prerequisites: Biology 142 and Biology 142L.

BIOLOGY 485 (2): Special Topics in Biology: Botanical Medicine & Health
Quave, T u Th, 11:30-12:45, MAX: 20, Location TBD
This seminar will provide a survey of modern methods for quantitatively measuring and modeling animal behavior, focusing primarily on the scientific literature. Readings will be composed of a combination of experimental, theoretical, and computational studies, with the overall goals of outlining the current state of our knowledge and highlighting areas of recent investigation. Covered topics will include: measuring behavior from images and time series, analyzing patterns and sequences of behavior, biomechanics and control, collective and social behavior, and aspects of genetic and neurobiological mechanisms. All students will be responsible for reading and presenting articles and for completing a final project. Graduate enrollees will also be required to complete approximately biweekly assignments.

This course originates in Human Health and may be taken as elective credit for the Biology major.

Text: Selected readings.

Prerequisites: Biology 142 and Biology 142L (for Biology 485).

BIOLOGY 495A/495BW (1): Honors Research (Variable Credit, 1-8 Hours)
Eisen

Biology 495A is the first semester of the two-semester BIOLOGY HONORS PROGRAM for Biology majors; Biology 495BW is the second semester and requires the written completion of an Honors Thesis, which must be orally presented before an Honors Committee.

Senior Biology majors with a 3.5 (and higher) g.p.a. in the Biology major (the biology g.p.a. is calculated using the courses taken for the biology major) and overall at the end of the Junior year are eligible to participate in the Biology Honors Program.

Eligible students should take Biology 495A in the Fall semester of their senior year and 495BW in the Spring semester. Students graduating in a Fall semester should take 495BW in the Fall semester and should register for the first semester of the Honors Program the prior Fall semester. You cannot register for Biology 495A in the Spring semester.

For additional information, please go to the Biology Department website and visit the Honors Program in Biology webpage.

Permission of instructor is required for both Biology 495A and 495BW. Eligible students will need to contact Tonya Woolcock at tdavis6@emory.edu or call 404-727-6292 to obtain a permission number.

A maximum of 4 credit hours of Biology 495 may be counted as elective credit and as an upper-level lab only after the completion of the second semester of 495. Biology 495B will also fulfill a writing requirement for the GERs.

Prerequisites: Biology 142 and Biology 142L, senior standing, a declared Biology major, and a 3.5 (or higher) g.p.a. in the Biology major and in your overall g.p.a.

BIOLOGY 497R (00P-09P): Supervised Reading
Individual Faculty (See OPUS for section and class numbers)

This course does NOT count for the Biology major and does NOT fulfill a writing requirement for the GERs.

For this course, selected readings are done in conjunction with a Biology Department faculty member. Interested students should communicate with appropriate faculty and obtain their permission prior to preregistration. Once permission is received from the faculty member, contact Tonya Woolcock at tdavis6@emory.edu or 404-727-6292 to obtain a permission number.

This course may be taken for variable credit (1 to 4 hours per semester).

Prerequisites: Biology 142 and Biology 142L.
BIOLOGY 499R (00P): Undergraduate Research

Individual Faculty

This is a two-semester research participation course open to sophomores, juniors, and seniors and must be taken for 4 hours each semester. Permission of Dr. Nicole Gerardo (ngerard@emory.edu) is required.

The student must find a faculty member to supervise the research and submit an application form to Dr. Nicole Gerardo, Director of Undergraduate Research, prior to registration. Once the application has been approved, the student will receive a permission number from Dr. Gerardo and must then register through normal procedures. The application forms and other detailed information regarding Biology 499R requirements can be obtained from the Undergraduate Education page of the Biology Department website.

A maximum of 4 hours of elective credit may be used to satisfy the requirements for the Biology major after successful completion of the second semester of Undergraduate Research. This course will also fulfill the upper level lab requirement for the Biology major after successful completion of the second semester.

Prerequisites: Biology 142 and Biology 142L, second-semester freshman standing (or higher), AND a declared major in Biology.