Spring 2017 - Course Offerings

(Updated 11.1.16)

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. Once you have met with your advisor, he/she will remove the enrollment hold.

New Requirements for the Biology major are in effect beginning Fall 2015. The new Calculus sequence is Math 111 and Math 116. Math 115 is no longer being taught and Math 112 will no longer be accepted for the Biology major (except for AP credit). Students who matriculated prior to Fall 2015 will remain under the Fall 2014 or Fall 2013 biology major requirements, as applicable.

Introductory Courses
Biology 141, 141L, 142, and 142L are required for all 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.

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 141L before taking Biology 142 and 142L. Students who have taken Biology 141/142 prior to Fall 2014 will remain under the Fall 2013 or Fall 2008 requirements, as applicable.

Biology Major
The major also requires one course in each of three areas of biology (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.

A maximum of four (4) credit hours of Biology 495 or Biology 499R (or Biology_OX 399R for Oxford Continues) may be counted as elective credit and as an upper-level lab only after completion of the second semester of Biology 495/499R/399R.

Additional Requirements
The BA and BS degrees in Biology have additional required courses in Chemistry, Math, and Physics (or AP equivalents). The BA and BS require Chemistry 141 and 142 with labs. The BS also requires Chemistry 221, Chemistry 221L, Math 111, Math 116, QTM 100, and Physics 141 or 151 with Lab. Math 112 (or AP credit) will no longer be accepted for the Biology major effective Fall 2014.

Freshmen who have AP credit for Chem 141 and take Chem 221/226L will be exempt from taking Chem 142 for the Biology major.

ORDER courses: Students may take one approved upper-level ORDER course for the biology major. If taken, this course will count as the one cross-listed course that originates in another department that is allowed for the biology major. See the college course atlas for the current ORDER courses available.
**BIOLOGY 120 000 (000): Concepts in Biology w/Lab**  
*Tower-Gilchrist, M W, 2:30-3:45, MAX: 90, 1462 Clifton Road, Room 230*

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

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

- **LABs:**  
  - LB1, Tu, 2:30-5:30, MAX: 24, 1462 Clifton Road, Room 119  
  - LB2, Tu, 6:00-9:00, MAX: 21, 1462 Clifton Road, Room 119  
  - LD1, Th, 2:30-5:30, MAX: 24, 1462 Clifton Road, Room 119  
  - LD2, Th, 6:00-9:00, MAX: 21, 1462 Clifton Road, Room 119

The lecture portion 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. The laboratory portion of this course will put students in the role of scientific researchers and will involve designing experiments, performing experimental assays, analyzing results, and presenting their work. This course is designed to have you think critically about biological subjects and to help you seek out reliable sources.

**Text:** Laboratory bound notebook with carbonless copies. *(LAB-REQUIRED)*

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.

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**BIOLOGY 142 (000-005): Foundations of Modern Biology II: Molecular Genetics (LECTURE) (SNT)**  
*Calferty (000), MWF, 11:00-11:50, MAX: 90, 1462 Clifton Road, Room 230*  
*Calferty (001), MWF, 12:00-12:50, MAX: 90, 1462 Clifton Road, Room 230*  
*Orloff (002), MW, 1:00-2:15, MAX: 70, 1462 Clifton Road, Room 308*  
*Spell (003), Tu Th, 8:30-9:45, MAX: 90, 1462 Clifton Road, Room 230*  
*Abreu (004), Tu Th, 10:00-11:15, MAX: 90, 1462 Clifton Road, Room 230*  
*Abreu (005), Tu Th, 11:30-12:45, MAX: 90, 1462 Clifton Road, Room 230*

**NOTE:** **YOU MUST ALSO REGISTER FOR A BIOLOGY 142 LABORATORY.** Dr. Megan Cole is the lab director. (See BIOLOGY 142L for dates and times).

This course, in addition to the laboratory component, is required for the biology major.

Biology 141 and 142 will provide a topic-driven overview of molecular and cellular biology and genetics. Biology 142 will cover evolution, genomics, molecular, developmental, and cancer genetics. The topics covered in class will address major issues in human biology and medicine. The integrated lecture and lab will emphasize the basic principles and critical thinking involved in modern biological discovery. In lab, students will design and perform experiments using several important model systems.

**Text:** Freeman, Scott. *Biological Science, 5th Edition* *(Customized Emory University Edition-2014).* *(Includes a Modified Mastering Biology Access Kit.)* *(Pearson/Prentice-Hall)* *(LECTURE-REQUIRED)*

Biology 141, 141L, 142, and 142L are required of all biology majors, and Biology 141 and 141L, along with Chemistry 141, should be taken in the fall of the Freshman year by prospective biology majors; Biology 142, 142L, and Chemistry 142 in spring of the Freshman year. If scheduling precludes taking both, it is recommended that you take Chemistry 141 and 142 before taking Biology. Biology 141/141L and Biology 142/142L are prerequisites for all upper level biology courses and meet the biology and genetics premedical requirements.
AP Biology scores of 4 or 5 will count for the BIOLOGY 141 LECTURE ONLY (effective Fall 2014). Students taking Biology 141 and 142 Fall 2014 and later will be required to take Biology 141L and 142L.

Biology 120 is recommended for non-science majors who are not premed but who wish to satisfy the Life Science Lab requirement for the GER.

Some lecture and lab exams may be administered in the evening (dates and times to be determined).

Prerequisites: Biology 141/141L. Chemistry 141 is strongly recommended.

BIOLOGY 142L (000-005): Foundations of Modern Biology II LAB: Molecular Genetics (LAB) (SNTL)
Cole, Megan

This is the laboratory component of Biology 142 and is required for all students taking Biology 142 Fall 2014 or later.

Dates and times are as follows:

LABs:
LA1, M, 2:30-5:30, MAX: 96, 1462 Clifton Road, Rooms 106-120
LA2, M, 6:00-9:00, MAX: 72, 1462 Clifton Road, Rooms 106-120
LB1, Tu, 2:30-5:30, MAX: 96, 1462 Clifton Road, Rooms 106-120
LB2, Tu, 6:00-9:00, MAX: 96, 1462 Clifton Road, Rooms 106-120
LC1, W, 2:30-5:30, MAX: 96, 1462 Clifton Road, Rooms 106-120
LC2, W, 6:00-9:00, MAX: 48, 1462 Clifton Road, Rooms 106-120
LD1, Th, 2:30-5:30, MAX: 96, 1462 Clifton Road, Rooms 106-120

Text: Laboratory bound notebook with carbonless copies.

AP Biology scores of 4 or 5 count for the Biology 141 LECTURE ONLY (effective Fall 2014). Students taking Biology 141 in Fall 2014 and later will also be required to take Biology 141L, Biology 142, and Biology 142L. Some exams may be administered in the evening.

Prerequisites: Biology 141 and Biology 141L. Pre- or corequisite: Biology 142.

BIOLOGY 190 (000): Freshman Seminar: 21st Century Medicine: Experiments, Ethics, and Issues (FSEM)
Yedvobnick, Tu Th, 10:00-11:15, MAX: 18, 1462 Clifton Road, Room 100A

NOTE: This course is for Freshmen only and does NOT count toward the Biology major.

How are the human genome sequence, evolving infectious diseases, and stem cell methods influencing the next generation of medicine? How will disease be diagnosed and treated using this new information? Are gene therapy clinical trials worth the risks? Can human stem cells reverse spinal cord injury? Should there be restrictions on stem cell experimentation? Should fear of human cloning impact therapeutic cloning? Should physician-assisted
suicide be legal? Are vaccinations dangerous? Why are HIV and malaria such difficult global health issues? These are representative topics that will be addressed in this class.

After several lecture and instructor-led discussions, the class will be largely based on student presentations, discussions, and a few debates. Primary reading will be literature reviews and Web materials. A strong interest in Biology and Medicine is recommended.

Prerequisites: None.

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**BIOLOGY 190 (001): Freshman Seminar: DNA & Forensics**
*Campbell, MWF, 10:00-10:50, MAX: 18, 1462 Clifton Road, Room 126*

NOTE: This course is for Freshmen only and does NOT count toward the Biology major.

This seminar will address the basics of DNA structure, the development of techniques used in modern genetic research, and how DNA is used in forensic analyses.


The class will be discussion-based, with little formal lecture. Grading will be based on class participation and case-study presentations.

Prerequisites: None.

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**BIOLOGY 190 (002): Freshman Seminar: Evolution: Conceptions and Misconceptions (FSEM)**
*Marsteller, Tu Th, 1:00-2:15; MAX: 8, Woodruff Library, Room 215*

(Same as NBB 190; MAX: 8)

NOTE: This course is for Freshmen only and does NOT count toward the Biology major.

This seminar course will address conceptions and misconceptions of the theory of evolution. We will begin with a discussion of theory and evidence from a scientific perspective. Using web material (for example, http://evolution.berkeley.edu/evostyle/misconcepts/index.shtml), readings, discussions, simulations, and PBL exercises, we will examine how the conception of evolution has changed over time. We will examine major misconceptions about evolution, including the idea of progress, randomness, chance, and necessity. Current debates about "intelligent design" will also be considered.

Required Texts:

NOTE: Texts may be ordered from Amazon.com.

Required websites:
- Understanding Evolution (http://evolution.berkeley.edu/evolibrary/home/php)
- History of Evolutionary Thought (http://evolution.berkeley.edu/evolibrary/article/history_01)
- Nature online: Evolution (http://www.nhm.ac.uk/nature-online/evolution/index.html)
- Evo Ed Cases (http://www.evo-ed.com/)
- Avida Ed (http://avida-ed.msu.edu/)
- National Center for Case Study Teaching in Science (http://sciencecases.lib.buffalo.edu/cs/collection/)

Grades will be based on learning issues and products from the PBL exercises, on-line reflections, class participation, a group class presentation, and a final project.
**Prerequisites:** None.

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**BIOLOGY 190 (003): Freshman Seminar: Bonds Between Plants and People**

*Deal, Tu Th, 11:30-12:45, MAX: 18, 1462 Clifton Road, Room 126*

**NOTE:** This course is for Freshmen only and does NOT count toward the Biology major.

Human civilization could not exist without plants. All of the food that we eat is directly or indirectly generated by plant photosynthesis; we use plants as an important source of fuels; hundreds of medicines, intoxicants, and poisons that we employ are derived from plants; and plants are objects of beauty that have been used for decorative and ceremonial purposes for millennia.

This course will delve into each of these relationships between plants and people (food, fuel, medicine, and beauty), with emphasis on the unique biology of plants and how humans have taken advantage of these traits. We will also explore how plants might help us solve some of the great challenges that our civilization currently faces, such as feeding a growing population, climate change, and disease.

Grading will be based on class participation and group presentations.

**Prerequisites:** None.


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**BIOLOGY 190 (04P): Freshman Seminar: Delicious! Brain and Flavor**

*Sober, M, 2:30-5:30, MAX: 15, Few Hall G24 (Kitchen)*

**NOTE:** This course is for Freshmen only and does NOT count toward the Biology major.

Applications must be submitted to EmoryNeurogastronomy@gmail.com by 11:59 p.m. on THURSDAY, November 10th.

We will decide who has been accepted into the class and will e-mail ALL applicants with their status by midnight on SUNDAY, November 13th. Students who are not accepted into this class will therefore be able to select other courses (including first-year seminars) during regular registration beginning on November 14th.

This course explores the biology of deliciousness. We will focus on the brain systems that allow us to taste and smell and how the chemical, physical, and cultural properties of different foods affect our experience of eating. The class will meet in a test kitchen on campus, and every class will include cooking and eating, as well as discussion of assigned readings.

Grades will be based on written assignments and classroom participation.

No prior background in neurobiology, chemistry, or cooking is required, however, a willingness to participate in both cooking and class discussions is essential.

**Enrollment in this course is by PERMISSION OF INSTRUCTOR.**

Interested students must submit an application to EmoryNeurogastronomy@gmail.com by 11:59 p.m. on THURSDAY, November 10th, containing the following:

1. Your name.
2. Your student ID number.
(3) A 500-word essay describing a memorable food or meal and what you hope to gain from taking this class.

All applicants will be notified of their status by midnight on Sunday, November 13th. Accepted students will then be provided with a permission number during their registration period.

Prerequisites: None.

BIOLOGY 205 (000): Comparative Vertebrate Anatomy w/Lab
Starnes (000), MWF, 9:00-9:50, MAX: 70, 1462 Clifton Road, Room 308

NOTE: YOU MUST ALSO REGISTER FOR A BIOLOGY 205 LABORATORY. Dates and times are as follows:

LABs:
LA1, M, 2:30-5:30, MAX: 24, 1462 Clifton Road, Room 124
LC1, W, 2:30-5:30, MAX: 24, 1462 Clifton Road, Room 124
LD1, Th, 2:30-5:30, MAX: 22, 1462 Clifton Road, Room 124

Content: 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.

Texts:

Particulars: 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.

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

Prerequisites: Biology 142 and Biology 142L.

BIOLOGY 212 (000): Computational Modeling for Science and Engineering, w/Lab
Nemenman, MW, 10:00-11:15, MAX: 15, Math & Science Center N306

(Same as PHYS 212 000; MAX: 25)

NOTE: YOU MUST ALSO REGISTER FOR A BIOLOGY / PHYSICS 212 LABORATORY. Dates and times are as follows:

LABs:
LD1, Th, 2:30-5:30, MAX: 8, MSC N303
LE1, F, 2:30-5:30, MAX: 7, MSC N303

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.

This course is SHARED by the Physics and Biology Departments and may be taken as elective credit for the Biology major.

Prerequisites: Physics 141 or 151 and Math 112 or 116.

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**BIOLOGY 223 (000): Developmental Biology**
Corces, MWF, 10:00-10:50, MAX: 120, 1462 Clifton Road, Room 230

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.


Ten quizzes will make up 25% of the grade. Three non-cumulative exams will each make up 25% of the grade.

This course will fulfill the Column A requirement for the Biology majors.

Prerequisites: Biology 142 and Biology 142L.

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**BIOLOGY 240 (000): Organismal Form and Function**
Salem, H., Tu Th, 1:00-2:15, MAX: 60, 1462 Clifton Road, Room 308

Recommended for second-year Biology students.

Major topics include evolutionary biology and the physiology of animals and plants in an evolutionary and ecological context.

Texts:

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

This course will fulfill the Column B requirement for the Biology major.

Prerequisites: Biology 141 (or AP credit). Students with AP credit for Biology 141 may take Biology 240 before (or at the same time) as taking Biology 142 and Biology 142L.

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**BIOLOGY 241 (000): Evolutionary Biology**
Real (000), Tu Th, 1:00-2:15, MAX: 40, 1462 Clifton Road, Rooms 100C

**NOTE: YOU MUST ALSO REGISTER FOR A BIOLOGY 241 000 DISCUSSION SECTION.** Dates and times are as follows:

DISCUSSION SECTIONs:
- DB1, Tu, 11:00-11:50: MAX: 20, 1462 Clifton Road, Room 113
- DD1, Th, 11:00-11:50, MAX: 20, 1462 Clifton Road, Room 113

11/1/2016
This course will study the 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 on molecular, genetic, ecological, and evolutionary factors related to variation and adaptation to environment, and constraints on adaptation.

**Texts:**

There will be three tests and a cumulative final exam. Discussion of current and classic literature and group presentations will be required. Students will also be required to attend a separate discussion section.

**Prerequisites:** Biology 142 and Biology 142L. This class will fulfill the Column C requirement for the Biology major.

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**BIOLOGY 250 (000): Cell Biology**  
*Eisen, Tu Th, 10:00-11:15, MAX: 45, 1462 Clifton Road, Room 126*

We will explore the structure and function of cells at the molecular level. Primary themes include: control of gene expression, the relationship between structure and function, integration of cellular functions, and the dynamic behavior of cells. We will discuss how different research approaches and experimental model systems are utilized to study the topics covered. Small-group oral presentations of primary (research) literature and group discussion of current research articles will be used to explore these concepts. Emphasis is on developing and testing hypotheses and thinking critically about cellular biology and how it fits into biology and society writ large.

**Text:** Lodish, Harvey, et al. *Molecular Cell Biology, 8th Edition*. (W.H. Freeman)

There will be two exams and a 30 minute group presentation.

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

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

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**BIOLOGY 264 (000): Genetics: A Human Perspective**  
*Crouse, Tu Th, 10:00-11:15, MAX: 70, 1462 Clifton Road, Room 308*

**NOTE:** YOU MUST ALSO REGISTER FOR A BIOLOGY 264 DISCUSSION SECTION. Dates and times are as follows:

**DISCUSSION SECTIONS:**
- DC1, W, 2:00-2:50, MAX: 18, 1462 Clifton Road, Room 101
- DC2, W, 3:00-3:50, MAX: 17, 1462 Clifton Road, Room 101
- DD1, Th, 2:00-2:50, MAX: 18, 1462 Clifton Road, Room 101
- DD2, Th, 3:00-3:50: MAX: 17, 1462 Clifton Road, Room 101

**Content:** This course will provide a foundation of genetic concepts by synthesizing traditional genetic approaches and current genomic technologies with implications for understanding human genetics. By discussing examples of human health and disease, we will study how genetic approaches in model organisms can be applied to the understanding of genetic disorders and possible treatments of these diseases. In addition to a focus on single-gene human diseases, we will introduce genomic approaches and the emerging new technologies developed
along or after the human genome project. Topics include classic Mendelian genetics, molecular genetics, population genetics, human origin and evolution, behavior and gene therapy.

**Text:** Meneely, Philip. *Genetic Analysis: Genes, Genomes, and Networks in Eukaryotes, 2nd Edition.* (Oxford University Press)

There will be three in-class exams.

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

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

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**BIOLOGY 301 (000-001): Biochemistry**

Escobar (000), Tu Th, 8:30-9:45, MAX: 65, 1462 Clifton Road, Room 308
Escobar (001), Tu Th, 11:30-12:45, MAX: 65, 1462 Clifton Road, Room 308

Students may also take CHEMISTRY 301 for the Biology major, to fulfill the requirement for medical school, and for MCAT preparation.

Biochemistry is the science that studies the energetics and molecules that create life. This level of inquiry can be very technical but you will gain a much deeper understanding of the workings of living systems by studying Biochemistry. One of the interesting themes that will arise throughout the course is that despite the diversity of life on this planet, there are many unifying principles that apply to all life. From the use of DNA as a storage molecule to the extensive use of membranes in cells to accomplish the various tasks of life, living systems share much in their workings and this is taken as supporting evidence for the common origins of life. This will be a fast-paced course, but let's see if we can have some fun along the way!

**This course may be taken as elective credit for the Biology major** and should provide students with a firm foundation in Biochemistry.

**Text:** Nelson, David L. and Michael M. Cox. *Lehninger - Principles of Biochemistry, 5th Edition.* (Freeman)

**Prerequisites:** Biology 142, Biology 142L, and Chemistry 221.

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**BIOLOGY 325 (000): Primate Social Psychology**

*de Waal* (Psychology), Tu Th, 11:30-12:45, MAX: 30, PAIS 290

(Same as PSYC 325; MAX: 50)

**This course originates in the Psychology Department.**

Following a general introduction to primatology, this course covers recent progress in the growing field of primate social behavior. Topics range from aggression and dominance (e.g., warfare and power politics among chimpanzees) to affiliation, sex, and peaceful coexistence (e.g., parental behavior, behavioral sex differences, conflict resolution). The evolution of the large brain and remarkable intelligence of primates has been explained as related to the complexity of their societies: survival in such societies requires sophisticated social skills and a thorough understanding of the relationship network. Course segments focus on the motivational and cognitive processes underlying coalition formation, reciprocal exchange of benefits, reconciliation following conflict, and the origin of moral systems. Parallels with human behavior will be discussed.

**Texts:**
- Ciocchon/Wisbett. *Primate Anthology.*

**This course may be taken as elective credit for the Biology major.**
Prerequisites: Psych 110, Biology 142 and Biology 142L (for Biol 325).

BIOLOGY 329 (00P): Coastal Biology, w/Lab
Real, W, 2:30-5:30, MAX: 12, 1462 CR 109; Field Activity: St. Simons Island, GA, March 3-12, 2017

LAB/FIELD FEE: $1200.00 (includes meals). A non-refundable deposit of $600 (check or money order made payable to Emory University Biology Department) will be required during preregistration in order to secure a spot in the class, with the remaining balance due in January 2017 when classes begin.

IMPORTANT NOTES: Students interested in this course will need to SUBMIT (to Dr. Real at lreal@emory.edu) a ONE PAGE ESSAY explaining why you want to take this course, along with the titles of at least two completed Biology courses and the names of the instructors. Interested students will also meet with Dr. Real for a personal interview. Students selected for the course will be added to the course (or issued a permission number) by Ms. Barbara Shannon (room 2006, Biology Department) during add/drop/swap and once the non-refundable deposit of $600 has been received.

For the field portion of the course, students will drive in vans to St. Simons Island and visit a variety of sites and islands along the Georgia coast.

The lecture and laboratory portions of this course emphasize basic principles of coastal biology, the human impact on coastal ecosystems, and the diversity of plants and animals living in these ecosystems. Students will also participate in a 9-day laboratory/field activity during Spring Break.

The regular term schedule includes lectures and discussion of course topics. There will be limited laboratory activities during several of the lecture hours, introducing students to the most common plants and invertebrates found in coastal Georgia. The intensive field experience is based at Epworth by the Sea (on St. Simons Island, Georgia) and on Cumberland, Blackbeard, Sapelo, and Jekyll Islands. On two occasions we will charter boats to study pelagic and benthic organisms in the sound surrounding the islands. During all field activities, students will collect and subsequently identify plants and invertebrates typical of the ecosystem.


In this class, students will be required to write a review paper covering current research related to coastal marine ecology and/or coastal environmental issues. Students will also be required to write a lab report based on field experiments carried out during the field trip to the Georgia coast. The remainder of the grade will be based on student participation and in-class presentations.

This course will fulfill the column C and upper-level laboratory requirements for the Biology major.

Prerequisites: Biology 142, Biology 142L, and permission of instructor. Interested students should contact Dr. Les Real at lreal@emory.edu to schedule an interview appointment. Required documents are to be submitted to Dr. Real at the interview appointment (see "Important Notes" above.)

BIOLOGY 336 (000 and 001): Human Physiology
O'Toole (000), Tu Th, 2:30-3:45, MAX: 100, 1462 Clifton Road, Room 230
O'Toole (001), Tu Th, 4:00-5:15, MAX: 100, 1462 Clifton Road, Room 230

This course is a study 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.

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

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

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**BIOLOGY 336 (002): Human Physiology**  
*Shepherd (002), MWF, 10:00-10:50, MAX: 70, 1462 Clifton Road, Room 308*

This course will study human physiology emphasizing homeostatic mechanisms of integrated body functions. Topics include cell signaling, neurophysiology, endocrinology, muscle physiology, cardiology, respiration, and renal physiology.


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

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

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**BIOLOGY 355 (000): Introduction to Time Series Analysis**  
*Berman (000), Tu Th 10:00-11:15, MAX: 15, Room TBD*

(Same as QTM 355 000; MAX: 15)

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.

**Text:** Cryer, *Time Series Analysis with Applications in R, 2nd Edition.*

This class is shared by the Biology and QTM Departments and may be taken as elective credit for the Biology major.

**Prerequisites:** QTM 220; Biology 142 and Biology 142L.

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**BIOLOGY 360 (000): Introduction to Neurobiology**  
*Frenzel (NBB), Tu Th, 1:00-2:15, MAX: 5, 1462 Clifton Road, Room 126*

(Same as NBB 301; MAX: 40)

This class is **SHARED by the Biology and NBB Departments** and is taught by the Biology Department in Fall semester and by the NBB Department in the Spring semester.

This course is an introduction to cellular and integrative neurobiology. Topics include the electrochemical and biophysical mechanisms for neuronal signaling, synaptic transmissions, and the neural bases of behavior and perception. The Spring version of this course will be taught using active learning methodologies. Traditional course lectures will be "flipped" and assigned to be watched as homework and problem sets, case studies, computer simulations, or other assignments based on these lectures will serve as the in-class work.

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

This course will fulfill the Column B requirement for the Biology major.
Prerequisites: Completion of Chemistry 142, Biology 142, and Biology 142L is required; completion or concurrent enrollment in Intro Physics is strongly recommended.

BIOLOGY 370 (000): Introduction to Microbiology
Levin (000), M W, 1:00-2:15, MAX: 70, 1462 Clifton Road, Room 230

NOTE: YOU MUST ALSO REGISTER FOR A BIOLOGY 370 DISCUSSION SECTION. Dates and times are as follows:

DISCUSSION SECTIONS:
DB1, Tu, 5:00-5:50, MAX: 24, 1462 Clifton Road, Room 126
DC1, W, 6:00-6:50, MAX: 24, 1462 Clifton Road, Room 113
DC2, W, 6:00-6:50: MAX: 22, 1462 Clifton Road, Room 126

This course will present the history and basic elements of microbiology, including the study of viruses as well as bacteria. Emphasis will be given to: (i) the genetics and molecular biology of bacteria, (ii) microbial ecology, (iii) microbial evolution, (iv) the mechanisms of virulence of the pathogenic bacteria and viruses of humans, (v) the epidemiology of infectious disease in the developed and underdeveloped worlds, (vi) antibiotic and antiviral treatment and resistance, (vii) vaccines and vaccination programs, (viii) hospital-acquired infections, and (xi) microbes in food production and industry.

There is an optional 2-credit hour lab associated with the course (Biology 370L-Introduction to Microbiology Laboratory).

Texts:
• Slonczewski, J.L. and J.W. Foster. *Microbiology: An Evolving Science*. (NOTE: We will not cover the whole book and you can purchase the assigned chapters on line.)

There will be two exams and a cumulative final examination. Examination scores for the semester will be calculated in two ways: (i) with all three examinations given equal weight, and (ii) with the cumulative final examination given double weight. Grades will be based on the higher relative score of this calculation.

While this is primarily a lecture course, occasional scheduled classes will be devoted to the discussion of the material. For these Discussion Sections, the class will be divided into smaller groups. There will also be occasional voluntary sessions devoted to specific topics. Examinations and review sessions will be given at scheduled times in the evening.

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

Prerequisites: Biology 142 and Biology 142L.

BIOLOGY 370L* (LC1 and LD1): Laboratory in Microbiology (2 credit hours)
Campbell (LC1), W, 2:30-5:30, MAX: 24 1462 Clifton Road, Room 117
Campbell (LD1), Th, 2:30-5:30, MAX: 24, 1462 Clifton Road, Room 117

This 2-credit hour laboratory course 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.

Text: None.

Students will be graded on the basis of their performance in the lab, on quizzes that will be administered throughout the term, and on a major, peer reviewed article of their analysis of the organisms they isolate that will be due at the end of the term. Biology 370, taken previously or concurrently, is also required.
This course may be taken for elective credit and will fulfill the upper level laboratory requirement for the Biology major.

Prerequisites: Biology 142 and Biology 142L; Pre- or corequisite: Biology 370.

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**BIOLOGY 371 (000): Ecology of the Tropics (2 credit hours)**
Wilson, Lawrence, Tu, 2:30-4:30, MAX: 12, 1462 Clifton Road, Room 100C (2 Credit Hours)

(Same as ENVS 371 (000); MAX: 12)

This course is SHARED by the Biology and Environmental Science (ENVS) Departments.

This 2-credit hour lecture course will explore the diverse biomes of the tropics. Focus will be on tropical forests and grasslands with an emphasis on ecological processes, biodiversity, human impact on the tropics, indigenous people, and ethnobotany.

Text: A variety of published papers and selected readings from books will be utilized.

Grading is based on class participation, short written assignments, and a final exam.

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

Prerequisites: Biology 142 and Biology 142L (for Biology 371).

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**BIOLOGY 372 (00P): Ecology of the Tropics - Field Course (2 credit hours)**
Wilson, Lawrence, March 3-12, 2017 (Amazon Rain Forest, Peru), MAX: 6 (2 Credit Hours)

(Same as ENVS 372 (00P); MAX: 6)

NOTE: This course is part of the Emory College Study Abroad Program (formerly CIPA).

This 2 credit hour course is SHARED by the Biology and Environmental Science (ENVS) Departments.

This is the field course to accompany the lecture course on tropical ecology (BIOL 371 / ENVS 371) and will take place during Spring Break (March 3-12, 2017). The field class is taught in the Amazon Rainforest of Peru. The upper Amazon basin is home to the greatest expression of life (biodiversity) on the entire planet.


Students who completed BIOL 371/ENVS 371 in Spring 2016 or are enrolled in the Spring 2017 semester are eligible for this course, however, students who have already completed Biology 371 have priority for the class, along with seniors enrolled in Spring 2017. Eligible students will need to pick up a packet from Barbara Shannon in the Biology Department (room 206, O. Wayne Rollins Research Center) before or during preregistration. The registration form and deposit for the field trip ($1400--payable by personal or cashiers check or by money order--payable to Emory College Study Abroad) are due to Barbara Shannon by November 3rd, 2016. Estimated total cost is $3000. The remaining balance will be due to Emory College Study Abroad not later than January 13th, 2017. Grading for the course is based on a field journal and a field project.

This course may be taken for elective credit and will fulfill the upper-level lab requirement for the biology major.

Prerequisites: Biology 142 and Biology 142L; Pre- or corequisite: Biology 371/ENVS 371 (for Biology 371). Permission of instructor is required (see above paragraph).

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**BIOLOGY 430 (000): Human Genome Project & Disease**
Yokoyama, Tu Th, 10:00-11:15, MAX: 25, 1462 Clifton Road, Room 101

In 1980, it was proposed to construct a genetic linkage map of the human genome. Since then, the nucleotide sequence of the entire genome has been almost completely characterized. This course examines the historical background and process of completion of the human genome project. We will then not only study how the linkage map and massive DNA sequence can be used in identifying the genes that cause various human diseases, but also how these diseases are maintained in human populations.

**Text:** None.

The course will have lectures, student presentations of original literature, and class discussions. All students are expected to read roughly one original paper every 2-3 weeks. Grades will be based on presentations and class participation.

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

**Prerequisites:** Biology 142, Biology 142L, and an interest in quantitative methods.

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**BIOLOGY 450 (00P): Computational Neuroscience**
Jaeger, Tu Th, 3:30-5:30, MAX: 10, 1462 Clifton Road, Room 109

(This course is also taught as IBS 534; MAX: 10)

**Permission of instructor is required.** Please contact Dr. Dieter Jaeger at djaeager@emory.edu for permission. Permission will depend on demonstrating basic computer programming skills, such as writing a for loop or an if statement.

Exploration of single neurons and biological neural networks with computer simulations. Each class consists of an introductory lecture followed by a computer lab using neural simulation software and Matlab. Specific topics include passive cable theory, compartmental modeling, Hodgkin-Huxley channel modeling, synaptic conductance modeling, motor pattern generation, and cortical networks.

**Text:** Bower, James M. and David Beeman. *The Book of GENESIS.* (Free on-line at www.genesis-sim.org.)

Grades will be determined through homework exercises and class participation.

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

**Prerequisites:** Biology 360/NBB 301 or IBS 514 or equivalent. Basic programming skills are also required.

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**BIOLOGY 475 (000): Biology of the Eye**
Iuvone / Nickerson / Boatright (Emory Eye Center/Ophthalmology), MWF, 10:00-10:50, MAX: 45, Emory Clinic B, Calhoun Auditorium

(This course is also taught as IBS 548; MAX: 15)

A course designed for seniors and graduate students interested in understanding the eye. This course presents basic principles and advanced information on ocular anatomy, embryology, biochemistry, physiology, molecular biology and genetics, immunology, microbiology, pathology, and treatment.

**Text:** No textbook *per se*; a course outline will be used for each lecture.
The course will have three didactic lectures with discussion per week. Grades are determined by two mid-term examinations and one final examination. Graduate level work additionally includes a "journal club" with student presentations and audience participation.

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

**Prerequisites:** Biology 142 and Biology 142L. Senior status required.

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**BIOLOGY 485 (000): Special Topics in Biology: Behavioral Ecology--A Quantitative Approach**

*Arbilly, Tu Th, 1:00-2:15, MAX: 20, 1462 Clifton Road, Room 109*

This course will examine how behavior evolves in relation to animals' ecology, focusing on theoretical models as a tool in answering this question. Drawing from fields such as economics and game theory, behavioral ecology as a discipline relies heavily on theoretical modeling to explain the behaviors we see in nature. Why is there altruism in nature? Why do some species use elaborate, risky displays to win mates? How do animals choose between food sources, and why do they sometimes join the crowd and sometimes choose to avoid it? We will cover key topics in Behavioral Ecology to see how observations and experiments are put into simple mathematical models, and how the predictions of these models are later tested through carefully designed experiments and analyses.


The course is lecture-based, with student presentations in the last four classes. Grades will be determined based on these presentations, two midterms, and a final exam.

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

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

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**BIOLOGY 495A* / 495B* (00P): Honors Research**

*Eisen*

(GER Tag: WRT (Biol 495B))

This is a 2-semester Honors Program for Biology majors. Declared Senior biology majors who have a 3.5 or higher g.p.a. (in the biology major AND in their overall coursework) at the end of their junior year are eligible to participate in the Biology Department Honors Program during their senior year. An information meeting will be held at the beginning of the semester for students in the Honors Program. Applications will be due to Dr. Eisen prior to the meeting.

Senior biology honors students should take Biology 495A in the Fall semester and 495B in the Spring semester. Those graduating in the Fall semester should take 495B in the Fall. (NOTE: Second semester juniors who will graduate in a Fall semester must register for the Honors Program the prior Fall semester. You cannot register for Honors (Biology 495A) in the Spring semester.) For more information, please visit the Biology Honors Program website.

Permission of instructor is required for both Biology 495A and 495B. A maximum of 4 elective credits and upper-level lab credit may be used to satisfy the requirements toward the Biology major after completion of the second semester. Biology 495B (second semester) will also fulfill a writing requirement for the GERs. Contact Tonya Davis at tonya.davis@emory.edu to obtain a permission number.

**Prerequisites:** Biology 142 and Biology 142L, and a 3.5 or higher g.p.a. in the Biology major and overall.
BIOLOGY 497R (00P-12P): Supervised Reading  
*Individual Faculty*

*(Permission of Tonya Woolcock, Room 2006, Rollins Research Center, required.)*

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 in advance of registration.

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

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

Contact Tonya Woolcock at tdavis6@emory.edu to request a permission number.

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

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BIOLOGY 499R (00P): Undergraduate Research  
*Individual Faculty*

*(Permission of Dr. Rachelle Spell required (rachelle.spell@emory.edu).)*

**Assessment:** Research participation open to sophomores, juniors, and seniors, by permission only. The student must find a faculty member to supervise the research and **SUBMIT AN APPLICATION FORM TO DR. RACHELLE SPELL, DIRECTOR OF UNDERGRADUATE RESEARCH, PRIOR TO REGISTRATION.** ONCE THE APPLICATION HAS BEEN APPROVED, THE STUDENT MUST THEN REGISTER THROUGH NORMAL PROCEDURES. The application form and other detailed information regarding Biology 499R requirements can be obtained from the Undergraduate Research Opportunities page of the Biology Department website. Students will be required to enroll in **4 credit hours for both semesters**, however, a maximum of 4 elective credits may be used to satisfy the requirements toward a Biology major after completion of the second semester. This course will also fulfill the upper level lab requirement for the Biology major after completion of the second semester.

**Prerequisites:** Biology 142. Biology 142L, a second semester Freshman (or higher) standing, **AND a declared major in Biology.**