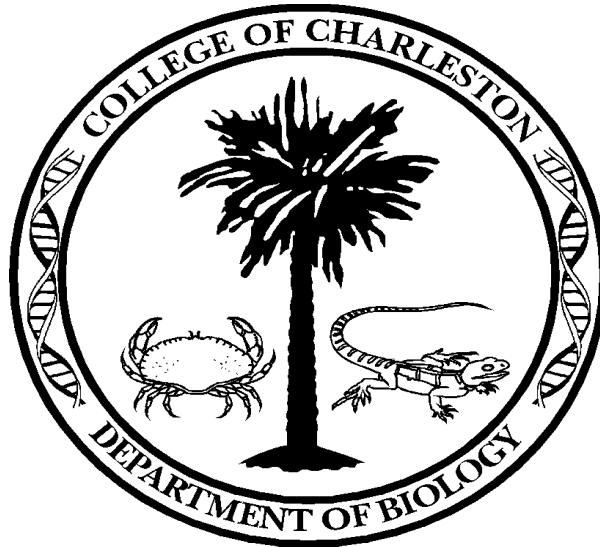


# College of Charleston Department of Biology



## Handbook for BIOLOGY & MARINE BIOLOGY MAJORS

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Dr. Jaap Hillenius, Department Chair

Updated 4/20/09

**DEPARTMENT OF BIOLOGY  
HANDBOOK for MAJORS**

**TABLE OF CONTENTS**

<b><u>CONTENTS</u></b>	<b><u>PAGE(S)</u></b>
Department of Biology Faculty/Staff Listing	3
General Information about the Department	4
Faculty Research Interests	5-7
Description of Courses	8-17
Degree Requirements	18-21
General Schedule	22
Guide for Completion of Graduation Requirements	23
Information for Graduate and Professional Education	
Graduate School	23
Pre-Professional School	23
Pre-Nursing & Allied Health	24
Employment	24
Guidelines for Requesting Letters of Recommendation from Faculty	25
Guidelines for Undergraduate Independent Studies	25
Biology Club, Alpha Epsilon Delta, Biology Computer Lab	25

# **DEPARTMENT OF BIOLOGY FACULTY/STAFF LISTING**

## **PROFESSORS**

Louis E. Burnett, Jr., Giacomo R. DiTullio, Phillip Dustan, Jaap Hillenius,  
David W. Owens, Paul A. Sandifer, Craig J. Plante, Brian G. Scholtens

## **ASSOCIATE PROFESSORS**

Agnes J. Ayme-Southgate, Isaure de Buron, Robert T. Dillon, Jr.,  
Antony Harold, Melissa Hughes, Christopher Korey, Mark D. Lazzaro,  
Elizabeth Meyer-Bernstein, Seth Pritchard, Gorka Sancho, Allan Strand, D. Reid Wiseman

## **ASSISTANT PROFESSORS**

Christine A. Byrum, Eric J. McElroy, Susan J. Morrison, Courtney Murren,  
Robert D. Podolosky, Matthew T. Rutter, Erik Sotka,  
Jeffrey D. Tribblehorn,  
Allison M. Welch, Anastasia Zimmerman,

## **SENIOR INSTRUCTORS**

Stephanie Dellis, Jean B. Everett,  
John S. Peters, Peyre G. Pringle

## **INSTRUCTOR**

Deborah Bidwell

## **LECTURER**

Dorian R. McMillan

## **BUSINESS MANAGER**

Kristen D. Wright

## **OFFICE MANAGER**

Debbie K. Robertson

## **ADMINISTRATIVE SPECIALISTS**

Saneva Ody  
Michelle Brew - Grice Marine Lab  
Peter Meier – Grice Marine Lab

## **LABORATORY MANAGERS**

Dorian R. McMillan  
Sarah Prior- Grice Marine Lab  
Tricia D. Roth – Molecular Core Facility

## **REPAIR TECHNICIAN**

Don Barrett

Please keep this handbook for reference throughout your career at the College of Charleston. Requirements may change in the future, but you will only be responsible for those in effect at the time of your entrance - either as a freshman, as a transfer student, or as a returning student (if you leave the College for one or more semesters without a leave of absence).

In this **unofficial** publication, efforts have been made to be as accurate as possible. Requirements and courses are officially listed in the College of Charleston Undergraduate Catalog. This catalog should be consulted for further clarifying information.

## GENERAL INFORMATION

Biology is of fundamental importance in a liberal arts education because it provides the student with a keener insight into a deeper education of the many facts of living systems. For the non-science major, biology often serves as the only introduction to science and methods employed in scientific endeavors. For both majors and non-majors alike, a study of biology may provide life-long vocational interests. Those who major in biology are provided with a broad background into the science of life.

The Department of Biology's thirty-three (33) faculty members hold doctoral degrees and have collective expertise in virtually all areas of modern biology. Teaching and counseling students are the **first** priority for the College of Charleston faculty. In addition to this, the faculty are involved in research in such areas as plant and animal molecular biology, nematode worm reproduction, insect biology, fish and invertebrate ecology, molluscan genetics, satellite imaging of oceans, coral reef ecology, marine invertebrate physiology, developmental biology of fishes and invertebrates and its genetic regulation, taxonomy of marine algae, interactions between physical oceanographic phenomena and marine organisms, effects of habitat fragmentation on plant ecology, marine sediment-animal interactions, vertebrate functional morphology and locomotory biology, and evolutionary relationships and biogeography of fishes and invertebrates. The diversity of these research interests translates into a diversity of information available to College of Charleston students.

The Department of Biology offers **(1)** a Bachelor of Science (B.S.) degree in Biology, **(2)** a Bachelor of Science (B.S.) degree in Marine Biology, **(3)** a Bachelor of Science (B.S.) degree in Biology with an emphasis in Molecular Biology, **(4)** A Bachelor of Science (B.S.) degree in Biology, Teaching option, and **(5)** a Bachelor of Arts (B.A.) degree in Biology. A Master of Science (M. Sc.) degree in Marine Biology and a Master of Science (M. Sc.) degree in Environmental Studies are also offered as a part of a graduate curriculum. A biology degree is not only valuable for advanced studies but also provides a background for the pursuit of a variety of careers - teaching, marine biology, medical and biological research, allied health services, fisheries biology, forestry, wildlife biology, horticulture, sales, industrial quality control, pollution control, museum work, and land-use planning. An Environmental Studies Minor and a Neuroscience Minor are available for those students wishing to enhance their bachelor's degrees

Note: A student who fulfills the requirement for a B.S. in Marine Biology and declares a major in such may not also simultaneously declare and hold a major for the B.S. in Biology. Likewise, a student who declares a major for the B.S. in Biology or the B.S. in Marine Biology may not simultaneously declare and hold a major for the B.A. in Biology. All exceptions must be approved by the Department Chair.

The Department of Biology has extensive facilities in the Rita Hollings Science Center (downtown Charleston), the Grice Marine Laboratory (GML) at Fort Johnson, and various other facilities in downtown Charleston. **Undergraduate courses are taught at all locations.** The Science Center's facilities include the department office, 9 teaching laboratories for upper division biology courses, faculty offices and research labs, a student computer room, and shared instrumentation rooms. The four labs for introductory biology majors and non-majors are in the Lightsey Center (downtown). Facilities at the Grice Marine Laboratory include two classrooms, two large teaching laboratories, aquarium and collection rooms, graduate student dormitory space, and smaller laboratories for research. Several library facilities are located in the Charleston area. They include the Addlestone Library at the College of Charleston, the Medical University of South Carolina Library, and the Marine Resources Research Institute Library at Fort Johnson, The Citadel Library, and the Charleston County Public libraries.

## **DEPARTMENT OF BIOLOGY FACULTY RESEARCH INTERESTS**

**Agnes J. Ayme-Southgate, Ph.D.** (University of Geneva - Geneva, Switzerland)

Genomics and molecular analysis of insect muscle proteins. Protein structure-function relationship and biophysical modeling. Application and significance for development, flight physiology and evolution.

**Deborah Bidwell, MSc.** (University of New Hampshire)

Marine finfish aquaculture. Flounder and cod larval rearing techniques. Current interests focus on undergraduate science education, inquiry based learning, writing across the curriculum, and residential learning communities.

**Louis E. Burnett, Jr., Ph.D.** (University of South Carolina)

Comparative physiology of respiration, ion and acid-base regulation in marine organisms; physiology of respiratory pigments; physiological adaptations associated with the transition from breathing water to breathing air; environmental physiology of disease mechanisms.

**Isaure de Buron, Ph.D.** (Université Montpellier - France)

Host-parasite interactions at the cellular and molecular levels in aquatic and avian systems focusing on factors affecting transmission and survival of parasites in their hosts. Current systems of study include an isopod/acanthocephalan model, parasites from local fish, and helminths from deep-sea hydrothermal vent fish.

**Christine A. Byrum, Ph.D.** (University of Texas at Austin)

Molecular developmental biology and genomics: Cell signaling pathways and gene expression in development, especially in sea urchins and sea anemones.

**Stephanie Dellis, Ph.D.** (University of Wisconsin)

Protein: DNA interactions. Regulation of DNA replication and gene expression.

**Robert T. Dillon, Jr., Ph.D.** (University of Pennsylvania)

Genetics, especially of mollusks; population biology, ecology, and evolution of freshwater snails; aquaculture genetics of marine bivalves.

**Giacomo R. DiTullio, Ph.D.** (University of Hawaii)

Marine phytoplankton ecology: how marine microorganisms can influence the biogeochemical cycling of carbon, nitrogen, and sulfur.

**Phillip Dustan, Ph.D.** (State University of New York at Stony Brook)

Ecology of estuarine fronts and the distribution of primary productivity in river, estuarine and coastal waters. Remote sensing and photoecology of coral reefs and phytoplankton in communities. Ecology and vitality of Caribbean reef-building corals.

**Jean B. Everett, Ph.D.** (North Carolina State University)

Forest ecology and botany.

**Antony S. Harold, Ph.D.** (Memorial University of Newfoundland - Canada)

Phylogenetic and biogeographic research on marine fishes, especially gobies and deep-sea stomiforms.

**Willem J. Hillenius, Ph.D.** (Oregon State University)

Vertebrate morphology and paleobiology.

**Melissa Hughes, Ph.D.** (Duke University)

Communication, sexual selection, mating behavior and aggression in animals, including studies of visual and acoustic signals in birds and visual and chemical signals in crustaceans. In particular, the relationship between form and function in signals, and the function and evolution of multi-modal communication.

**Christopher Korey, Ph.D.** (Harvard University)

The role of palmitoylation in *Drosophila*: towards a molecular understanding of infantile neuronal ceroid lipofuscinosis.

**Mark D. Lazzaro, Ph.D.** (University of California at Riverside)

Investigating the structure and function of the microfilament and microtubule cytoskeleton in conifer pollination, sperm development, and pollen tube elongation using *Picea abies* (Norway Spruce) as a model system.

**Eric McElroy, Ph.D.** (Ohio University)

Evolution of animal performance. Comparative and evolutionary studies of locomotor mechanics, function, morphology, and physiology. Functional basis of animal behavior

**Elizabeth Meyer-Bernstein, Ph.D.** (State University of New York - Stony Brook)

Neurophysiology of circadian rhythms in *Drosophila* and mammals. In particular, molecular mechanisms underlying the regulation of circadian behavior and retinal physiology.

**Susan J. Morrison, Ph.D.** (Florida State University)

Estuarine and marine microbiology; sanitary microbiology distribution and survival of pathogenic bacteria in estuarine movements.

**Courtney Murren, Ph.D.** (University of Connecticut)

Ecological genetics of invasive plant species - particularly the roles of phenotypic plasticity, mating system, herbivory, and pollination on colonization success. Other research interests: the evolution of complex phenotypes, orchid reproductive ecology, effects of forest fragmentation on small population persistence.

**David W. Owens, Ph.D.** (University of Arizona)

Reproductive endocrinology, chemoreception and physiological ecology of marine turtles.

**John S. Peters, Ph.D.** (University of Northern Colorado)

Science Education: The effect of student-directed inquiry and problem-based pedagogies on college and pre-college students' Science-Technology-Society literacy. Fisheries Biology: Early life history of fish. Other Duties at the College of Charleston: Director, Supplemental Instruction Program for the Natural Sciences.

**Craig J. Plante, Ph.D.** (University of Washington)

Microbial ecology, marine benthic ecology, and the influence of animal-microbe interactions on biogeo-chemical processes in sediments. Director of the Marine Biology Graduate Program.

**Robert D. Podolsky, Ph.D.** (University of Washington)

Functional biology and evolutionary ecology of marine invertebrates, larval ecology and life-history evolution, fertilization ecology, physiological ecology, phenotypic plasticity.

**Peyre G. Pringle, M.D.** (Medical University of South Carolina)

Human anatomy.

**Seth G. Pritchard, Ph.D.** (Auburn University)

Plant physiological ecology: physiological responses of plants to ongoing global environmental changes including rising atmospheric carbon dioxide and ozone concentrations, warming, and soil salinization; implications for ecosystem function and food production.

**Gorka Sancho, Ph.D.** (Massachusetts Institute of Technology)  
Behavioral ecology of fishes.

**Brian G. Scholtens, Ph.D.** (University of Michigan)  
Plant-insect interactions and the faunistics and systematics of the Lepidoptera. Research locales include the Upper Great Lakes Region in Michigan and Great Smoky Mountains National Park.

**Erik Sotka, Ph.D.** (University of North Carolina Chapel Hill)  
Ecology and evolution of marine biotic interactions, larval dispersal, phylogeography, molecular ecology, chemical ecology.

**Allan E. Strand, Ph.D.** (New Mexico State University)  
The use of genealogies of alleles to understand how perennial life history and mating systems affect evolutionary rates in plant populations.

**Jeffrey D. Tribblehorn, Ph.D.** (University of Maryland, College Park.)  
Sensory neurobiology and the neural control of behavior within the neuroethological context of predator-prey interactions; neurophysiological and behavioral studies primarily involving invertebrates.

**Allison M. Welch, Ph. D.** (University of Missouri)  
Evolutionary and behavioral ecology of amphibians; sexual selection and the evolution of courtship displays and mating preferences; genetic and environmental sources of variation in life history traits; genetic variation in tolerance to environmental stressors

**D. Reid Wiseman, Ph.D.** (Duke University)  
Systematics and ecology of marine algae.

**Anastasia Zimmerman, Ph.D.** (Washington State University)  
Molecular evolution of the vertebrate immune system. Genome-wide analyses of innate and adaptive immune loci in fishes. Use of the zebrafish as an immunological model system.

## DESCRIPTIONS OF BIOLOGY COURSES

### **101 ELEMENTS OF BIOLOGY (3) F & S**

A course for non-science majors on living systems with an emphasis on the concepts of structure and function at the molecular and cellular levels. Topics include biochemistry, cell structure and function, respiration, photosynthesis, genetics, and molecular biology. Provides a background to understanding and evaluating critically issues facing society. Topics are considered in relation to technology, societal issues, and the history and limits of science. Lectures - 3 hours per week.

**Corequisite:** Biology 101L

### **101L ELEMENTS OF BIOLOGY LABORATORY (1) F & S**

A laboratory course to accompany Biology 101. Laboratory - 3 hours per week.

**Corequisite:** Biology 101

### **102 ELEMENTS OF BIOLOGY (3) F & S**

A course for non-science majors on living systems with an emphasis on evolution, ecology, and the structure and functions of the major groups of organisms. Provides a background to understanding and evaluating critically issues facing society. Topics are considered in relation to technology, societal issues, and the history and limits of science. Lectures - 3 hours per week.

**Prerequisite:** Biology 101/101L

**Corequisite:** Biology 102L

### **102L ELEMENTS OF BIOLOGY LABORATORY (1) F & S**

A laboratory course to accompany Biology 102. Laboratory - 3 hours per week.

**Corequisite:** Biology 102

### **111 INTRODUCTION TO CELL & MOLECULAR BIOLOGY (3) F & S**

A foundation course for science majors emphasizing the concept of structure and function of biological systems at the molecular and cellular levels. Topics include biochemistry, biochemical and molecular evolution, cell function, respiration, photosynthesis, genetics, and molecular biology. Lectures - 3 hours per week.

**Corequisite:** Biology 111L

### **111L INTRODUCTION TO CELL & MOLECULAR BIOLOGY LABORATORY (1) F & S**

A laboratory course to accompany Biology 111. Laboratory - 3 hours per week.

**Corequisite:** Biology 111

### **112 EVOLUTION, FORM AND FUNCTION OF ORGANISMS (3) F & S**

A foundation course for science majors providing an introduction to evolution and a study of the major groups of organisms with an emphasis on their structure, form and function. Lectures - 3 hours per week.

**Prerequisite:** Biology 111/111L

**Corequisite:** Biology 112L

### **112L EVOLUTION, FORM AND FUNCTION OF ORGANISMS (1) F & S**

A laboratory course to accompany Biology 112. Laboratory - 3 hours per week.

**Prerequisite:** Biology 111/111L

**Corequisite:** Biology 112

Notes: Biol 111, 111L, 112, 112L are prerequisites for all upper-division biology courses except for Biol 204 and Biol 209, which have no prerequisites. Students who have completed Biol 101, 102, 101L, 102L and who wish to take upper-division biology courses may do so only with permission of the department. Students may not receive credit for both Biol 101 and 111, or for both Biol 102 and 112, or for both Biol 111 and 112 and Honors Biology. Biol 211 and 211D are prerequisites, and Biol 305 is a pre- or corequisite for all 300-, 400-, and 500-level courses.

**201 HUMAN PHYSIOLOGY (4) F & S**

An introduction to the structure and function of the major organ systems of the human body. This course is specifically intended for pre-allied health, physical education, and pre-nursing majors. Lectures - 3 hours per week; laboratory - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L or equivalents

**202 HUMAN ANATOMY (4) F & S**

An introduction to the gross morphology and microscopic anatomy of the major organ systems of the human body. This course is specifically intended for pre-allied health, physical education, and pre-nursing majors. Lectures - 3 hours per week; laboratory - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L or equivalents

**204 MAN AND THE ENVIRONMENT (3)**

A study of the interdependence of man and his environment. Emphasis will be on man's place in nature, man-modified habitats, pollution and environmental protection. **Note:** Students may apply this course toward the Minimum Degree Requirements in natural science; however, they may also take laboratory courses. Lectures - 3 hours per week.

**209 MARINE BIOLOGY (4) SUMMER**

An introduction to the study of marine organisms and their environment. Lectures - 3 hours per week; laboratory - 3 hours per week.

**211 BIODIVERSITY, ECOLOGY & CONSERVATION BIOLOGY OF ORGANISMS (4) F & S**

A foundation course for intermediate-level biology majors. Students will explore synthetic biological concepts, including evolution, population-community-ecosystem ecology, behavior, biodiversity and conservation.

**Prerequisites:** BIOL 111/111L, BIOL 112/112L

**Corequisite:** BIOL 211D (corresponding section, i.e. BIOL 211.001 and BIOL 211.D01)

**211D BIODIVERSITY, ECOLOGY & CONSERVATION BIOLOGY OF ORGANISMS (1) F & S**

A one (1) hour recitation section to accompany BIOL 211. Students will be required to read, discuss, and critique scientific literature (both popular and primary) related to these topics.

**Prerequisites:** BIOL 111/111L, BIOL 112/112L

**Corequisite:** BIOL 211 (corresponding section, i.e. BIOL 211.001 and BIOL 211.D01)

**250 SPECIAL TOPICS IN BIOLOGY (1-4)**

Lectures and discussions on selected topics of biological interest.

**Prerequisites:** One year of biology or permission of the instructor

**300 BOTANY (4)**

Gross morphology, life history, taxonomy, and evolution of representative algae, fungi, bryophytes, and vascular plants. Lectures - 3 hours per week; laboratory - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L, 211/211D,  
**Co or prerequisite:** Biology 305

**301 PLANT TAXONOMY (4)**

The collection, identification and classification of vascular plants with special emphasis on local flora. The student will have practice in the use of keys and herbarium techniques. Lectures - 3 hours per week; laboratory - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L, 211/211D,  
**Co or prerequisite:** Biology 305

**302 PLANT ANATOMY (4)**

A comparative study of the anatomy of representative vascular plants relating the anatomical features to functions and evolution. The laboratory will include an introduction to the techniques of plant histology and wood anatomy. Lectures - 3 hours per week; laboratory - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L, 211/211D,  
**Co- or prerequisite:** Biology 305

**303 PHYCOLOGY (4)**

A survey of the algae from the ultraplankton to the kelps. The laboratory experience will involve extensive field collecting and identification, preparations of herbarium materials, and culturing for life-history studies. Lectures - 3 hours per week; laboratory - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L, 211/211D,  
**Co- or prerequisite:** Biology 305

**304 PLANT PHYSIOLOGY (4)**

A study of plant function. Topics will include metabolism, hormones, mineral nutrition, transpiration, translocation, and flowering. Lectures - 3 hours per week; laboratory - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L, 211/211D, **and** one year of Chemistry  
**Co- or prerequisite:** Biology 305

**305 GENETICS (3)**

The basics of the science of heredity. The course encompasses Mendelian genetics, the molecular basis of inheritance, changes in chromosome number and structure, gene mapping, mutations and population genetics. Population and quantitative genetic approaches are applied to clarify the understanding of evolution.

**Prerequisites:** BIOL 111/111L, BIOL 112/112L.

**305L GENETICS LABORATORY (1)**

An introduction to the principles of heredity using common experimental organisms. Recent techniques in molecular genetics are also covered. Laboratory 3 hours per week.

**Prerequisites:** BIOL 111/111L, BIOL 112/112L.  
**Co- or prerequisite:** BIOL 305

**310 GENERAL MICROBIOLOGY (4)**

An introduction to the microbial world with a special emphasis on bacteria. Topics include cellular structures,

bacterial metabolism, virology, microbial genetics, bacterial growth and its control, and the epidemiology and pathogenicity of disease-producing microorganisms. The laboratory emphasizes proper handling techniques, identification methods, and properties of microorganisms. Lectures - 3 hours per week; laboratory - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L, and 211/211D **and** one year of chemistry.

**Co- or Prerequisite:** BIOL 305

CHEM 232 can be substituted for BIOL 211/211D and 305.

**312 MOLECULAR BIOLOGY (3)**

An in-depth study of important cellular macromolecules and the techniques used in their analysis, gene structure, and regulation. Special topics include discussions of molecular immunology, mobile genetic elements, virology, and the biology of cancer. Lectures - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L, 211/211D, 305 **and** one year of chemistry.

CHEM 232 can be substituted for BIOL 211 and 305.

**312L MOLECULAR BIOLOGY LABORATORY (1)**

A comprehensive study of the techniques used in the isolation and analysis of important cellular macromolecules. Techniques covered will include electrophoresis of proteins and nucleic acids, southern and western blotting, liquid chromatography and those involved in the formation and analysis of recombinant molecules. Laboratory three hours per week.

**Co- or Prerequisite:** BIOL 312

**313 CELL BIOLOGY (3)**

A study of the structural and functional correlates in cell biology. Topics include membrane specialization, cytoskeleton, structure and function of cellular organelles, adhesion, motility, mitotic mechanisms, transport mechanisms, immunology, and energetics. Lectures - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L, and 211/211D **and** one year of chemistry.

**Co- or Prerequisite:** BIOL 305

CHEM 232 can be substituted for BIOL 211 and 305.

**313L CELL BIOLOGY LABORATORY (1)**

The laboratory exercises introduce the student to some of the modern methods used to study cell function.

**Co- or Prerequisite:** BIOL 313

**314 IMMUNOLOGY (3)**

A comprehensive study of the cellular and molecular aspects of the immune response. Subjects covered will include antibody structure and function, immunogenetics, the biology of cell-mediated responses, autoimmunity, immunodeficiencies, and the evolution of the immune system.

**Prerequisites:** Biology 111/111L, 112/112L, 211/211D, 305 **and** one year of chemistry

**320 HISTOLOGY (4)**

A detailed study of the microscopic structure of mammalian tissues and organs. Lectures - 3 hours per week; laboratory - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L, and 211/211D

**Co- or Prerequisite:** BIOL 305

- 321 GENERAL & COMPARATIVE PHYSIOLOGY (4)**  
 A study of the principles of the functional mechanisms that underlie the life processes of all organisms with the emphasis on the ways in which diverse organisms perform similar functions. Lectures - 3 hours per week; laboratory - 3 hours per week.  
  
**Prerequisites:** Biology 111/111L, 112/112L, 211/211D, 305 **and** one year of chemistry. CHEM 232 can be substituted for BIOL 211 and 305.
- 322 DEVELOPMENTAL BIOLOGY (4)**  
 Lecture surveys the different stages of development from fertilization to organogenesis in both invertebrate and vertebrate model systems. Lecture covers both the descriptive nature of embryonic development, as well as the conserved molecular and cellular patterns. The laboratory covers some techniques of developmental biology, as well as histology slides of embryonic development, and research paper discussion. Lectures - 3 hours per week; laboratory - 3 hours per week.  
**Prerequisites:** Biology 111/111L, 112/112L, 211/211D, and 305
- 323 COMPARATIVE ANATOMY OF VERTEBRATES (4)**  
 Lectures on the functional morphology and phylogeny of vertebrate organ systems and laboratory dissection of shark and cat. Lectures - 3 hours per week; laboratory - 4 hours per week.  
  
**Prerequisites:** Biology 111/111L, 112/112L, and 211/211D  
**Co- or Prerequisite:** BIOL 305
- 332 VERTEBRATE ZOOLOGY (4)**  
 Life histories, adaptations, ecology, and classifications of vertebrate animals. Laboratory work emphasizes living material from the local fauna. Lectures - 3 hours per week; laboratory - 3 hours per week.  
  
**Prerequisites:** Biology 111/111L, 112/112L, 211/211D, ~~305~~  
**Co- or Prerequisite:** BIOL 305
- 333 ORNITHOLOGY (4)**  
 An introduction to the biology of birds. Laboratory work will emphasize the identification, classification, behavior, and ecology of local species. Lectures - 2 hours per week; laboratory - 4 hours per week.  
  
**Prerequisites:** Biology 111/111L, 112/112L, and 211/211D  
**Co- or Prerequisite:** BIOL 305
- 334 HERPETOLOGY (4)**  
 An introduction to the biology of amphibians and reptiles. The laboratory will emphasize the identification, classification, behavior and ecology of local species. Lectures - 3 hours per week; laboratory - 3 hours per week.  
  
**Prerequisites:** Biology 111/111L, 112/112L, and 211/211D  
**Co- or Prerequisite:** BIOL 305
- 335 BIOLOGY OF FISHES (4)**  
 A brief survey of gross morphology with emphasis on the structures used in identification and more detailed considerations of some aspects of physiology, ecology, life histories, and behavior. **Instruction is held at the Grice Marine Laboratory.** Lectures - 3 hours per week; laboratory - 3 hours per week.  
  
**Prerequisites:** Biology 111/111L, 112/112L, and 211/211D  
**Co- or Prerequisite:** BIOL 305
- 336 PARASITOLOGY (4)**

Morphology, physiology, epidemiology, ecology, and life cycles of parasites of vertebrates and invertebrates. Laboratory work will center on living and preserved material and will include methods of fecal, blood, histological, and serodiagnostic examinations. Lectures - 3 hours per week; laboratory - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L, 211/211D, 305

**337 BIOLOGY OF INVERTEBRATES (4)**

Classification, morphology, physiology, and live histories of invertebrates. Laboratory work will emphasize the study of living material from the local fauna. Lectures - 3 hours per week; laboratory - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L, and 211/211D

**Co- or Prerequisite:** BIOL 305

**338 ENTOMOLOGY (4)**

A course designed to introduce students to the diversity of insects and their lifestyles. Lectures include taxonomic topics covering the orders and major families, structure and function, basic physiology, ecology, and the interaction of insects with humans. Laboratory work concentrates on collecting insects in the field and doing short field trips accompanied by identification in the lab. Lectures - 3 hours per week; laboratory - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L, and 211/211D

**Co- or Prerequisite:** BIOL 305

**339 DINOSAUR BIOLOGY (3) Maymester**

A course designed to examine the paleobiology, paleoecology, evolution, and extinction of dinosaurs and their Mesozoic contemporaries through a variety of approaches. Emphasis is placed on the fossil evidence and the methods used in reconstructing the lives of these animals, once the most successful of all land vertebrates. Lectures - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L, and 211/211D

**Co- or Prerequisite:** BIOL 305

**340 ZOOGEOGRAPHY (3)**

An introduction to the study of animal distribution patterns, their origins, and their significance for ecology and evolution. Lectures - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L, and 211/211D

**Co- or Prerequisite:** BIOL 305

**341 GENERAL ECOLOGY (4)**

Consideration of organisms and their environmental relationships. Lectures - 3 hours per week; laboratory - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L, and 211/211D

**Co- or Prerequisite:** BIOL 305

**342 OCEANOGRAPHY (4)**

An introduction to the study of the marine environment. Lecture and laboratory work will emphasize the interrelationships of physical, chemical, geological, and biological processes in the sea. **Instruction is held at the Grice Marine Laboratory.** Lectures - 3 hours per week; laboratory - 3 hours per week.

**Prerequisites:** Biology 111/111L, 112/112L, 211/211D and one year each of college mathematics and chemistry

**Co- or Prerequisite:** BIOL 305

- 343 ANIMAL BEHAVIOR (4)**  
 An introduction to the mechanisms and evolution in behavior of vertebrate and invertebrate animals. Lectures - 3 hours per week; laboratory - 3 hours per week.  
**Prerequisites:** Biology 111/111L, 112/112L, 211/211D, and 305
- 350 EVOLUTION (3)**  
 A study of the mechanisms and patterns of plant and animal evolution with an emphasis on the species level of organization. Lectures - 3 hours per week.  
**Prerequisites:** Biology 111/111L, 112/112L, 211/211D, and 305
- 351 PRINCIPLES OF NEUROBIOLOGY (3)**  
 A study of molecular and cellular aspects of the nervous system. This lecture course will focus on electrical and chemical properties of neurons. These topics will be considered in the context of neuroanatomy and neurological disease. Lectures - 3 hours per week.  
**Prerequisites:** Biology 111/111L, 112/112L, 211/211D and PSYC 103.
- 352 NEUROBIOLOGY AND BEHAVIOR (3) S**  
 A study of the basic neural mechanisms underlying complex behavior. This course focuses on functional neuroanatomy, sensory and motor systems, neural regulatory systems, and behavioral /cognitive neuroscience. Lectures - 3 hours per week.  
**Prerequisites:** BIOL/PSYC 351
- 360 INTRODUCTION TO BIOMETRY (3)**  
 Introduction to the basic statistical methods and their applications in the analysis of biological and physical data. Introduction to distribution, experimental design, testing of hypothesis, regression, correlation, analysis of variance, covariance, and factorial agreements. Lectures - 3 hours per week.  
**Prerequisites:** Biology 111/111L, 112/112L, 211/211D, **and** precalculus (Math 111) or equivalent or permission of instructor  
**Co- or Prerequisite:** BIOL 305
- 396 BIOPHYSICAL MODELING OF EXCITABLE CELLS (3)**  
 (cross listed as PHYS 296)  
 An introduction to the concepts and methods of computer modeling of excitable cells. Topics include basic electrophysiology of excitable cells, biophysics of ion conduction, mathematical modeling of activation/inactivation mechanisms using experimental data, and computer simulations.  
**Prerequisites:** BIOL 111/112 and PHYS 112/HONS 158 or BIOL 211/305 and PHYS 102/PHYS 112/HONS 158 or the permission of the instructor.
- 397 RESEARCH EXPERIENCE IN BIOLOGY (0, repeatable)**  
 A student works under faculty supervision to learn a research method, to explore possible research topics, or to continue an ongoing study. The faculty member helps the student to determine the course goals and objectives, and supervises the execution of the project. The student will provide a written report to the faculty at the end of the semester. Students will receive a grade of "S" (satisfactory) or "U" (unsatisfactory) for the course. *NOTE: Only majors may take a zero credit research course.*  
**Prerequisites:** Permission of the instructor and approval of the department chair.

- 399 TUTORIAL (1-3, repeatable up to 3),**  
Individual instruction given by a tutor in regularly scheduled meetings.
- Prerequisites:** BIOL 111/111L, 112/112L, 211/211D, and 305. GPA of at least 3.0 in Biology courses; junior standing plus permission of the tutor and the department chair.
- 406 CONSERVATION BIOLOGY (3) S**  
A course exploring the origin, maintenance and preservation of biodiversity at all levels: genetic, population, community, ecosystem and biosphere. The focus will be on applying ecological, genetic and evolutionary principles to problems in conservation. Optional field trips will make use of the rich biota of the Charleston area. Lectures - 3 hours per week.
- Prerequisites:** BIOL 111/111L, 112/112L, 211/211D, and 305. Biology 341 or permission of the instructor
- 410 APPLIED & ENVIRONMENTAL BIOLOGY (4)**  
A lecture and laboratory study of the special application of microbiology to domestic water and waste water, solid wastes, food and dairy products, agriculture, and industrial processes. Include microbial distribution and role in various marine freshwater, terrestrial, animal, atmospheric, and product environments. Lectures - 3 hours per week; laboratory - 3 hours per week.
- Prerequisites:** BIOL 111/111L, 112/112L, 211/211D; 310 and one year of chemistry.  
**Co- or Prerequisite:** BIOL 305.
- 411 MICROTECHNIQUE & CYTOCHEMISTRY (4)**  
A study of the history, theory, and application of microscopy and microscopy techniques applicable for the study of cells, tissues, and macro- and microorganisms. Lectures - 3 hours per week; laboratory - 3 hours per week.
- Prerequisites:** Biology 111/111L, 112/112L, 211/211D, **and** one year of chemistry  
**Co- or Prerequisite:** BIOL 305.
- 414 ENVIRONMENTAL IMMUNOLOGY (3)**  
This course, directed at graduate and advanced undergraduate students, addresses the role of the immune system in maintaining the health of the human and wildlife populations. Lectures and independent reading, followed by classroom discussion, build skills in critical analysis of current literature in immunotoxicology, clinical and comparative immunology.
- Prerequisites:** BIOL 111/111L, 112/112L, 211/211D, one year of chemistry;  
**Co-or Prerequisite:** BIOL305, 312 or BIOL313 or CHEM351 and permission of the instructor.
- 420 GENERAL & COMPARATIVE ENDOCRINOLOGY (4)**  
A study of the comparative anatomy and physiology of the ductless glands of invertebrate and vertebrate animals. Laboratory experiments are designed to demonstrate classical as well as modern approaches to the study of hormone actions. Lectures - 3 hours per week; laboratory - 3 hours per week.
- Prerequisites:** BIOL 111/111L, 112/112L, and 211/211D;  
**Co-requisite or prerequisite:** BIOL 305. A course in physiology or permission of the instructor.
- 421 TOPICS IN PHYSIOLOGY, CELL, AND MOLECULAR BIOLOGY OF MARINE ORGANISMS (3) SUMMER**  
A course for students who are interested in cellular, molecular, and physiological approaches to do research in marine biology. Specific lecture topics center on environmental bioindicators, developmental biology, organismal and environmental physiology, immunology, and population genetics of marine organisms.

**Prerequisites:** Biology 312 or 313, 321, **and** permission of the instructor

**444 PLANT ECOLOGY (4)**

This course will explore the population ecology of plants covering the genetic, spatial, age, and size structure of plant populations. The focus will be on understanding the origins of these different kinds of structures, understanding how they influence each other, and understanding why they change with time.

**Prerequisites:** Biology 111/111L, 112/112L, 211, and 211D

**Co-requisite or prerequisite:** Biology 305 **and** Biology 341 or permission of the instructor

**445 SYSTEMATIC BIOLOGY (3)**

An in-depth study of the principles of systematics with emphasis on reconstruction of relationships and evolutionary history of organisms. Topics include current theories of systematic and evolutionary biology, methods of phylogenetic systematics, and critical evaluation of phylogenetic hypotheses.

**Prerequisites:** 111/111L, 112/112L, 211, 211D, 305 Junior standing **and** at least one upper division course in organismal biology (e.g., Biology 300, 301, 303, 332, 333, 334, 335, 336, 337, or 338)

**446 SPECIAL TOPICS IN NEUROSCIENCE (3)**

A special topics course designed to supplement course offerings in neuroscience.

**Prerequisite:** Junior or senior standing and permission of the instructor.

**447 SEMINAR IN NEUROSCIENCE (3)**

A seminar course exposing students to cutting-edge neuroscience research. Research seminars by neuroscientists will be combined with the reading and discussion of primary literature. Students will learn to effectively write about and present their own ongoing research projects. This course serves as a capstone experience for students minoring in neuroscience.

**Prerequisite:** BIOL /PSYC 445/446

**Co-requisite:** BIOL /PSYC 448 or permission of the instructor. Students engaged in independent research or a bachelor's essay will be given priority for enrollment.

**448 BACHELOR'S ESSAY IN NEUROSCIENCE (6)**

A year-long senior research project conducted under the supervision of a faculty member in the neuroscience program at CofC or MUSC. Along with the faculty mentor, the student must submit a written project proposal for approval prior to course registration. This course is designed for students who are working towards a neuroscience minor.

**Prerequisite:** BIOL /PSYC 351 and 352 and permission of both the student's major department and the neuroscience program director.

**449 BIOLOGY OF CORAL REEFS (3)**

An introduction to the biology and ecology of reef-building corals and coral reefs. Topics to be covered include coral ecology (physical environment, nutrition, reproduction, growth, and population structure), taxonomy, systematic, diversity, biogeography, reef-building processes, and natural and human induced disturbances.

**Prerequisites:** BIOL 111, 112, 211, 305, and BIOL 341 (or equivalent). Open to undergraduate student of junior or senior standing who have completed at least 15 semester hours in biology and have a GPA of at least 3.0 in all biology courses. Students not meeting these requirements may enroll with permission of the instructor and departmental chair.

**450/ PROBLEMS IN BIOLOGY (1-4)**

**451 PROBLEMS IN MARINE BIOLOGY (1-4)**

Literature and laboratory investigations of specific problems in biology and marine biology. The nature of the problem(s) are to be determined by the interests of the student after consultation with departmental faculty. Open to exceptional students with junior or senior standing who are interested in continuing toward a graduate degree in biology or related sciences. Credit value is determined by the type of problem. **Special note:** Before entering either of these independent study courses, students must have **(1)** at least junior standing [60 semester hours], **(2)** a minimum GPA of 3.0 in all science courses [Biology, Chemistry, Physics], and **(3)** a completed study plan prior to the beginning of the semester in which the independent study is to be done. This study plan requires the signature of the student, the faculty supervisor, and the department chairperson. Forms for completion of the study plan are available in the department office.

**Prerequisites:** BIOL 111/111L, 112/112L, 211/211D, and 305. Enrollment by permission of the instructor and approval of the department chair.

**452 SEMINAR (1) S**

Students will attend the biological seminars in which they will be exposed to a variety of subdisciplines within the life sciences as well as methods that can be employed to examine biological questions. Each student must attend a minimum of ten (10) seminars and prepare a literate analysis of each.

**Prerequisites:** BIOL 111/111L, 112/112L, 211/211D, and 305. Students must have junior or senior standing, have completed at least 15 credit hours in biology, and have a minimum overall GPA of 2.5 in their biology courses.

**453 SPECIAL TOPICS (1-3) OCCASIONALLY**

Special topics developed departmental members designed to supplement an offering made in the department or to investigate an additional area of biological research.

**Prerequisites:** BIOL 111/111L, 112/112L, 211/211D, and permission of the instructor.

**Co-or Prerequisite:** BIOL 305

**455 SEMINAR IN MOLECULAR BIOLOGY (2)**

Required capstone course for majors emphasizing molecular biology.

**Prerequisites:** Biology 111/111L, 112/112L, 211/211D, 305 **and** Biology 312 and Biology 313

**499 BACHELOR'S ESSAY (6)**

A year-long research and writing project done during the senior year under the close supervision of a tutor from the department. The student must take the initiative in seeking a tutor to help in both the design and the supervision of the project. A project proposal must be submitted in writing and approved by the department prior to registering for the course. Must have a GPA of at least a 3.0 in all Biology courses.

**Prerequisites:** BIOL 111/111L, 112/112L, 211/211D, and 305. GPA of at least a 3.0 in all Biology courses, permission of the instructor, and approval of the department chair.

**501 BIOLOGY OF THE CRUSTACEA (4)**

A study of the biology of crustacean arthropods. Topics include evolution, taxonomy, functional morphology, physiology, embryology, ecology, behavior, commercial management, and agriculture. **Instruction is held at the Grice Marine Laboratory**, typically during a summer session. Open to students with a junior or senior standing who have completed at least 15 hours in biology and have a GPA of at least 3.0 in all biology courses. Students not meeting these requirements may enroll with permission of the instructor and department chair.

**Prerequisites:** Biology 111/111L, 112/112L, 211/211D, 305 **and** a course in invertebrate zoology (Biology 337)

**502 SPECIAL TOPICS IN MARINE BIOLOGY (1-4)**

Special topics designed to supplement an offering made in the program or to investigate an additional specific area of marine biological processes in the sea. Open to students with junior or senior standing who have completed at least 15 semester hours in biology and have a GPA of at least 3.0 in all biology courses. Students not meeting these requirements may enroll with permission of the instructor and the department chair.

**Prerequisites:** BIOL 111/111L, 112/112L, 211/211D, and 305.

**503 SPECIAL TOPICS IN ECOLOGY (3-4). This course may sometimes include a lab in which case the number of credits will be 4.**

Investigation of advanced, specific areas of ecology beyond General Ecology (Biology 341). Examples of offerings may include marine microbial, phytoplankton ecology, benthic ecology, community ecology, and population ecology.

**Prerequisites:** Biology 111/111L, 112/112L, 211/211D, 305 **and** Biology 341 and/or permission of the instructor, Must have Junior or Senior Standing

## **BIOLOGY MAJOR REQUIREMENTS**

### **Biology Major Minimum Requirements for all Degrees:**

- 100-Level Courses: Biology 111/111L, 112/112L
- 200-Level Courses: Biology 211/211L
- 300-Level Courses: Biology 305 (305L optional, except for the B.S. with concentration in Molecular Biology)

### **Bachelor of Science (B.S.) Major in Biology:**

#### Additional Biology Course Requirements

- 19 hours at the 300-level or above, including
  - At least 4 biology courses with labs at the 300-level or above \*

\*NOTE: Independent study (HONS 398), Research Experience (BIOL 397), Tutorial (BIOL/HONS 399), Bachelor's Essay (BIOL/HONS 499) or problems courses (BIOL 448, 450, 451) with laboratories do not fulfill the laboratory requirement.

#### Math

- 120

#### Chemistry

- 111/111L, 112/112L
- 231/231L, 232/232L

#### Physics

- 101/101, 102/102L **or** 111/111L, 112/112L

### **Bachelor of Science (B.S.) Major in Marine Biology:**

#### Additional Biology Course Requirements

- 19 hours at the 300-level or above, including
  - BIOL 341 (Ecology)
  - BIOL 335 (Biology of Fishes)
  - BIOL 337 (Invertebrate Zoology)
  - BIOL 342 (Oceanography)

#### Math

- 120

#### Chemistry

- 111/111L, 112/112L
- 231/231L, 232/232L **or** 221 (Quant.)

#### Physics

- 101/101, 102/102L **or** 111/111L, 112/112L

#### Additional Requirements:

- 1 semester of Geology

### **Bachelor of Science (B.S.) Major in Biology with an emphasis in Molecular Biology:**

#### Additional Biology Course Requirements

- 305L (Genetics laboratory)
- 18 hours at the 300-level or above, including
  - BIOL 312/312L (Molecular Biology)
  - BIOL 313/313L (Cell Biology)
  - BIOL 455 (Seminar in Molecular Biology)

NOTE: Students must complete at least one additional biology course with laboratory at the 300 level or above for a total of four laboratories at the 300 level or above. The laboratory courses may carry separate credit or may be part of a four-credit (4) course. Independent study (HONS 398), Research Experience (BIOL 397), Tutorial (BIOL/HONS 399), Bachelor's Essay (BIOL/HONS 499), or problems courses (BIOL 448, 450, 451) with laboratories do not fulfill the laboratory requirement

#### Math

- 120

#### Chemistry

- 111/111L, 112/112L
- 231/231L, 232/232L
- 351/352/354L
- 221 is recommended but not required]

#### Physics

- 101/101, 102/102L or 111/111L, 112/112L

#### **BS in Biology with an Emphasis in Teaching**

- A. Biology 111/112 and Labs (8)
- B. Biology 211/211D – Biodiversity and Ecology of Living Organisms (4)
- C. Biology 305 – Genetics, and one of the following courses (7)
  - Biology 312 or Biology 313 - Molecular Biology or Cell Biology
  - The laboratory for at least one of the above courses (305,312,313) must be taken.
- D. One of the following courses (4)
  - Biology 304 or 321 – \*Plant Physiology or General and Comparative Physiology
- E. At least one course from the following group (4)
  - Biology 300 (Botany), or Biology 302 (Plant Anatomy) or 303 (Phycology) or \*Plant Physiology (*\*Plant Physiology fulfills requirements D and E*)
- F. At least one course from the following group (4)
  - Biology 310 (Microbiology), 322 (Developmental Biology), 323 (Comparative Anatomy), 332 (Vertebrate Zoology), 333 (Ornithology), 334 (Herpetology), 335 (Fish Biology), 336 (Parasitology), 337 (Invertebrate Zoology), 338 (Entomology), 343 (Animal Behavior)
- G. Elective (3-8 hrs)
  - Any 300 level course listed above or
    - 301 (Plant Taxonomy), 314 (Immunology); 340 (Zoogeography), 341 (Ecology), 342 (Oceanography), 350 (Evolution) or 406 (Conservation Biology); 410 (Applied & Environmental Microbiology); 420 (General & Comparative Endocrinology); 421 (Topics in the Physiology, Cell and Molecular Biology of Marine Organisms); 444 (Plant Ecology); 445 (Systematics); 450-453 (Problems in Biology; Seminar; Special Topics).

**Total Biology Hours Required = 34 (100 level- 8 hrs.; 200 level – 7-8 hrs.; 300 level of above 19-20 hrs.).**

One of the following courses:

Chemistry 102 and Lab or 231 and Lab

Physics 101 and 102 and labs  
Math through Calculus (Math 120)

To complete the BS degree with an emphasis in teaching, students must successfully complete the minor in Secondary Biology Education, including one (1) semester of student teaching.

**Bachelor of Arts (B.A.) Major in Biology:**

Additional Biology Course Requirements

- 13 additional hours in biology, 9 of which must be at the 300-level or above
- At least 3 biology courses with labs at the 200 level or above, 2 of which must be at the 300-level or above\*  
\*Independent study (HONS 98), Research Experience (BIOL 397), Tutorial (BIOL/HONS 399), Bachelor's Essay (BIOL/HONS 499) or problems courses (BIOL 448, 450, 451) with laboratories do not fulfill the laboratory requirement

Chemistry

- 111/111L, 112/112L  
or 101/101L, 102/102L

Math

- One year

**For all major degrees, at least fifteen (15) hours of courses in the major beyond Biology 111/111L, 112/112L must be taken at the College of Charleston.**

**Minor in Biology: (20 semester hours)**

Biology 111/111L: Introduction to Cell and Molecular Biology (w/ laboratory)

Biology 112/112L: Evolution, Form & Function of Organisms (w/ laboratory)

Biology 211/211D: Biodiversity, Ecology and Conservation Biology (w/ discussion)

Biology 305: Genetics

+ Five (5) additional hours in Biology, with at least three (3) hours at the 300 level or above.

**For the minor, at least nine (9) hours of Biology beyond 111/111L, 112/112L must be taken at the College of Charleston.**

**Interdisciplinary Minors**

*Biology is involved in cooperative efforts with the following minor programs. Please visit the appropriate web pages on the C of C website for more information.*

**Archaeology** - <http://www.cofc.edu/~archaeology>

**Program in Discovery Informatics** - <http://di.cofc.edu/>

**Environmental Studies** - <http://www.cofc.edu/envminor/>

**Minor in Neuroscience** - <http://www.cofc.edu/neuroscience/>

## **Minor in Neuroscience**

In addition to the major requirements, a total of 15 credit hours will be necessary to complete a Minor in Neuroscience. Depending on the electives taken, a total of 24-26 credit hours may be taken. Of these, 3-4 hours of coursework can be applied to the requirements to fulfill either the Biology or Psychology major.

NOTE: Only one course from the minor can be applied towards the student's major.

### **Required courses**

- A. Psychology 103 (3)
- B. Biology 351 (Principles of Neurobiology ) (3) (This course also counts towards the hours needed to fulfill the major.)
- C. Biology 352 (Neurobiology and Behavior) (3)
- D. Biology 447 (Seminar in Neuroscience) (3)
- E. Biology 448 (Bachelor's Essay in Neuroscience) (6)

### **Elective courses: 9–11 hours**

Students will be required to take **one specialized neuroscience elective** and **two general electives**.

### **Specialized neuroscience electives**

PSYC 386 Psychopharmacology  
PSYC 387 Clinical Neuropsychology  
BIOL396/PHYS296 Biophysical Modeling of Excitable Cells  
BIOL 446/PSYC 446 Special Topics in Neuroscience

### **General electives**

The two general electives must be taken **outside the declared major** in order to fulfill the interdisciplinary nature of the minor. **At least one of these electives** must be offered by the Biology or Psychology Departments.

Anthropology (may also be used to fulfill the general education requirement)

ANTH 333 Human Evolution  
ANTH 334 Human Variation and Adaptation  
ANTH 335 Primate Behavior and Evolution  
ANTH342 Human Behavior and Evolution

Biology

BIOL 305 Genetics  
BIOL 312 Molecular Biology  
BIOL 313 Cell Biology  
BIOL 321 General and Comparative Physiology  
BIOL 322 Developmental Biology  
BIOL 343 Animal Behavior

Chemistry

CHEM 351 Biochemistry  
CHEM 352 Biochemistry II

Computer Science

CSCI 470 Principles of Artificial Intelligence

Discovery Informatics

DISC 101 Introduction to Discovery Informatics

Philosophy (may also be used to fulfill the general education requirement)

PHIL 170 Biomedical Ethics  
PHIL 204 Minds and Machines  
PHIL 260 Philosophy of Biology  
PHIL 265 Philosophy of Science  
PHIL 330 Philosophy of Mind

Psychology

PSYC 215 Cognitive Psychology  
PSYC 313 Sensation and Perception  
PSYC 317 Motivation  
PSYC 318 Comparative Psychology  
PSYC 336 States of Consciousness  
PSYC 384 Eating and Drinking  
PSYC 410 Behavioral Genetics

Note that one of the courses can be applied towards the Biology Major and that Psychology 103, as well as some of the electives can be used to fulfill the general education requirements.

## GENERALIZED SCHEDULE

Below is a typical schedule for a biology major. This is to assist you in your thinking and planning and **is in no way** a substitute for one-on-one counseling with your academic advisor.

<b>FRESHMAN YEAR</b>	
Biology 111/111L, 112/112L	8 semester hours
English 110	4 semester hours
Math 111/120	6-8 semester hours
Chemistry 111/111L, 112/112L	8 semester hours
General education requirements (history, foreign language or humanities)	3-6 semester hours
<b>TOTAL SEMESTER HOURS</b>	<b>33-34 semester hours</b>
<b>SOPHOMORE YEAR</b>	
Biology 211 /211D, 305	7-8 semester hours
Chemistry 231/231L, 232/232L	8 semester hours
General education requirements	15-18 semester hours
Elective courses	0-3 semester hours
<b>TOTAL SEMESTER HOURS</b>	<b>30-34 semester hours</b>
<b>JUNIOR YEAR</b>	
One biology course per semester	8 semester hours
Physics 101/101L, 102/102L <b>or</b> 111/111L, 112/112L	8 semester hours
General education requirements	12-15 semester hours
Elective courses	0-3 semester hours
<b>TOTAL SEMESTER HOURS</b>	<b>31-32 semester hours</b>
<b>SENIOR YEAR</b>	
3 biology courses	11-12 semester hours
Elective courses	18-23 semester hours
<b>TOTAL SEMESTER HOURS</b>	<b>29-45 semester hours</b>

## GENERAL GUIDE FOR COMPLETION OF GRADUATION REQUIREMENTS

1. Visit the Department of Biology office to obtain forms and declare your major. You will be assigned a biology faculty as your advisor. Major advisors are a great resource: they can help you plan your curriculum, explain degree requirements, guide you to valuable campus resources, and meet with your advisor early and often. You can change your major at any time by filling out a new major declaration form. Once you have declared your major, you can also declare a second (double) major, add a minor, and/or declare a concentration.
2. All general education requirements should be completed **no later** than the end of your junior year.
3. You should try to complete as many of your specified course requirements as possible (e.g., chemistry, physics, geology, and required biology courses) before your senior year. If you need a course your last semester and it is not offered or you can not schedule it, **you do not graduate**.
4. Biology 111/111L, 112/112L, 211/211D, and 305 should be completed before the end of your sophomore year.
5. If you wish to take Biology 397, 399, 448, 450, 451 or 499, or Honors 399 or 499, you must contact a faculty member with whom you want to do a research project **before** registering for the semester. A student must be accepted by a specific faculty member to do research under his/her direction. Individual enrollment forms are available in the Department office. See guidelines for independent studies in Biology and Marine Biology, below.
6. Those students who are planning to pursue graduate work or professional schools should successfully complete the most rigorous academic program possible.

## GUIDELINES FOR INDEPENDENT STUDIES IN BIOLOGY AND MARINE BIOLOGY

The Department of Biology is strongly committed to undergraduate research, and encourages students to participate in independent studies with faculty. There are a variety of opportunities and resources for such activities. Undergraduate research projects can be pursued either with a faculty at the College of Charleston or with faculty at other institutions (e.g., MUSC), but in this case a CofC Biology faculty member must nevertheless be the official mentor and instructor of record. To select a mentor within the Biology department at CofC, consult the Faculty research interest information posted on this website, as well as faculty's individual webpages. Based on your own interests, identify 4-5 possible faculties and contact them directly.

**IMPORTANT:** in each case, you must be accepted by a faculty member prior to beginning any investigations, and before registering for any of the relevant courses. In most cases, Junior class standing (>60 hours) and a GPA of 3.0 in all biology course is required (see course descriptions).

Individual enrollment forms are available in the Department office.

Independent Study Courses in Biology are (see *Course Descriptions* for complete information):

**Biol 399 Tutorial.** Repeatable, up to 3 hrs. Individual instruction given by a tutor in regularly scheduled meetings. This is often the first independent study course taken by Biology or Marine Biology students.

**Biol 450/451 Problems in Biology/Marine Biology.** Repeatable, up to 4 hrs. Laboratory or Literature investigations of specific problems in biology/marine biology, to be determined by the interests of the student in consultation with departmental faculty. Research may take place at other institutions (e.g., MUSC), but a CofC Biology faculty member must still be identified as the official mentor.

**Biol 499 Bachelor's Essay.** Two semesters, 6 hrs total. A year-long research and writing project done during the senior year under the close supervision of a tutor from the department. This is usually preceded by Biol 399 or 450/451.

**Biol 448 Bachelor's Essay in Neurobiology.** Two semesters, 6 hrs total. Similar to Biol 499, but specifically designed for students in the Neuroscience program.

**Biol 397 Research Experience.** Repeatable, 0 hrs. Like Biol 450/451 but specifically intended for students in externally-funded research programs (e.g., INBRE, REU), or students who have exhausted all other Independent Study Courses.

## INFORMATION FOR GRADUATE AND PROFESSIONAL EDUCATION

### GRADUATE SCHOOL

If you plan to attend graduate school, your search for an appropriate school should begin no later than the summer following your junior year. Information about graduate programs in biology and other related areas can be obtained from:

- (1) Peterson's Guide to Graduate Schools
- (2) Graduate school literature (request information from many schools – most available on line)
- (3) Scientific journals (to learn the location of authors whose work is of particular interest to you)
- (4) Talking with faculty members
- (5) Bulletin boards with biology graduate program notices (2<sup>nd</sup> floor - Science Center)

Typically, each application will require a college transcript, letters of reference, and Graduate Record Exam (GRE) scores [verbal, quantitative, analytical, and biology subject test]. The Counseling Office has your schedule and registration information for the GRE, which should be taken midway through your senior year (e.g., January). Financial support (e.g., a teaching or research assistantship) is often available to those who have a strong academic record, a desire to pursue graduate work in a specific area of biology, and their application completed on time (the deadline may be as early as February 1<sup>st</sup>). Although most students begin a graduate program in the fall semester, many graduate schools do admit students at the start of other semesters. Regardless, your application, including letters of recommendation by faculty members, must be completed by the appropriate deadline. You should request reference letters from faculty members in ample time to meet this deadline.

A Ph.D. may be sought directly after earning a Master's degree. Biology faculty members can explain the advantages/disadvantages of these options.

### MEDICAL/PROFESSIONAL SCHOOL

All students interested in medical, dental, or veterinary school should establish contact with their assigned faculty advisor in their freshman year and in addition should meet with the Director of Pre-Professional Health Advising, Karen Eippert (<mailto:eippertk@cofc.edu>). You should plan on taking the professional school admission tests for the first time at the end of your junior year so that, if necessary, you can repeat them at the beginning of your senior year. **Scheduling of all these tests is your responsibility.** You should apply to professional schools one year in advance of the day you plan to enter. The pre-professional advisor can discuss the filing of these applications with you. Applications to take the MCAT or other admission tests are available of the Office of Career Development. Applications to medical school, for those schools that use the American Medical College Application Service (AMCAS), are available in the Office of Undergraduate Studies and the Office of Career Development. You must write directly for those that do not use the service.

### NURSING & ALLIED HEALTH

Students should consult the separate handbooks on Allied Health and/or Pre-Nursing. Students should also contact their assigned faculty advisor, as well as the Director of Pre-Professional Health Advising, Karen Eippert.

## EMPLOYMENT

Depending on your desire and circumstances, pursuit of a job often becomes an integral part of one's academic life (e.g., student worker, volunteer work, or participation in a co-op program). Information about the co-op program is available through the Placement Office at the College of Charleston. Such programs alternate full-time work with full-time study. The increased length of time until graduation is usually more than offset by job experience and the possibility of immediate employment by the co-op employer.

A thorough job search of possible employers should be undertaken. The Placement Office would be a logical first step. Job opportunities in biology and related scientific areas are listed in various scientific journals. Most federal, state, county and city employment openings can be found in various listings. The federal government has the Civil Service Commission (the Federal Register) as well as a few agencies (e.g., FBI, Nuclear Regulatory Commission) which handle their own personnel placement. Regardless, a professional resume is needed for your job-seeking effort.

Use the advice, knowledge, and experience of the College's placement office and faculty members. All correspondence with potential employers should be well written, typed in proper business format, and exhibit an excellent command of the English language.

A partial list of South Carolina employers for biology majors is listed below:

- (1) SC Wildlife & Marine Resources
- (2) SC Department of Health & Environmental Control (DHEC)
- (3) US National Oceanic & Atmospheric Administration (NOAA)
- (4) US Department of the Interior
- (5) US Department of Agriculture
- (6) Zoos, parks, fisheries, and aquariums
- (7) University laboratories - USC, Clemson, MUSC, etc.
- (8) Private medical and consulting laboratories
- (9) Major industries - DuPont, Westvaco, etc.
- (10) Peace Corps
- (11) Laboratories of food-processing companies, medical supply manufacturers, dairies, and waste water treatment facilities
- (12) Suppliers of scientific equipment, supplies, books, and pharmaceuticals
- (13) Public and private elementary and secondary schools

If employment opportunities in your chosen academic area are extremely limited, you should consider employment in a non-related area and continue to vigorously seek a job that is commensurate with your training and skills. You do not need to limit your search to the State of South Carolina. A handout entitled "Seeking Employment in Marine Biology" is available in the Department office.

## GUIDELINES FOR REQUESTING A LETTER OF RECOMMENDATION

Provide a self-addressed, stamped envelope. Address it as directed on the application and use the professor's name and address for the return address. Fill in and/or sign the required part of the form. Allow adequate time for the faculty member to complete and mail the letter. Check with the institution(s) where you have applied to be sure your file is complete by the deadline date; letters sometimes get lost. You can aid a faculty member in writing a more knowledgeable letter about you by providing the following information **in writing**:

1. Full name and nickname (if used in class)
2. College ID number

3. Course(s)/semester(s) when you had the faculty member
4. Other associations with the faculty member (e.g., as an employee, a volunteer, a member of a campus organization or committee, etc.)

Other information which can be helpful includes:

1. Grade point ratio (GPR) - overall and science/math
2. Pertinent scores - SAT, GRE, MCAT, DAT, etc.
3. Transcripts
4. Volunteer experience, work experience, campus activities, etc.

## **BIOLOGY CLUB**

The Biology Club is open to biology majors and other interested students at the College. The club meets regularly and provides a forum for invited speakers, field trips and other activities that relate to biology. Additionally, the club sponsors picnics and other events.

## **ALPHA EPSILON DELTA - THE PRE-MEDICAL HONOR SOCIETY**

Meetings are not limited to society members but are open to **all** students and staff. Members of the Delta chapter-College of Charleston are elected by the Society. Minimal academic standards for acceptance into the Society are **(1)** completion of three semesters, **(2)** an overall GPR of 3.0, **(3)** a class average of 3.0 in all science courses, and **(4)** ranking in the upper 35% of the class. The Society is open to qualified students interested in all health professions (medicine, dentistry, osteopathy, optometry, podiatry, pediatrics, and veterinary medicine) including students in the allied health fields who have completed the same or equivalent courses as regular pre-medical students. One of the objectives of the Society is to promote cooperation and contacts between pre-medical students, medical personnel, and educators in developing an adequate program of pre-medical education. The Society is an affiliate of the American Association of the Advancement of Science and a member of the Association of College Honor Societies.

## **BIOLOGY COMPUTER ROOM**

Room 241B in the Science Center is specifically designated as a study area for the exclusive use of biology majors. Students are asked to observe the **NO SMOKING, NO EATING AND NO DRINKING** regulation when using this room.