Department of Biology

In today’s world, studies in Biology are becoming increasingly important. Georgia Southern University’s Biology program prepares students for careers as professional biologists in a wide variety of fields. Southeast Georgia is a biologically rich and ecologically diverse area that encompasses coastline, wetlands, woodlands, and cities. Consistent with the mission of the University, the Biology Department seeks to expand horizons through outreach, preserve distinctive cultural and natural legacies, and maintain the integrity of South Georgia’s environment.

Biology Majors

Biology Minor

Biology Concentration
- Environmental Sustainability Interdisciplinary Concentration (http://catalog.georgiasouthern.edu/archive/2015-2016/undergraduate/science-mathematics/biology/environmental-sustainability-interdisciplinary-concentration)

BIOL 1110 General Biology Laboratory
1 Credit Hour. 0 Lecture Hours. 2 Lab Hours.
A series of laboratory components that involve hands on experimentation with the biological concepts of genetics, growth, ecology, reproduction, development and physiological processes.
Cross Listing(s): BIOL 1110H, BIOL 1110S.

BIOL 1110H General Biology Laboratory
1 Credit Hour. 0 Lecture Hours. 2 Lab Hours.
A series of laboratory components that involve hands on experimentation with the biological concept of genetics, growth, ecology, reproduction, development and physiological processes.
Cross Listing(s): BIOL 1110, BIOL 1110S.

BIOL 1110S General Biology Laboratory
1 Credit Hour. 0 Lecture Hours. 2 Lab Hours.
A series of laboratory components that involve hands on experimentation with the biological concepts of genetics, growth, ecology, reproduction, development and physiological processes.
Cross Listing(s): BIOL 1110H, BIOL 1110.

BIOL 1130 General Biology
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
An introductory course covering the concepts and applications of biological diversity. In this course, cell organization, genetics, diversity, plant and animal structure and function, ecology, evolution, and our impact on the environment will be discussed in class.
Cross Listing(s): BIOL 1130H, BIOL 1130S.

BIOL 1130S General Biology
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
An introductory course covering the concepts and applications of biological diversity. In this course, cell organization, genetics, diversity, plant and animal structure and function, ecology, evolution, and our impact on the environment will be discussed in class.

BIOL 1130H Environmental Biology Laboratory
1 Credit Hour. 0 Lecture Hours. 2 Lab Hours.
A series of laboratory components that are directed toward ecological and environmental science and stress experimental design and data analysis.
Cross Listing(s): BIOL 1210H.

BIOL 1140 Environmental Biology Laboratory
1 Credit Hour. 0 Lecture Hours. 2 Lab Hours.
A series of laboratory components that are directed toward ecological and environmental science and stress experimental design and data analysis.
Cross Listing(s): BIOL 1140.

BIOL 1131 Insects and People
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
An introduction to the role insects and other arthropods serve in relation to humans. Insect human interactions in the home, yard, garden, workplace, recreational areas, and human body are included. Considerations of the natural history, life cycles and optional human actions regarding pests, beneficial insects, insects and disease, insects and food, and aesthetics is included.

BIOL 1333 From Neuron to Brain
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
A consideration of the workings of the brain from a biological perspective. The mechanisms of neural function from cell to network to brain will be studied. Topics will include neurons, neurotransmitters, nerve nets, the biological basis of learning, vision, language, brain sex differences, major disorders of mind and brain, and aging of the brain.

BIOL 1335 Plants and Civilization
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
An introduction to major groups of economic plants and their role in the origin and maintenance of civilization. The course also deals with plant biodiversity and the potential impact of biological losses.
Cross Listing(s): BIOL 1335H, BIOL 1335S.

BIOL 1335H Plants and Civilization
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
An introduction to major groups of economic plants and their role in the origin and maintenance of civilization. The course also deals with plant biodiversity and the potential impact of biological losses.
Cross Listing(s): BIOL 1335, BIOL 1335S.
BiOL 1335S Plants and Civilization
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
An introduction to major groups of economic plants and their role in the
origin and maintenance of civilization. The course also deals with plant
biodiversity and the potential impact of biological losses.
Cross Listing(s): BIOL 1335, BIOL 1335H.

BiOL 2107 Principles of Biology I
0.3 Credit Hours. 0.3 Lecture Hours. 0.1 Lab Hours.
A general course covering the concepts and applications of cellular and
molecular biology. Includes scientific method, cell organization, gene
regulation, molecular genetics, cell diversity, cell structure and function,
and evolution.
Cross Listing(s): BIOL 2107H.

BiOL 2107H Principles of Biology I
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
A general course covering the concepts and applications of cellular and
molecular biology. Includes scientific method, cell organization, gene
regulation, molecular genetics, cell diversity, cell structure and function,
and evolution.
Cross Listing(s): BIOL 2107.

BiOL 2108 Principles of Biology II
0.3 Credit Hours. 0.3 Lecture Hours. 0.3 Lab Hours.
Overview of major organismal, evolutionary and ecological topics in
biology including evolution, diversity of life on earth, plant and animal form
and function, and ecology. The course also discusses how life evolved to
meet changing conditions on the planet.
Cross Listing(s): BIOL 2108H.

BiOL 2108H Principles of Biology II
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Overview of major organismal, evolutionary and ecological topics in
biology including evolution, diversity of life on earth, plant and animal form
and function, and ecology. The course also discusses how life evolved to
meet changing conditions on the planet.
Corequisite(s): BIOL 2108L.
Cross Listing(s): BIOL 2108.

BiOL 2108L Principles of Biology II Laboratory
1 Credit Hour. 0 Lecture Hours. 3 Lab Hours.
Laboratory course emphasizing hands-on experience in the applications of
cellular and molecular biology through emphasis on experimental design
and data analysis.

BiOL 2107 Principles of Biology I Laboratory
1 Credit Hour. 0 Lecture Hours. 3 Lab Hours.
Laboratory course emphasizing hands-on experience in the applications of
biological sciences and techniques through emphasis on experimental design
and data analysis.

BiOL 3099 Selected Topics/Biology
3-4 Credit Hours. 3-4 Lecture Hours. 0 Lab Hours.
Course taught on a selected topic in biology on a one time basis.
Prerequisite(s): BIOL 2107, BIOL 2107L, BIOL 2108, BIOL 2108L.
Cross Listing(s): BIOL 3099H, BIOL 3099S.

BiOL 3099H Selected Topics/Biology
3-4 Credit Hours. 3-4 Lecture Hours. 0 Lab Hours.
Course taught on a selected topic in biology on a one time basis
Prerequisite(s): BIOL 2107, BIOL 2107L, BIOL 2108, BIOL 2108L.
Cross Listing(s): BIOL 3099H, BIOL 3099S.

BiOL 3099S Selected Topics/Biology
3-4 Credit Hours. 3-4 Lecture Hours. 0 Lab Hours.
Course taught on a selected topic in biology on a one time basis
Prerequisite(s): BIOL 2107, BIOL 2107L, BIOL 2108, BIOL 2108L.
Cross Listing(s): BIOL 3099H, BIOL 3099S.

BiOL 3130 Principles of Genetics
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
This course includes the study of gene structure and function, the role of
genes in determining the traits of living organisms, and the role of genes
evolution. Topics include the physical basis of Mendelian inheritance,
interaction of genes, linkage and mapping, sex linkage, DNA replication,
mutation, RNA transcription, protein translation, regulation of gene
expression, and the fundamental principles of population, quantitative, and
evolutionary genetics.
Prerequisite(s): BIOL 2107, BIOL 2107L, BIOL 2108, BIOL 2108L.
Cross Listing(s): BIOL 3130H.

BiOL 3130H Principles of Genetics- Honors
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
This course includes the study of gene structure and function, the role of
genes in determining the traits of living organisms, and the role of genes
evolution. Topics include the physical basis of Mendelian inheritance,
interaction of genes, linkage and mapping, sex linkage, DNA replication,
mutation, RNA transcription, protein translation, regulation of gene
expression, and the fundamental principles of population, quantitative, and
evolutionary genetics.
Prerequisite(s): BIOL 2107, BIOL 2107L, BIOL 2108, BIOL 2108L.
Cross Listing(s): BIOL 3130.

BiOL 3131 Principles of Physiology
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
This course is an introduction to the fundamental principles of physiology.
The focus is on how organisms maintain homeostasis in the face of
changes in their internal and external environment. This course will cover
energetics, the basic physiological processes of cells, how cell signaling
can coordinate more elaborate functions, the hierarchical organization of
cells into organs and organ systems, and how these organ systems can
carry out complex adaptive functions. Students will see the fundamental
relationship between structure and function and learn how physiological
systems are constrained by phylogeny, physical limits, and functional
trade-offs.
Prerequisite(s): A minimum grade of "C" in all of the following: BIOL
2107, BIOL 2107L, BIOL 2108 and BIOL 2108L.

BiOL 3133 Evolution and Ecology
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
An introduction to major principles of genetics, evolution, and ecology.
This course covers the origin of maintenance of genetic variation
(Mendelian and population genetics), genetic change in populations over
time (micro evolutionary processes of selection, drift, and gene flow),
and taxonomic diversification (macro evolutionary process of speciation).
Students will see how this evolution and diversification are shaped by
ecological interactions between organisms and their biotic environment.
These ecological interactions will be studied at the population, community,
and ecosystem levels.
Prerequisite(s): BIOL 2107, BIOL 2107L, BIOL 2108, BIOL 2108L.
BIOL 3440 Field Biology
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
Field study of the basic natural history of plants and/or animals of the southeastern United States. Lectures, laboratories, and field trips emphasize the ability to locate, observe, collect, and identify organisms in the field, as well as manage field data.
Prerequisite(s): BIOL 2107 and BIOL 2107L and BIOL 2108 and BIOL 2108L.

BIOL 3535 The Biology of Plants
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
An introduction to the biology of plants. Topics include the evolution and diversity of plants, as well as the unique morphology, physiology, reproduction and ecology of higher plants in particular.
Prerequisite(s): BIOL 2107 and BIOL 2107L and BIOL 2108 and BIOL 2108L.

BIOL 3541 Invertebrate Zoology
0.4 Credit Hours. 0.3 Lecture Hours. 0.3 Lab Hours.
A survey of the diversity and basic biology of the invertebrates. Emphasis is placed on adaptations responsible for the diversity and life history strategies of invertebrates, and identifications of locally important invertebrate groups. Field trips and research project required.
Prerequisite(s): BIOL 2107 and BIOL 2107L and BIOL 2108 and BIOL 2108L.

BIOL 3630H Honors Current Trends in Biological Research
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Provides students in Departmental Honors in Biology with a structured introduction to current topics in biological research. The course familiarizes students with the scope of biological research and aids students in selecting an area of inquiry to pursue their capstone research requirement. Students will attend the Departmental Seminar series as part of this course. One outcome of this course is a research proposal written with a faculty mentor. Students may not receive credit for this course and BIOL 4620.
Prerequisite(s): BIOL 2320H and acceptance into the Departmental Honors in Biology Program is required.

BIOL 3790 Teaching Internship in Biology
1-3 Credit Hours. 0 Lecture Hours. 0 Lab Hours.
Student internship in BIOL 1210 under the mentorship of a faculty member. The student will participate in an introductory workshop immediately prior to the start of the semester, intern in BIOL 1210, and meet with the faculty mentor one hour each week.
Prerequisite(s): BIOL 2107, BIOL 2107L, BIOL 2108, BIOL 2108L.

BIOL 4230 Introduction to Immunology
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Introduction to the biology of lymphocytes and adaptive immune response including the study of immunoglobulins and cytokines. The roles of the immune system in health and disease are also examined.
Prerequisite(s): BIOL 2107, BIOL 2107L, BIOL 2108 and BIOL 2108L.

BIOL 4240 Biology of Microorganisms
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
Covers the principles and techniques of general microbiology, including physiology, genetics, and host-parasite interactions involving bacteria, eukaryotic microorganisms and viruses.
Prerequisite(s): BIOL 2107, BIOL 2107L, BIOL 2108 and BIOL 2108L.

BIOL 4535 Vertebrate Zoology
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
An introduction to the evolution, structure, and function of the vertebrates. This course will trace the origin of vertebrates from their invertebrate ancestors and explore how basic vertebrate design has evolved in the major vertebrate groups. Students will also learn how vertebrate structure has affected their function, distribution, behavior, and ecology.
Prerequisite(s): BIOL 2107, BIOL 2107L, BIOL 2108 and BIOL 2108L.

BIOL 4620 Undergraduate Seminar
2 Credit Hours. 2 Lecture Hours. 0 Lab Hours.
Group study of selected biological topics held in conjunction with the normal seminar schedule of the Department of Biology. Topics will vary each semester and will be led by biology faculty.
Prerequisite(s): BIOL 2107, BIOL 2107L, BIOL 2108, BIOL 2108L and Junior standing in Biology Program is required.

BIOL 4730 Internship in Biology
3 Credit Hours. 0 Lecture Hours. 0 Lab Hours.
Qualified biology majors may acquire practical experience by working with a public or private agency that specializes in the proposed area of study. A faculty member in the biology department will act as advisor. Internships must be approved by the head of the department, and a poster presentation of the results must be presented at the end of the semester.
Prerequisite(s): BIOL 2107, BIOL 2107L, BIOL 2108 and BIOL 2108L.

BIOL 4890 Undergraduate Research
1-4 Credit Hours. 0 Lecture Hours. 0 Lab Hours.
Biology majors will be encouraged to conduct a research project under the supervision of faculty. The faculty recommendation must have approval of the head of the biology department. A written abstract and an oral presentation of the results by the student must be presented at the end of the semester.
Prerequisite(s): BIOL 2107, BIOL 2107L, BIOL 2108 and BIOL 2108L.
Cross Listing(s): BIOL 4890S.

BIOL 4890S Undergraduate Research
1-4 Credit Hours. 0 Lecture Hours. 0 Lab Hours.
Biology majors will be encouraged to conduct a research project under the supervision of faculty. The faculty recommendation must have approval of the head of the biology department. A written abstract and an oral presentation of the results by the student must be presented at the end of the semester.
Cross Listing(s): BIOL 4890.

BIOL 4895H Honors Research
1-3 Credit Hours. 0 Lecture Hours. 3-9 Lab Hours.
Independent research under the guidance of a biology faculty member for students in the Departmental Honors program. Required for students attempting to earn Departmental Honors in Biology. Students may register for 1-3 credit hours, but must complete 4 credit hours. Students opting to attempt the honors degree program would be precluded from receiving biology elective credit for BIOL 4890.

BIOL 4999H Honors Thesis
2 Credit Hours. 2 Lecture Hours. 0 Lab Hours.
Written and oral presentation of results of independent research. Honors thesis must follow the guidelines adopted by the University Honors Program. Required for students attempting to earn Departmental Honors in Biology.

BIOL 5099H Selected Topics/Biology
3,4 Credit Hours. 3 Lecture Hours. 0,3 Lab Hours.
A course taught on a one-time basis. Lecture only courses will be three credit hours while courses with a laboratory will be four credit hours. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5099G, BIOL 5099S, BIOL 5099H.
BIOL 5099H Selected Topics/Biology
0-4 Credit Hours. 0-4 Lecture Hours. 0-4 Lab Hours.
A course taught on a one-time basis. Lecture only courses will be three credit hours while courses with a laboratory will be four credit hours. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5099, BIOL 5099S, BIOL 5099G.

BIOL 5099S Selected Topics/Biology
3,4 Credit Hours. 3 Lecture Hours. 0,3 Lab Hours.
A course taught on a one-time basis. Lecture only courses will be three credit hours while courses with a laboratory will be four credit hours. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.

BIOL 5131 Cell Biology
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Examines the structure and physiology of cells and subcellular organelles. Topics include the cell membrane and membrane transport, the extracellular matrix of the cell, the cell cytoskeleton, DNA structure and replication, transcription, translation and the regulation of gene expression. Graduate students will be given an extra assignment or an extra section on tests, as determined by the instructor, that undergraduates will not be required to do.
Cross Listing(s): BIOL 5131S, BIOL 5131G, BIOL 5131H.

BIOL 5131H Cell Biology (Honors)
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Examines the structure and physiology of cells and subcellular organelles. Topics include the cell membrane and membrane transport, the extracellular matrix of the cell, the cell cytoskeleton, DNA structure and replication, transcription, translation and the regulation of gene expression. Graduate students will be given an extra assignment or an extra section on tests, as determined by the instructor, that undergraduates will not be required to do.
Cross Listing(s): BIOL 5131, BIOL 5131S, BIOL 5131G.

BIOL 5131S Cell Biology
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Examines the structure and physiology of cells and subcellular organelles. Topics include the cell membrane and membrane transport, the extracellular matrix of the cell, the cell cytoskeleton, DNA structure and replication, transcription, translation and the regulation of gene expression. Graduate students will be given an extra assignment or an extra section on tests, as determined by the instructor, that undergraduates will not be required to do.
Cross Listing(s): BIOL 5131, BIOL 5131S, BIOL 5131G.

BIOL 5132 Molecular Genetics
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Examines aspects of inheritance of organisms at the molecular, biochemical, cytological, organismic and population levels. Graduate students will be given an extra assignment or additional section of questions on tests that undergraduates will not be required to complete.
Cross Listing(s): BIOL 5132G.

BIOL 5134 Population/Quantitative Genetics
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Introduction to the dynamics of evolutionary change for qualitative and metric characters. Hardy-Weinberg equilibrium will provide a basis for further analysis of micro evolutionary "forces" of selection, drift, gene flow, and mutation. Methods for estimating heritability of metric traits and predicting the course of selection will also be introduced. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5134G.
BIOL 5237 Physiological Ecology
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Examines how physiological adaptations of animals and plants to abiotic environmental factors (e.g., temperature, salinity, moisture, ultraviolet radiation) contribute to the understanding of local species diversity, biogeographic patterns, and habitat exploitation. Emphasis is placed on how physiological function (e.g., osmoregulation, thermoregulation, gas exchange, energy use) interfaces with ecology and evolutionary biology. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5237G.

BIOL 5239 Neurobiology
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Introduction to the mechanisms of neural responses, neural integration, neural development, and environmental effects on developing mature nervous systems. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5239G, BIOL 5239H, BIOL 5239S.

BIOL 5239H Neurobiology (Honors)
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Introduction to the mechanisms of neural responses, neural integration, neural development, and environmental effects on developing mature nervous systems. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5239, BIOL 5239G, BIOL 5239S.

BIOL 5239S Neurobiology
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Introduction to the mechanisms of neural responses, neural integration, neural development, and environmental effects on developing mature nervous systems. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5239, BIOL 5239G, BIOL 5239S.

BIOL 5240 Histology
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
Examines the origin, development, structure and function of vertebrate tissues. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5240G.

BIOL 5241 Comparative Vertebrate Anatomy
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
A comparative and functional study of the morphological systems of vertebrates. Laboratory emphasizes dissection of representative vertebrate groups. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5241G.

BIOL 5243 Toxicology
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
An introduction to the principles of toxicology with a focus on the toxicology of aquatic organisms. Topics include risk assessment, regulatory toxicology, mutagenesis, teratology, and toxicology of the nervous and reproductive systems. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5243G.

BIOL 5244 Insect Physiology
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
An introduction to insect physiology. Topics include ingestion and utilization of food, reproduction, water balance, muscles, sensory systems and pheromones. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5244G.

BIOL 5246 Human Pathophysiology
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
A selective survey of causes and effects of disease in humans at the molecular, cellular and systemic level. Selected topics include cellular malfunctions, altered cell environments, cancer biology, and the pathophysiology of the nervous, endocrine, cardiovascular, pulmonary, and renal organ systems. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5246G.

BIOL 5247 Endocrinology
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
A study of endocrine mechanisms, including their evolution and importance at various levels of biological organization. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5247G.

BIOL 5248 Immunology
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
A detailed study of the mammalian immune system emphasizing the experimental basis of current immunological theories. Topics include antigen antibody interactions, organization and expression of immunoglobulin genes, complement, major histocompatibility complex, antigen processing and presentation, and generation of humoral and cellular immune responses. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5248G.

BIOL 5333 Emerging Diseases
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Study of the epidemiology of emerging and re-emerging human diseases throughout the world, but with emphasis on the situation in North America. New and resurging diseases caused by prions, viruses, bacteria, protozoa, fungi, arthropods, and helminths will be discussed, including some vector-borne and tropical diseases. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5333, BIOL 5333G.

BIOL 5333H Emerging Diseases (Honors)
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Study of the epidemiology of emerging and re-emerging human diseases throughout the world, but with emphasis on the situation in North America. New and resurging diseases caused by prions, viruses, bacteria, protozoa, fungi, arthropods, and helminths will be discussed, including some vector-borne and tropical diseases. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5333H, BIOL 5333G.

BIOL 5237 Physiological Ecology
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Examines how physiological adaptations of animals and plants to abiotic environmental factors (e.g., temperature, salinity, moisture, ultraviolet radiation) contribute to the understanding of local species diversity, biogeographic patterns, and habitat exploitation. Emphasis is placed on how physiological function (e.g., osmoregulation, thermoregulation, gas exchange, energy use) interfaces with ecology and evolutionary biology. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5237G.

BIOL 5239 Neurobiology
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Introduction to the mechanisms of neural responses, neural integration, neural development, and environmental effects on developing mature nervous systems. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5239G, BIOL 5239H, BIOL 5239S.

BIOL 5239H Neurobiology (Honors)
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Introduction to the mechanisms of neural responses, neural integration, neural development, and environmental effects on developing mature nervous systems. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5239, BIOL 5239G, BIOL 5239S.

BIOL 5239S Neurobiology
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Introduction to the mechanisms of neural responses, neural integration, neural development, and environmental effects on developing mature nervous systems. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5239, BIOL 5239G, BIOL 5239S.

BIOL 5240 Histology
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
Examines the origin, development, structure and function of vertebrate tissues. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5240G.

BIOL 5241 Comparative Vertebrate Anatomy
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
A comparative and functional study of the morphological systems of vertebrates. Laboratory emphasizes dissection of representative vertebrate groups. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5241G.

BIOL 5243 Toxicology
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
An introduction to the principles of toxicology with a focus on the toxicology of aquatic organisms. Topics include risk assessment, regulatory toxicology, mutagenesis, teratology, and toxicology of the nervous and reproductive systems. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5243G.

BIOL 5244 Insect Physiology
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
An introduction to insect physiology. Topics include ingestion and utilization of food, reproduction, water balance, muscles, sensory systems and pheromones. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5244G.
BIOL 5343 Medical-Veterinary Entomology
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
An intensive study of the role of arthropods in the transmission, dissemination and causation of diseases of humans and animals. Topics include identification of vector arthropods and associated diseases, ecology, and control. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5343G.

BIOL 5345 Systematic Biology
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
Introduces the principles and methods of biosystematics. Speciation, bio-nomenclature, hierarchical taxonomic categories, systematic characters, molecular systematics, and phylogenetic analyses are discussed. Laboratories involve use of modern molecular techniques and computational analysis with a variety of software packages. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5345G.

BIOL 5441 Mycology
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Examines the phylogeny, morphology, life history and ecology of fungi. Laboratory emphasizes the identification, morphology, and natural history of fungi. Field trips required. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5441G.

BIOL 5442 Ichthyology
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
Emphasizes the systematics, evolution, biology, ecology and behavior of recent and extinct fishes. Laboratory emphasizes the identification, morphological, and natural history of fishes. Field trips required. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5442G.

BIOL 5444 Virology
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
A comprehensive survey of the biology of viruses, with emphasis on viral diversity, virus-host interactions, viral diseases of humans, animals and plants and uses of viruses in medicine, research and biocontrol. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5444G.

BIOL 5446 Ornithology
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
A comprehensive study of the biology of birds. Lectures will emphasize the evolution, classification, structure, physiology, behavior, and ecology of birds. Laboratories will give hands-on experience with bird morphology, and field trips will emphasize finding and identifying birds in their natural habitats. Graduate students are given extra assignments not required of undergraduates.
Cross Listing(s): BIOL 5446G.

BIOL 5448 Mammalogy
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.
Examines the phylogeny, morphology, life history and ecology of mammals. Laboratory includes identification and preparation of specimens and development of field techniques. Field trips required. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5448G.

BIOL 5530 Wildlife Management
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
A survey of the principles and practices used to manage wildlife populations. The emphasis is on populations of importance to humans, particularly game animals. Students will explore the factors, both biotic and abiotic, that influence wildlife populations and how these factors can be managed to sustain game and nongame wildlife populations. Graduate students are given extra assignments not required of undergraduates.
Cross Listing(s): BIOL 5530G.

BIOL 5532 Evolution
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
Covers the historical development of evolutionary thought and focuses on current issues in evolution. Emphasis is placed on the perceived importance of natural selection, mechanisms of speciation, the history of life on Earth, and human evolution. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5532H, BIOL 5532G.

BIOL 5532H Evolution-Honors
3 Credit Hours. 0 Lecture Hours. 0 Lab Hours.
Covers the historical development of evolutionary thought and focuses on current issues in evolution. Emphasis is placed on the perceived importance of natural selection, mechanisms of speciation, the history of life on Earth, and human evolution. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.
Cross Listing(s): BIOL 5532, BIOL 5532G.
BIOL 5534 Conservation Biology  
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.  
Examines the causes and consequences of the loss of biodiversity, as well as methods for conserving rare species and ecosystems. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.  
**Cross Listing(s):** BIOL 5534G.

BIOL 5537 Biogeography  
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.  
Examines the distributional patterns of animals and plants from the perspectives of vicariance biogeography and organismal dispersal. One field trip required. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.  
**Cross Listing(s):** BIOL 5537G.

BIOL 5540 Ecology  
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.  
Reviews basic ecological principles and current hypotheses relevant to biological organisms from the level of the population to ecosystems. Application of mathematic models to biological processes is emphasized. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.  
**Cross Listing(s):** BIOL 5540G.

BIOL 5541 Tropical Marine Biology  
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.  
This is an intensive 2-week field course conducted at a tropical marine field station. Through daily lectures and field excursions, students are exposed to the natural history and ecology of a variety of marine organisms and ecosystems that may include mangroves, seagrasses, rocky shores and coral reefs. Additional fees required. Graduate students are given extra assignments not required of undergraduates.  
**Cross Listing(s):** BIOL 5541S, BIOL 5541G.

BIOL 5541S Tropical Marine Biology  
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.  
This is an intensive 2-week field course conducted at a tropical marine field station. Through daily lectures and field excursions, students are exposed to the natural history and ecology of a variety of marine organisms and ecosystems that may include mangroves, seagrasses, rocky shores and coral reefs. Additional fees required. Graduate students are given extra assignments not required of undergraduates.  
**Cross Listing(s):** BIOL 5541, BIOL 5541G.

BIOL 5542 Aquatic Ecology  
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.  
Covers the biological and physiochemical factors that affect common organisms found in local aquatic ecosystems, including streams and rivers, wetlands, estuaries, and lakes. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.  
**Cross Listing(s):** BIOL 5542G.

BIOL 5543 Biological Field Experience  
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.  
A field expedition involving biological investigations of a major biome or natural area. Expeditions normally require three to five weeks in the field, depending upon the habitat selected and the type of travel required. In addition to tuition, students must bear all travel expenses while in the field. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.  
**Cross Listing(s):** BIOL 5543G, BIOL 5543S.

BIOL 5544 Population Biology  
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.  
A review of the genetic consequences of evolutionary forces that impact population structure, cohesion, and persistence. Special attention is given to the behavioral, ecological, and demographic responses of populations to natural selection pressures arising from the social environment and the presence of other species in the community. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.  
**Cross Listing(s):** BIOL 5544G.

BIOL 5546 Plant Ecology  
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.  
Examines fundamental principles and major conceptual issues in plant ecology. Students will learn about the distinctive and often unique ways in which plants interact with the biotic and abiotic components of their environment, and how these factors affect the abundance and distribution of plants. Graduate students are given extra assignments not required of undergraduates.  
**Prerequisite(s):** BIOL 2107, BIOL 2108, BIOL 4635.  
**Cross Listing(s):** BIOL 5546G.

BIOL 5547 Marine Ecology  
4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.  
Course stresses ecological processes and adaptations that act to structure coastal associations and permit their persistence through time. The course provides a background for students interested in research in the marine sciences. Students will learn to develop good statistical designs and use various techniques to collect data in marine ecology. Several field trips are required. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.  
**Prerequisite(s):** BIOL 2107 and BIOL 2107L and BIOL 2108 and BIOL 2108L and BIOL 3133.  
**Cross Listing(s):** BIOL 5547G.

BIOL 5644 Behavioral Ecology  
0.4 Credit Hours. 0.3 Lecture Hours. 0.3 Lab Hours.  
An advanced course on how evolution and ecology shape behavior. Through lectures, discussions of papers from the primary literature, field trips with experiments related to recent topics covered in class, and presentations on their research, students will be immersed in the field of behavioral ecology. The laboratory will emphasize techniques used to study behavioral ecology and provide students an opportunity to conduct their own research projects. Graduate students will be given an extra assignment determined by the instructor that undergraduates will not be required to do.  
**Prerequisite(s):** BIOL 2107 and BIOL 2107L and BIOL 2108 and BIOL 2108L and BIOL 3635.  
**Cross Listing(s):** BIOL 5644G.

SUST 4730 Practicum in Environmental Sustainability  
3 Credit Hours. 0 Lecture Hours. 0 Lab Hours.  
A practicum for the completion of the Concentration in Environmental Sustainability. Students will work with a faculty mentor to develop and implement sustainability projects in their field of expertise on campus or in the community. Projects will be presented to the public at the end of the semester in a Sustainability Symposium. The course is offered through the Center for Sustainability at Georgia Southern.