BIOL - BIOLOGY

BIOL 1011K Introduction to Biology (3-1-4)
An introduction to fundamental unifying principles in biology. Topics covered in the course include: chemistry of life, cell structure and membranes, cellular functions (metabolism, respiration, photosynthesis, communication, and reproduction), genetics (inheritance patterns, DNA structure and function, gene expression, and biotechnology), and evolution. This course involves both lecture and lab components. Course available through eCore.

BIOL 1012K Introductory BIOL II and Lab (3-1-4)
This course covers the evolution and diversity of organisms, including microbes, protists, fungi, plants, and animals. Additional topics include body systems, the immune system, reproduction and development, and ecology. For non-biology majors only. Course available through eCore.

BIOL 1107K Principles of Biology I (3-2-4)
Part one of a two-course sequence designed for biology majors. This course is an introduction to basic concepts in biological chemistry, cell and molecular biology, genetics, and evolution. (Course may not be used to satisfy Area D of the core curriculum.)
Prerequisite(s): (Math Course Placement with a score of 1111 or Math Course Placement with a score of 1113 or Math Course Placement with a score of 1125 or Math Course Placement with a score of 1131 or Math Course Placement with a score of 1132 or MATH 0195 with a minimum grade of C< or MATH 1111 with a minimum grade of C or MATH 1113 with a minimum grade of C or MATH 1125 with a minimum grade of C or MATH 1131 with a minimum grade of C or MATH 1132 with a minimum grade of C)

BIOL 1108K Principles of Biology II (3-2-4)
Part two of a two-course sequence designed for biology majors. This course is an introduction to basic concepts in evolution, ecology, biological classification and biodiversity. (Course may not be used to satisfy Area D of the core curriculum.)
Prerequisite(s): BIOL 1231K with a minimum grade of C or BIOL 1107K with a minimum grade of C

BIOL 1125 Contemporary Issues in Biology Non-Lab (3-0-3)
An examination of two or three current topics in biology. Topics will include at least one medically-related and one environmentally-related issue and may draw from the fields of cell biology, physiology, systematics, and ecology. Course may be repeated for credit when offered with a different topic.
Repeatability: Repeatable for credit up to 3 times or 12 hours.

BIOL 1215K Introductory Biology (3-2-4)
Exploration of the scientific paradigm as applied for human understanding of the living cell, molecular genetics, population genetics, organic evolution, and ecology. Includes inquiry-based laboratory.

BIOL 1216K Human Biology (3-3-4)
A survey of the principles of biology employing the human organism as a representative species. (Course may not be used to satisfy Area D of the core curriculum.)

BIOL 1225K Contemporary Issues in Biology with Lab (3-2-4)
An examination of two or three current topics in biology. Topics will include at least one medically-related and one environmentally-related issue and may draw from the fields of cell biology, physiology, systematics, and ecology. Includes a laboratory experience; laboratory work or field trips may necessitate attendance at times other than those scheduled. Course may be repeated for credit with a different title.

BIOL 1715 Professionalism and Careers in Biology (1-0-1)
Restriction: Biology major. This course is designed to help students explore and begin to prepare for careers in biology and related fields. Soft skills that lead to success will be emphasized, including study techniques, career resources, library research, degree planning, and resume building. Students will also be introduced to the biology faculty and their research interests.

BIOL 2206K Organismic Biology I (3-2-4)
This course provides a comprehensive overview of the patterns and mechanisms of evolution, including the classification of living things. This is followed by reviews of the diversity, structure, function, and ecology of bacteria, archaea, algae, fungi, and plants. (Course may not be used to satisfy Area D of the core curriculum.)
Prerequisite(s): BIOL 1232K with a minimum grade of C or BIOL 1108K with a minimum grade of C

BIOL 2207K Organismic Biology II (3-2-4)
This course reviews the mechanisms and patterns of evolution that have produced the diversity of form and function of organisms on earth. Groups to be studied include protists and animals. (Course may not be used to satisfy Area D of the core curriculum.)
Prerequisite(s): BIOL 1232K with a minimum grade of C or BIOL 1108K with a minimum grade of C

BIOL 2251K Anatomy & Physiology I (3-2-4)
This integrated lecture and laboratory course is the first course in a two-semester sequence designed to explore the biological and chemical processes underlying the structure and function of the human body at the cellular, tissue, organ, and whole-body level. Topics to be covered include, but are not limited to, biological chemistry; cellular structure and function; tissues; and the integumentary, skeletal, muscular, and nervous systems. This course includes laboratory exercises that supplement the material covered in lectures. This course is designed primarily for non-biology majors, especially those pursuing majors in nursing and the allied health professions.
Prerequisite(s): BIOL 1107K with a minimum grade of C or BIOL 1215K with a minimum grade of C or BIOL 1231K with a minimum grade of C or (CHEM 1151 with a minimum grade of C and CHEM 1151L with a minimum grade of C) or (CHEM 1211 with a minimum grade of C and CHEM 1211L with a minimum grade of C)

BIOL 2252K Anatomy & Physiology II (3-2-4)
This integrated lecture and laboratory course is the second course in a two-semester sequence designed to explore the biological and chemical processes underlying the structure and function of the human body at the cellular, tissue, organ, and whole-body level. Topics to be covered include, but are not limited to, the cardiovascular, endocrine, lymphatic and immune, respiratory, digestive, urinary, and reproductive systems. Metabolism and fluid, electrolyte, and acid-base balance will also be covered. This course includes laboratory exercises that supplement the material covered in lectures. This course is designed primarily for non-biology majors, especially those pursuing majors in nursing and the allied health professions.
Prerequisite(s): BIOL 2221K with a minimum grade of C or BIOL 2251K with a minimum grade of C

BIOL 2260K Foundations of Microbiology (3-2-4)
This integrated lecture and laboratory course provides an introduction to microbiology. This course introduces the student to the diversity and classification of medically significant microorganisms, their modes of pathogenesis and transmission, and the infectious diseases they cause. Topics to be covered include, but are not limited to, microbial cell biology and genetics; major classes of disease-causing microorganisms; host immune response; microbial control; aseptic technique; disinfection; and isolation, culture, staining, and identification of microorganisms. Select laboratory exercises will provide training in the basic laboratory techniques for culture and identification of microbes. This course is designed primarily for non-biology majors, especially those pursuing majors in nursing and the allied health professions.
Prerequisite(s): BIOL 1107K with a minimum grade of C or BIOL 1215K with a minimum grade of C or BIOL 1231K with a minimum grade of C or (CHEM 1151 with a minimum grade of C and CHEM 1151L with a minimum grade of C) or (CHEM 1211 with a minimum grade of C and CHEM 1211L with a minimum grade of C)

BIOL 3215K Cell Biology (3-3-4)
Study of the morphology and function of cellular structures in multicellular organisms. Emphasis is placed on the structure, function, and unifying nature of cell membrane systems, cellular energetics, motility and transport, intercellular interactions, cellular communication, and cell division. Laboratory experiences introduce basic cytological study techniques.
Prerequisite(s): (BIOL 1231K with a minimum grade of C or BIOL 1107K with a minimum grade of C) and (CHEM 1212 with a minimum grade of C and CHEM 1212L with a minimum grade of C or CHEM 1212K with a minimum grade of C)

BIOL 3216K Genetics (3-3-4)
An introduction to genetic analysis. Topics include simple Mendelian inheritance, extensions of Mendelian inheritance, linkage, genetic mapping, quantitative inheritance, population genetics, prokaryotic genetics, and molecular genetics. Laboratory assignments will require more than the scheduled time periods.
Prerequisite(s): BIOL 1231K with a minimum grade of C or BIOL 1107K with a minimum grade of C

BIOL 3217K Ecology (3-4-4)
A laboratory and field-oriented course dealing with the distribution and abundance of living organisms. Topics include an exploration of adaptations to environments, population dynamics, and community organization and function. Laboratory and field work will require time beyond the scheduled periods.
Prerequisite(s): STAT 1401 with a minimum grade of C and (BIOL 1108K with a minimum grade of C or BIOL 1232K with a minimum grade of C) or ENVS 3105 with a minimum grade of C and (BIOL 1011K with a minimum grade of C or BIOL 1215K with a minimum grade of C)

BIOL 4392 Undergraduate Research (0-6-2)
In association with a faculty mentor, the student will propose and execute a research plan.
Prerequisite(s): BIOL 4391 with a minimum grade of C
Restriction(s):
Enrollment limited to students in the Department Prerequisite college.

BIOL 4393 Research Presentation (0-6-2)
Each student will analyze self-generated research data and prepare both written and oral presentations of the work. Where appropriate, students will be encouraged to make presentations at regional professional meetings or submit work to a scientific journal for publication.
Prerequisite(s): BIOL 4392 with a minimum grade of C or BIOL 4392H
Restriction(s):
Enrollment limited to students in the Department Prerequisite college.

BIOL 4698 Internship (0-(2-8)-(1-4))
Academic credit may be earned for approved biological work experiences, either as a volunteer or through employment. An internship experience must be agreed upon in advance by an on-site supervisor and a CSU faculty member. Successful completion requires a written evaluation from the on-site supervisor, a written report by the student intern and an oral presentation to faculty and students.
Restriction(s):
Freshman or Sophomore students may **not** enroll.
Enrollment limited to students in the Department Prerequisite college.

BIOL 4795 Capstone Senior Seminar (0-2-2)
Students and faculty participate in formal discussions of assigned readings related to biological evolution.
Prerequisite(s): BIOL 2206K with a minimum grade of C and BIOL 2207K with a minimum grade of C and (BIOL 3215K with a minimum grade of C or BIOL 3215 with a minimum grade of C or BIOL 3215H with a minimum grade of C or BIO 321 with a minimum grade of C) and (BIOL 3216K with a minimum grade of C or BIOL 3216 with a minimum grade of C or BIOL 3216H with a minimum grade of C) and (BIOL 3217K with a minimum grade of C or BIOL 3217 with a minimum grade of C or BIOL 3217H with a minimum grade of C)
Restriction(s):
Enrollment limited to students major in Biology.

BIOL 5117G Medical Genetics and Genomics (3-0-3)
Examination of the genetic and molecular basis of human health and disease, including modern human genetics and genomics methods.
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5117U Medical Genetics and Genomics (3-0-3)
Examination of the genetic and molecular basis of human health and disease, including modern human genetics and genomics methods.
Prerequisite(s): BIOL 3216K with a minimum grade of C

BIOL 5118G Neuroscience (3-0-3)
This course provides a detailed study of the nervous system. The student will explore the mechanics of the brain, spinal cord and nerves from a molecular and cellular perspective. The course explores neuroscience from the perspective of the neuron and neurological diseases and disorders.
Prerequisite(s): BIOL 3215K with a minimum grade of C or BIOL 3215 with a minimum grade of C or BIOL 3215H with a minimum grade of C or BIO 311 with a minimum grade of C or BIO 321 with a minimum grade of C or BY 340 with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5118U Neuroscience (3-0-3)
This course provides a detailed study of the nervous system. The student will explore the mechanics of the brain, spinal cord and nerves from a molecular and cellular perspective. The course explores neuroscience from the perspective of the neuron and neurological diseases and disorders.
Prerequisite(s): BIOL 3215K with a minimum grade of C or BIOL 3215 with a minimum grade of C or BIOL 3215H with a minimum grade of C or BIO 311 with a minimum grade of C or BIO 321 with a minimum grade of C or BY 340 with a minimum grade of C
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5215G Developmental Biology (3-3-4)
Detailed study of interacting systems in animal development. Fertilization, early development, regulation of gene expression, cell fate specification, morphogenesis, proximate tissue interactions, environmental influences on development, and evolution of developmental patterns.
Prerequisite(s): (BIOL 3215K with a minimum grade of C or BIOL 3215 with a minimum grade of C or BIOL 3215H with a minimum grade of C or BIO 311 with a minimum grade of C or BIO 321 with a minimum grade of C or BY 340 with a minimum grade of C) and (BIOL 3216K with a minimum grade of C or BIOL 3216 with a minimum grade of C or BIOL 3216H with a minimum grade of C or BIO 312 with a minimum grade of C or BIO 322 with a minimum grade of C or BY 370 with a minimum grade of C)
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5215U Developmental Biology (3-3-4)
Detailed study of interacting systems in animal development. Fertilization, early development, regulation of gene expression, cell fate specification, morphogenesis, proximate tissue interactions, environmental influences on development, and evolution of developmental patterns.
Prerequisite(s): (BIOL 3215K with a minimum grade of C or BIOL 3215 with a minimum grade of C or BIOL 3215H with a minimum grade of C or BIO 311 with a minimum grade of C or BIO 321 with a minimum grade of C or BY 340 with a minimum grade of C) and (BIOL 3216K with a minimum grade of C or BIOL 3216 with a minimum grade of C or BIOL 3216H with a minimum grade of C or BIO 312 with a minimum grade of C or BIO 322 with a minimum grade of C or BY 370 with a minimum grade of C)
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5216G Histology and Histotechniques (3-3-4)
A study of the microscopic and ultramicroscopic structure of mammalian tissues and organs. The course highlights normal vertebrate histology and the functional significance of microanatomical structures. Function of individual cells will be correlated to the function of the appropriate tissues, organs, organ systems and the organism as a whole. Laboratory sessions will include sessions dedicated to learning to identify tissue types and to learning common histological techniques.
Prerequisite(s): BIOL 3215K with a minimum grade of C or BIOL 3215 with a minimum grade of C or BIOL 3215H with a minimum grade of C or BIO 311 with a minimum grade of C or BIO 321 with a minimum grade of C or BY 340 with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5216U Histology and Histotechniques (3-3-4)
A study of the microscopic and ultramicroscopic structure of mammalian tissues and organs. The course highlights normal vertebrate histology and the functional significance of microanatomical structures. Function of individual cells will be correlated to the function of the appropriate tissues, organs, organ systems and the organism as a whole. Laboratory sessions will include sessions dedicated to learning to identify tissue types and to learning common histological techniques.
Prerequisite(s): BIOL 3215K with a minimum grade of C or BIOL 3215 with a minimum grade of C or BIOL 3215H with a minimum grade of C or BIO 311 with a minimum grade of C or BIO 321 with a minimum grade of C or BY 340 with a minimum grade of C
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5217G Cell and Molecular Techniques (2-4-4)
A laboratory-intensive course that introduces basic experimental techniques used in cell and molecular biology, laboratory safety and methods in research. The lecture topics covered include the structure and function of nucleic acids and proteins, biochemistry, molecular genetics and genetic engineering. The cellular techniques represent an application of cell biology, genetics and biochemistry.
Prerequisite(s): BIOL 3215K with a minimum grade of C or BIOL 3215 with a minimum grade of C or BIOL 3215H with a minimum grade of C or BIO 311 with a minimum grade of C or BIO 321 with a minimum grade of C or BY 340 with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5217U Cell and Molecular Techniques (2-4-4)
A laboratory-intensive course that introduces basic experimental techniques used in cell and molecular biology, laboratory safety and methods in research. The lecture topics covered include the structure and function of nucleic acids and proteins, biochemistry, molecular genetics and genetic engineering. The cellular techniques represent an application of cell biology, genetics and biochemistry.
Prerequisite(s): BIOL 3215K with a minimum grade of C or BIOL 3215 with a minimum grade of C or BIOL 3215H with a minimum grade of C or BIO 311 with a minimum grade of C or BIO 321 with a minimum grade of C or BY 340 with a minimum grade of C
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5218G Introduction to Virology (3-0-3)
Introduction to Virology is a course designed for graduate level biology majors interested in the world of viruses. This course will introduce students to the mechanisms behind viral replication and transmission to other cells. It will also provide insight into the immune cell response. In addition, students in this course will learn about various molecular techniques used in viral studies including culturing methods. Hence, a thorough knowledge of cellular and molecular biology, genetics and biochemistry is required.
Prerequisite(s): BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5218U Introduction to Virology (3-0-3)
Introduction to Virology is a course designed for advanced undergraduate biology majors interested in the world of viruses. This course will introduce students to the mechanisms behind viral replication and transmission to other cells. It will also provide insight into the host cell response to viral infections. In addition, students in this course will learn about various molecular techniques used in viral studies. Hence, a thorough knowledge of cellular and molecular biology, genetics and biochemistry is required.
Prerequisite(s): BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C
Restriction(s):
Enrollment limited to Junior or Senior students.

BIOL 5219G Immunology (3-3-4)
The study of the human immune system, its development, innate and adaptive immune responses, B and T cell receptors and signaling, cytokines and chemokines, and antigen presentation. The course will also explore the immune system as it relates to infectious disease—specifically host-pathogen interactions, vaccines, and immunodeficiency disorders.
Prerequisite(s): BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5219U Immunology (3-3-4)
The study of the human immune system, its development, innate and adaptive immune responses, B and T cell receptors and signaling, cytokines and chemokines, and antigen presentation. The course will also explore the immune system as it relates to infectious disease—specifically host-pathogen interactions, vaccines, and immunodeficiency disorders.
Prerequisite(s): BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C

BIOL 5225G Microbial Pathogenesis (3-3-4)
The study of the pathogenesis of microorganisms including bacteria, viruses, and eukaryotic pathogens. Emphasis will be placed upon how these organisms cause disease, specific mechanisms of virulence, and how pathogens evade the host immune response.
Prerequisite(s): BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5225U Microbial Pathogenesis (3-3-4)
The study of the pathogenesis of microorganisms including bacteria, viruses, and eukaryotic pathogens. Emphasis will be placed upon how these organisms cause disease, specific mechanisms of virulence, and how pathogens evade the host immune response.
Prerequisite(s): BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C

BIOL 5245G Comparative Animal Physiology (3-3-4)
The principles of physiology and their application to how animals function in different environments. An evolutionary approach to animal function, comparing the physiological challenges and adaptations that species and groups of species have. Major animal organ systems covered include neural, muscular, endocrine, cardiovascular, digestive, renal, and respiratory.
Prerequisite(s): BIOL 3215K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5245U Comparative Animal Physiology (3-3-4)
The principles of physiology and their application to how animals function in different environments. An evolutionary approach to animal function, comparing the physiological challenges and adaptations that species and groups of species have. Major animal organ systems covered include neural, muscular, endocrine, cardiovascular, digestive, renal, and respiratory.
Prerequisite(s): BIOL 3215K with a minimum grade of C
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5246G Entomology (3-3-4)
A general introduction to the classification, morphology, physiology, ecology and behavior of insects.
Prerequisite(s): BIOL 2207K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5246U Entomology (3-3-4)
A general introduction to the classification, morphology, physiology, ecology and behavior of insects.
Prerequisite(s): BIOL 2207K with a minimum grade of C
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5247G Microbial Diversity (3-3-4)
Survey of microbial diversity and the roles of these organisms in the environment and human health. (Course fee required).
Prerequisite(s): BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C and BIOL 3217K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5247U Microbial Diversity (3-3-4)
Survey of microbial diversity and the roles of these organisms in the environment and human health. (Course fee required).
Prerequisite(s): BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C and BIOL 3217 with a minimum grade of C

BIOL 5248G Ornithology (3-3-4)
The biology of birds, with topics including avian evolution, functional morphology, physiology, ecology and behavior. Labs will focus on avian form and function, and identification of local bird species by sight and sound.
Prerequisite(s): BIOL 2207K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5248U Ornithology (3-3-4)
Prerequisites: BIOL 2207K with a grade of "C" or better. The biology of birds, with topics including avian evolution, functional morphology, physiology, ecology and behavior. Labs will focus on avian form and function, and identification of local bird species by sight and sound.
Prerequisite(s): BIOL 2207K with a minimum grade of C
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5249G Parasitology (3-3-4)
This course surveys selected parasites of medical and veterinary importance and examines the pathogenesis and epidemiology of their associated diseases.
Prerequisite(s): BIOL 2207K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5249U Parasitology (3-3-4)
This course surveys selected parasites of medical and veterinary importance and examines the pathogenesis and epidemiology of their associated diseases.
Prerequisite(s): BIOL 2207K with a minimum grade of C
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5255G Vertebrate Diversity (3-3-4)
The classification, natural history, anatomy, physiology, and adaptive strategies of the major groups of vertebrates. Labs will focus on the identification of local species.
Prerequisite(s): BIOL 2207K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5255U Vertebrate Diversity (3-3-4)
The classification, natural history, anatomy, physiology, and adaptive strategies of the major groups of vertebrates. Labs will focus on the identification of local species.
Prerequisite(s): BIOL 2207K with a minimum grade of C
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5256G Plant Taxonomy (2-4-4)
This field-oriented course will focus on regional plant identification. This course will cover classification, morphology and distribution of plants families as well as an introduction to local genera and species. (course fee required)
Prerequisite(s): BIOL 2206K with a minimum grade of C and BIOL 3216K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5256U Plant Taxonomy (2-4-4)
This field-oriented course will focus on regional plant identification. This course will cover classification, morphology and distribution of plants families as well as an introduction to local genera and species. (course fee required)
Prerequisite(s): BIOL 2206K with a minimum grade of C and BIOL 3216K with a minimum grade of C

BIOL 5257G Biology of Aging (3-2-4)
This class is designed to help students understand the changes that occur to organisms once they get past reproductive maturity. Because aging has been studied more in humans than in other organisms, more time will be devoted to humans. However, the information that is understood about other organisms (e.g., yeast, fruitflies, mice) will also be studied. (course fee required)
Prerequisite(s): BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5257U Biology of Aging (3-2-4)
This class is designed to help students understand the changes that occur to organisms once they get past reproductive maturity. Because aging has been studied more in humans than in other organisms, more time will be devoted to humans. However, the information that is understood about other organisms (e.g., yeast, fruitflies, mice) will also be studied. (course fee required)
Prerequisite(s): BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C

BIOL 5259G Comparative Vertebrate Anatomy (3-2-4)
This course examines the adaptive anatomy and phylogeny of representative vertebrates and their organ systems. The course includes laboratory time devoted to meticulous dissection and examination.
Prerequisite(s): BIOL 2207K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5259U Comparative Vertebrate Anatomy (3-2-4)
This course examines the adaptive anatomy and phylogeny of representative vertebrates and their organ systems. The course includes laboratory time devoted to meticulous dissection and examination.
Prerequisite(s): BIOL 2207K with a minimum grade of C

BIOL 5265G Food Microbiology (3-3-4)
This course is designed to investigate the types of bacteria and fungi involved in food production and spoilage, and the biological and chemical processes carried out by these organisms during these actions. Food-borne disease and control methods will also be studied.
Prerequisite(s): (BIOL 1231K with a minimum grade of C and BIOL 3215K with a minimum grade of C) or (CHEM 3141 with a minimum grade of C and CHEM 3345 with a minimum grade of C)
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5265U Food Microbiology (3-3-4)
This course is designed to investigate the types of bacteria and fungi involved in food production and spoilage, and the biological and chemical processes carried out by these organisms during these actions. Food-borne disease and control methods will also be studied.
Prerequisite(s): (BIOL 1231K with a minimum grade of C and BIOL 3215K with a minimum grade of C) or (CHEM 3141 with a minimum grade of C and CHEM 3345 with a minimum grade of C)

BIOL 5266G Ichthyology (3-3-4)
In this course students will learn basic concepts in several areas of ichthyology including evolution, taxonomy, systematics, and biogeography, anatomy and physiology, behavior, and ecology. This course will focus on form and function, behavior, life history, and ecology. We will also cover the key taxonomic characteristics of most of the orders of fishes. There will be a research project with an outside of class time commitment of 40+ hours. Lecture and lab hours vary with topic, and laboratory work may extend beyond scheduled hours.
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5266U Ichthyology (3-3-4)
In this course students will learn basic concepts in several areas of ichthyology including evolution, taxonomy, systematics, and biogeography, anatomy and physiology, behavior, and ecology. This course will focus on form and function, behavior, life history, and ecology. We will also cover the key taxonomic characteristics of most of the orders of fishes. There will be a research project with an outside of class time commitment of 40+ hours. Lecture and lab hours vary with topic, and laboratory work may extend beyond scheduled hours.
Prerequisite(s): BIOL 2206K with a minimum grade of C and BIOL 2207K with a minimum grade of C and BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C

BIOL 5285G Aquatic Biology (3-4-4)
An investigation of the abiotic and biotic processes that structure freshwater ecosystems and the differences among those ecosystems. The goal of this course is to learn the factors that influence population, community, and ecosystem structure in freshwaters; to conduct research in freshwater systems; and to gain a greater understanding of how human activities impact these systems.
Prerequisite(s): BIOL 3217K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5285U Aquatic Biology (3-4-4)
An investigation of the abiotic and biotic processes that structure freshwater ecosystems and the differences among those ecosystems. The goal of this course is to learn the factors that influence population, community, and ecosystem structure in freshwaters; to conduct research in freshwater systems; and to gain a greater understanding of how human activities impact these systems.
Prerequisite(s): BIOL 3217K with a minimum grade of C
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5286G Community Ecology (3-4-4)
This field-oriented course deals with the ecology of communities. Topics include diversity, community structure, metacommunities, island biogeography and disturbances.
Prerequisite(s): BIOL 3217K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5286U Community Ecology (3-4-4)
This field-oriented course deals with the ecology of communities. Topics include diversity, community structure, metacommunities, island biogeography and disturbances.
Prerequisite(s): BIOL 3217K with a minimum grade of C
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5287G Conservation Genetics (2-6-4)
Students will gain an appreciation for many of the concepts that form the basis of conservation genetics such as biodiversity and species loss, the genetic structure and evolution of natural populations, the consequences of reduced population size, the impact of gene flow on small populations, as well as the management and conservation of endangered species.
Prerequisite(s): BIOL 2206K with a minimum grade of C and BIOL 2207K with a minimum grade of C and BIOL 3216K with a minimum grade of C and BIOL 3217K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5287U Conservation Genetics (2-6-4)
Students will gain an appreciation for many of the concepts that form the basis of conservation genetics such as biodiversity and species loss, the genetic structure and evolution of natural populations, the consequences of reduced population size, the impact of gene flow on small populations, as well as the management and conservation of endangered species.
Prerequisite(s): BIOL 2206K with a minimum grade of C and BIOL 2207K with a minimum grade of C and BIOL 3216K with a minimum grade of C and BIOL 3217K with a minimum grade of C
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5288G Plant Ecology (3-4-4)
This is an advanced ecology course with lectures and lab activities that focus on plants and their interactions. Topics include pollination, fruit dispersal, herbivory, competition, diversity, succession and physiology.
Prerequisite(s): BIOL 3217K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5288U Plant Ecology (3-4-4)
This is an advanced ecology course with lectures and lab activities that focus on plants and their interactions. Topics include pollination, fruit dispersal, herbivory, competition, diversity, succession and physiology.
Prerequisite(s): BIOL 3217K with a minimum grade of C
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5289G Environmental Toxicology (3-3-4)
Environmental Toxicology provides an understanding of why and how chemicals can cause adverse effects on living organisms, going from the cellular to the community levels of biological organization. The lab component includes basic equipment use and care, along with computational and critical thinking so that the student gains practical skills useful in a toxicity testing facility. (course fee required)
Prerequisite(s): BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C and BIOL 3217K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5289U Environmental Toxicology (3-3-4)
Environmental Toxicology provides an understanding of why and how chemicals can cause adverse effects on living organisms, going from the cellular to the community levels of biological organization. The lab component includes basic equipment use and care, along with computational and critical thinking so that the student gains practical skills useful in a toxicity testing facility. (course fee required)
Prerequisite(s): BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C and BIOL 3217K with a minimum grade of C

BIOL 5295G Animal Communication (3-2-4)
Prerequisite: BIOL 2207K and BIOL 3217K with a minimum grade of C. Animal Communication will expose students to evolutionary and ecological concepts centered on animal communication. Students will explore mechanisms of signal production and reception, how and why animals have evolved to communicate with one another, techniques used to quantify information contained within signals, and the effect anthropogenic activities have on animal communication systems. Students will use evolutionary game theory to explore important aspects of animal communication including signal honesty, conflict resolution, territoriality, and mating.
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5295U Animal Communication (3-2-4)
Prerequisite: BIOL 2207K and BIOL 3217K with a minimum grade of C. Animal Communication will expose students to evolutionary and ecological concepts centered on animal communication. Students will explore mechanisms of signal production and reception, how and why animals have evolved to communicate with one another, techniques used to quantify information contained within signals, and the effect anthropogenic activities have on animal communication systems. Students will use evolutionary game theory to explore important aspects of animal communication including signal honesty, conflict resolution, territoriality, and mating.

BIOL 5317G Genomics and Bioinformatics Lab (0-3-1)
Using genomics and bioinformatics data analysis tools to analyze gene structures and identify variants associated with human diseases.
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5317U Genomics and Bioinformatics Lab (0-3-1)
Using genomics and bioinformatics data analysis tools to analyze gene structures and identify variants associated with human diseases.
Prerequisite(s): BIOL 3216K with a minimum grade of C

BIOL 5318G Neuroscience Lab (0-3-1)
The student will explore the nervous system from a molecular and cellular perspective in a laboratory setting. Planned and student-generated experimental design will provide the framework for experiential learning. Techniques will include electrophysiology, dissection, and cell culture.
Prerequisite(s): BIOL 3215K with a minimum grade of C and BIOL 5118G (may be taken concurrently) with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5318U Neuroscience Lab (0-3-1)
The student will explore the nervous system from a molecular and cellular perspective in a laboratory setting. Planned and student-generated experimental design will provide the framework for experiential learning. Techniques will include electrophysiology, dissection, and cell culture.
Prerequisite(s): BIOL 3215K with a minimum grade of C and BIOL 5118U (may be taken concurrently) with a minimum grade of C
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5515G Selected Topics in Cell and Molecular Biology ((0-4)-(0-8)-(1-4))
An opportunity to study in depth one of many specialized fields in cellular and molecular biology. The specific topic will vary by semester and instructor. Course may be repeated for credit when topic differs. Laboratory experiences, when included, will introduce the student to basic cytological study techniques for that specific field. Lecture and lab hours vary with topic, and laboratory work may extend beyond scheduled hours.
Prerequisite(s): BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5515U Selected Topics in Cell and Molecular Biology ((0-4)-(0-8)-(1-4))
An opportunity to study in depth one of many specialized fields in cellular and molecular biology. The specific topic will vary by semester and instructor. Course may be repeated for credit when topic differs. Laboratory experiences, when included, will introduce the student to basic cytological study techniques for that specific field. Lecture and lab hours vary with topic, and laboratory work may extend beyond scheduled hours.
Prerequisite(s): BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5525G Selected Topics in Organismic Biology ((0-4)-(0-8)-(1-4))
An opportunity to study one of the fields encompassed by organismic biology. The specific topic will vary by semester and instructor. Topics will be related to knowledge and investigation of the structure, function, and adaptations of groups of living organisms. Topics include but are not limited to: morphology, physiology, or taxonomy of various groups of organisms. Lecture and lab hours vary with topic, and laboratory work may extend beyond scheduled hours. Course may be repeated for credit when topic differs.
Prerequisite(s): BIOL 2206K with a minimum grade of C and BIOL 2207K with a minimum grade of C and BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5525U Selected Topics in Organismic Biology ((0-4)-(0-8)-(1-4))
An opportunity to study one of the fields encompassed by organismic biology. The specific topic will vary by semester and instructor. Topics will be related to knowledge and investigation of the structure, function, and adaptations of groups of living organisms. Topics include but are not limited to: morphology, physiology, or taxonomy of various groups of organisms. Lecture and lab hours vary with topic, and laboratory work may extend beyond scheduled hours. Course may be repeated for credit when topic differs.
Prerequisite(s): BIOL 2206K with a minimum grade of C and BIOL 2207K with a minimum grade of C and BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5535G Selected Topics in Ecological and Evolutionary Biology ((0-4)-(0-8)-(1-4))
An opportunity to study one of the fields encompassed by ecological or evolutionary biology. The specific topic will vary by semester and instructor. Topics will be related to knowledge and investigation of the distribution, abundance and adaptations of living organisms as mediated by the environment and natural selection. Lecture and lab hours vary with topic, and laboratory work may extend beyond scheduled hours. Course may be repeated for credit when topic differs.
Prerequisite(s): BIOL 2206K with a minimum grade of C and BIOL 2207K with a minimum grade of C and BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C and BIOL 3217K with a minimum grade of C
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5535U Selected Topics in Ecological and Evolutionary Biology ((0-4)-(0-8)-(1-4))
An opportunity to study one of the fields encompassed by ecological or evolutionary biology. The specific topic will vary by semester and instructor. Topics will be related to knowledge and investigation of the distribution, abundance and adaptations of living organisms as mediated by the environment and natural selection. Lecture and lab hours vary with topic, and laboratory work may extend beyond scheduled hours. Course may be repeated for credit when topic differs.
Prerequisite(s): BIOL 2206K with a minimum grade of C and BIOL 2207K with a minimum grade of C and BIOL 3215K with a minimum grade of C and BIOL 3216K with a minimum grade of C and BIOL 3217K with a minimum grade of C
Restriction(s):
Enrollment is limited to Undergraduate Level level students.

BIOL 5899G Independent Study (0-0-(1-3))
An opportunity to study a biological topic or carry out a research project in an area of interest. A proposal must be submitted to the department head by the midpoint of the semester prior to the one in which the study is to be undertaken. The proposal must be approved and a faculty mentor identified before registration. Assessment of this study will include a public presentation.
Restriction(s):
Enrollment is limited to Graduate Level level students.

BIOL 5899U Independent Study (0-0-(1-3))
An opportunity to study a biological topic or carry out a research project in an area of interest. A proposal must be submitted to the department head by the midpoint of the semester prior to the one in which the study is to be undertaken. The proposal must be approved and a faculty mentor identified before registration. Assessment of this study will include a public presentation.
Restriction(s):
Senior, Non-Degree - Undergrad PostBac or Degree - Undergrad PostBac students may **not** enroll.
Enrollment limited to students in the Department Prerequisite college.

BIOL 6000 Masters Thesis Defense (0-0-0)
Prerequisite: Permission of the Program Director. A satisfactory grade in the course indicates a successful oral defense of the master's thesis, the completion of edits and approval by the advisor or committee, and submission to the library. Degree candidates must be enrolled in this course during the semester of their defense. (S/U grading)
Restriction(s):
Enrollment limited to students in the Department Prerequisite college.

BIOL 6215 Principles of Experimental Design and Applications in Biology (3-2-4)
Experimental design discussions will vary by semester and expertise of the instructor. Lectures and laboratory experiences, when included will provide experiential, hands-on learning in the process of properly designing experiments and how different designs are applied in different research situations. Students will put into practice use of the scientific method; they will develop hypotheses, set up and collect preliminary data, analyze and report results, as well as discuss their results and draw conclusions. Laboratory and lecture hours may vary. Laboratory work may extend beyond the scheduled class hours. Course may be taught in a project-based format.
Restriction(s):
Enrollment limited to Degree - Graduate, Non-Degree - Graduate, Transient - Graduate, Audit - Graduate or Teacher Cert - Graduate students.
Enrollment limited to students major in Natural Sciences.
Enrollment limited to students in the College of Letters Sciences college.

BIOL 6515 Advanced Selected Topics in Cellular and Molecular Biology ((0-3)-(0-8)-(3-4))
Topics will vary by semester and expertise of the instructor. Topics may include but are not limited to Advanced Molecular Techniques, Advanced Neurobiology, Advanced Developmental Biology or Advanced Histology. This course, under different topic titles, may be repeated to allow specialization in the area of Cellular and Molecular Biology. Laboratory experiences, when included, will provide experiential, hands-on learning in the specific topic being covered. Laboratory and lecture hours may vary. Laboratory work may extend beyond the scheduled class hours. Course may be taught in a project-based format.
Repeatability: Repeatable for credit up to 5 times or 18 hours.
Restriction(s):
Enrollment is limited to Graduate Level level students.
Enrollment limited to students in the College of Educ Health Prof or College of Letters Sciences colleges.

BIOL 6516 Advanced Selected Topics in Organismic Biology ((0-3)-(0-8)-(3-4))
Topics will vary by semester and expertise of the instructor. Topics may include but are not limited to advanced study of Plant Taxonomy, Parasitology, Entomology, Ornithology, Mammalogy, Comparative Vertebrate Anatomy, Vertebrate Diversity, Comparative Vertebrate Physiology, Microbial Diversity, or Invertebrate Biology. This course may be repeated for credit when the topic differs to allow specialization in the area of Organismic Biology. Laboratory experiences, when included, will provide experiential, hands-on learning in the specific topic being covered. Laboratory and lecture hours may vary. Laboratory work may extend beyond the scheduled class hours and require Saturday or weekend field trips. Course may be taught in a project-based format.
Repeatability: Repeatable for credit up to 5 times or 18 hours.
Restriction(s):
Enrollment is limited to Graduate Level level students.
Enrollment limited to students in the College of Educ Health Prof or College of Letters Sciences colleges.

BIOL 6517 Advanced Selected Topics in Ecological and Evolutionary Biology ((0-3)-(0-8)-(3-4))
Topics will vary by semester and expertise of the instructor. Topics will focus on the distribution, abundance and adaptations of living organisms. Topics may include but are not limited to advanced coverage in the areas of Aquatic Biology, Environmental Toxicology, Conservation Genetics, Community Ecology, Aquatic Entomology, Coastal Environments and/or Natural Environments of Georgia or the Southeast or any of the international program sites selected for study. This course, under different topic titles, may be repeated to allow specialization in the area of Ecological or Evolutionary Biology. Laboratory and field experiences, when included, will provide experiential, hands-on learning in the specific topic being covered. Laboratory and lecture hours may vary. Laboratory work may extend beyond the scheduled class hours and require Saturday and/or weekend field trips. Course may be taught in a project-based format.
Repeatability: Repeatable for credit up to 5 times or 18 hours.
Restriction(s):
Enrollment is limited to Graduate Level level students.
Enrollment limited to students in the College of Educ Health Prof or College of Letters Sciences colleges.

BIOL 6555 Selected Topics in Biology (0-0-(1-4))
An opportunity to study a biological topic or carry out a short term research project in an area of interest. Courses will be semester length or short-courses in specialty areas of biology, available as needed or as required by current topics in biology. These are topics not usually available on a regular basis and may be repeated under a different topic. This course may be repeated an unlimited number of times.
Restriction(s):
Enrollment limited to Degree - Graduate, Non-Degree - Graduate, Transient - Graduate, Audit - Graduate or Teacher Cert - Graduate students.
Enrollment limited to students in the MSSD06 program.
Enrollment is limited to Graduate Level level students.

BIOL 6605 Master of Science Biology Internship (0-0-(1-6))
Academic credit may be earned for approved biological work experiences, either as a volunteer or through employment. An internship experience must be approved through the advisor and agreed upon by an on-site supervisor working with the graduate student and faculty advisor. Successful completion will require a written or oral evaluation from the on-site supervisor, a written report and an oral presentation by the graduate student intern.
Restriction(s):
Enrollment limited to Degree - Graduate, Non-Degree - Graduate, Transient - Graduate, Audit - Graduate or Teacher Cert - Graduate students.
Enrollment limited to students in the MSSD06 program.
Enrollment is limited to Graduate Level level students.
Enrollment limited to students in a Master of Science degree.

BIOL 6795 Biology Seminar Series (1-0-1)
Students and faculty will participate in formal and informal discussions of new research in the various fields of biology and research projects at CSU and with our local, regional and national partners. This course will be repeated for a total of 4 credits with expectations of student presentations of new material (proposal, preliminary data collection and analyses, preparation for thesis or topic paper defense).
Repeatability: Repeatable for credit up to 3 times or 4 hours.
Restriction(s):
Enrollment limited to Degree - Graduate, Non-Degree - Graduate, Transient - Graduate, Audit - Graduate or Teacher Cert - Graduate students.
Enrollment limited to students major in Biology or Natural Sciences.
Enrollment is limited to Graduate Level level students.
Enrollment limited to students in the College of Educ Health Prof or College of Letters Sciences colleges.

BIOL 6821 Master of Science Literature / Topic Paper (0-0-(1-6))
Students will select a topic for literature research in consultation with the members of their graduate advisement committee. The student will conduct a thorough literature search and complete a written proposal. The proposal must be completed before permission to enroll in BIOL 6822 (Master of Science Literature/Topic Paper).
Restriction(s):
Enrollment is limited to Graduate Level level students.
Enrollment limited to students in the College of Letters Sciences college.

BIOL 6822 Master of Science Literature / Topic Paper (0-0-3)
Prerequisite: BIOL 6821 with a grade B or better. Students will thoroughly research the Literature/Topic paper proposed in BIOL 6821. Students must complete BIOL 6821 with a satisfactory grade before registering for BIOL 6822
Restriction(s):
Enrollment is limited to Graduate Level level students.
Enrollment limited to students in the College of Letters Sciences college.

BIOL 6823 Master of Science Literature / Topic Paper Defense (0-0-0)
Prerequisite or Corequisite BIOL 6822 . Students will complete their Literature/Topic Paper and defend the ideas and concepts presented in the paper at a public oral defense. The Literature/Topic Paper defense will be followed by a rigorous review by the graduate advisement committee. Students will be encouraged to present their findings at regional and national meetings as well as publish their findings when appropriate.
Restriction(s):
Enrollment is limited to Graduate Level level students.
Enrollment limited to students in the College of Letters Sciences college.

BIOL 6931 Master of Science Thesis Research (0-0-(1-9))
Students will select a topic for thesis research. Students will select a research mentor and committee, conduct a literature search and complete a written research proposal.
Restriction(s):
Enrollment limited to students major in Biology.
Enrollment is limited to Graduate Level level students.
Enrollment limited to students in the College of Letters Sciences college.

BIOL 7440 Fundamentals of Evolution (3-0-3)
GOML course offered by Georgia Southern.
Restriction(s):
Enrollment limited to students in the MATCEI24 or MEDEDAT programs.
Enrollment is limited to Graduate Level level students.
Enrollment limited to students in a Master of Arts in Teaching, Master of Arts in Teaching-SEd or Master of Education degrees.
Enrollment limited to students in the GeorgiaOnMyLine campus.