BIOLOGY (BIOL)

BIOL 1011K. Introduction to Biology (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. For additional course information, visit http://ecore.usg.edu/courses/description.php
Prerequisites: ECOR with a score of C

BIOL 1012K. Introductory BIOL 2 with lab (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. For additional course information, visit http://ecore.usg.edu/courses/description.php
Prerequisites: ECOR with a score of C

BIOL 1107. Principles of Biology I (3)
A study of the principles of biology for science majors covering the scientific method, introductory evolution, basic chemistry as it applies to life, carbon, macromolecules, energy and metabolism, cell structure and function, membranes and transport, cellular respiration, photosynthesis, Mendelian genetics, mitosis and meiosis, and gene expression. This course can be taken before or after BIOL 1108.
Prerequisites: BIOL 1107L (may be taken concurrently) and (MATH 0099 or MATH 1101 or MATH 1111 or MATH 1113 (may be taken concurrently) or MATH 1501 (may be taken concurrently) or MATH 1112 (may be taken concurrently) or MATH 1112A (may be taken concurrently) or COMM with a score of 40 or (CPEM with a score of 55 and CPTC with a score of 040) or A02 with a score of 18 or S02 with a score of 430) and (CHEM 1211 and CHEM 1211L)

BIOL 1107L. Principles of Biology Lab I (1)
This laboratory course is part of a sequence for students majoring in biology, chemistry, and other sciences. It uses an experimental approach to investigating major principles of molecular and cellular biology. Students carry out scientific investigations using model organisms. Scientific study design, technical lab skills, graphing and statistical analysis, and scientific writing are emphasized.
Prerequisites: BIOL 1107 (may be taken concurrently)

BIOL 1108. Principles of Biology II (3)
A study of the principles of biology for science majors covering the scientific method, evolution, natural selection, population genetics, ecology, and the characteristics of life. This course can be taken before or after BIOL 1107.
Prerequisites: BIOL 1108L (may be taken concurrently) and (MATH 0099 or MATH 1101 or MATH 1111 or MATH 1113 (may be taken concurrently) or MATH 1501 (may be taken concurrently) or MATH 1112 (may be taken concurrently) or MATH 1112A (may be taken concurrently) or COMM with a score of 40 or (CPEM with a score of 55 and CPTC with a score of 040) or A02 with a score of 18 or S02 with a score of 430)

BIOL 1108L. Principles of Biology Lab II (1)
This laboratory course is part of a sequence for students majoring in biology, chemistry, and other sciences. It uses an experimental approach to investigate the evolutionary and ecological processes acting on study organisms. Students carry out scientific investigations using model organisms. Scientific study design, graphing and statistical analysis, and scientific writing are emphasized.
Prerequisites: BIOL 1108 (may be taken concurrently)

BIOL 1111. Introduction to Biology I (3)
The biology sequence covers basic and biological chemistry, cellular organization and function, cell division, bioenergetics, and organ system physiology as well as Mendelian genetics, basic statistics, developmental biology, molecular genetics, biotechnology, ecology, and evolution.
Prerequisites: (MATH 1101 or MATH 1001 or MATH 1006 or MATH 1111 or MATH 1113 (may be taken concurrently) or MATH 1112A (may be taken concurrently) or MATH 1112 (may be taken concurrently) or MATH 1501 (may be taken concurrently) or MATH 0099) or COMM with a score of 40 or CPTE with a score of 070 or ACCM with a score of 070 or S02 with a score of 430 or A02 with a score of 18

BIOL 1111L. Intro to Biology Laboratory (1)
Laboratory accompanying BIOL 1111.
Prerequisites: BIOL 1111 (may be taken concurrently)

BIOL 1112. Introduction to Biology II (3)
Continuation of Introductory Biology I.
Prerequisites: (MATH 1101 or MATH 1006 or MATH 1111 or MATH 1113 (may be taken concurrently) or MATH 1112A (may be taken concurrently) or MATH 1112 (may be taken concurrently) or MATH 1501 (may be taken concurrently) or MATH 0099) or COMM with a score of 40 or CPTE with a score of 070 or ACCM with a score of 070 or S02 with a score of 430 or A02 with a score of 18

BIOL 2251. Anatomy and Physiology I (3)
This lecture 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 is designed primarily for non-biology majors, especially those pursuing majors in nursing and the allied health professions. Note: this course does not fulfill the Core Curriculum laboratory science requirement under Area D.
Prerequisites: (BIOL 1151L (may be taken concurrently) or BIOL 2251L (may be taken concurrently)) and (CHEM 1151 or CHEM 1211 or BIOL 1107 or BIOL 1111)

BIOL 2251L. Anatomy and Physiology Lab I (1)
This course is the laboratory component of BIOL 2251. It is designed to provide hands-on experiences that will enhance and reinforce the content covered in BIOL 2251. This course is designed primarily for non-biology majors, especially those pursuing majors in nursing and the allied health professions. Note: this course does not fulfill the Core Curriculum laboratory science requirement under Area D.
Prerequisites: BIOL 1151 (may be taken concurrently) or BIOL 2251 (may be taken concurrently)

BIOL 2252. Anatomy and Physiology II (3)
This lecture 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 is designed primarily for non-biology majors, especially those pursuing majors in nursing and the allied health professions. Note: this course does not fulfill the Core Curriculum laboratory science requirement under Area D.
Prerequisites: (BIOL 1152L (may be taken concurrently) or BIOL 2252L (may be taken concurrently)) and (BIOL 1151 or BIOL 2251) and (BIOL 1151L or BIOL 2251L)

BIOL 2252L. Anatomy and Physiology Lab II (1)
This course is the laboratory component of BIOL 2252. It is designed to provide hands-on experiences that will enhance and reinforce the content covered in BIOL 2252. This course is designed primarily for non-biology majors, especially those pursuing majors in nursing and the allied health professions. Note: this course does not fulfill the Core Curriculum laboratory science requirement under Area D.
Prerequisites: BIOL 1152 (may be taken concurrently) or BIOL 2252 (may be taken concurrently)

BIOL 2260. Foundations of Microbiology (3)
This lecture 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. This course is designed primarily for non-biology majors, especially those pursuing majors in nursing and the allied health professions.
Prerequisites: (BIOL 2250L (may be taken concurrently) or BIOL 2260L (may be taken concurrently)) and (BIOL 1151 or BIOL 2251) and (BIOL 1151L or BIOL 2251L)

BIOL 2260L. Found. of Microbiology Lab (1)
Select laboratory exercises will provide training in the basic laboratory techniques for culture and identification of microbes.
Prerequisites: BIOL 2250 (may be taken concurrently) or BIOL 2260 (may be taken concurrently)

BIOL 2500. Introductory Plant Biology (2)
Survey of the plant kingdom with greatest emphasis on structure and function of angiosperms.
Prerequisites: (BIOL 1108 and BIOL 1108L and BIOL 1107 and BIOL 1107L)

BIOL 2900. Biological Inquiry (2)
This course will develop students' ability to read, analyze, and evaluate scientific literature. Students will learn how to find and identify primary literature that they can use to design investigations into biological questions. Students will be expected to write scientific papers that effectively communicate the ideas and thoughts underlying their investigations. In addition, students will learn how to effectively navigate majoring in biology at Clayton State through identifying courses and experiential learning opportunities that map onto their career goals. Students will assemble an e-portfolio that will help them link their biology degree to opportunities in the biological and health sciences.
Prerequisites: (BIOL 1107 and BIOL 1107L) or (BIOL 1108 and BIOL 1108L)

BIOL 3200. Cell and Molecular Biology (3)
This course explores the basic unit of life. Students will examine the cell from both structural and functional viewpoints. The fundamentals of cellular chemistry, life cycles, and regulations will be discussed. Seminal experiments in cell biology will be examined, and current studies in primary research journals will be addressed. Students will gain an understanding of how contemporary methods in molecular biology are being used to study cells.
Prerequisites: BIOL 1108 and BIOL 1108L and CHEM 2411 and CHEM 2411L and BIOL 1107 and BIOL 1107L

BIOL 3200L. Cell and Molecular Biology Lab (1)
In this laboratory, students will perform laboratories relating to concepts in molecular biology. They will learn and apply laboratory techniques to analyze DNA and proteins. The class will emphasize inquiry-based learning, collaboration, and communication. There will also be multi-week projects that relate to the impact of biology on society.
Prerequisites: BIOL 3200 (may be taken concurrently)

BIOL 3201. Genetics (3)
A study of Mendelian principles, molecular genetics and population genetics. The cellular and molecular mechanisms of inheritance, gene expression and influences on evolution are included.
Prerequisites: BIOL 1108 and BIOL 1108L and BIOL 1107 and BIOL 1107L

BIOL 3210. Off-Campus Internship (3)
Internship program for selected students who perform supervised biological work in conjunction with professionals at local government, academic or private institutions. Employers coordinate with the University to evaluate student performance in the workplace. Students will be assigned a grade of Satisfactory or Unsatisfactory after completion of the internship.
Prerequisites: (BIOL 1108 and BIOL 1108L) and (BIOL 1107 and BIOL 1107L)

BIOL 3211. Off-Campus Internship (3)
Internship program for selected students who perform supervised biological work in conjunction with professionals at local government, academic or private institutions. Employers coordinate with the University to evaluate student performance in the workplace. Students will be assigned a grade of Satisfactory or Unsatisfactory after completion of the internship.
Prerequisites: (BIOL 1108 and BIOL 1108L) and (BIOL 1107 and BIOL 1107L)

BIOL 3220. On-Campus Internship I (3)
This is an internship program for selected students who will perform supervised work related to biology and/or pedagogy in conjunction with biology faculty at Clayton State University. Students will be assigned a grade for this course based on an evaluation by the faculty supervisor.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 3221. On-Campus Internship II (3)
This is an internship program for selected students who will perform supervised work related to biology and/or pedagogy in conjunction with biology faculty at Clayton State University. Students will be assigned a grade for this course based on an evaluation by the faculty supervisor.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 3222. Off-Campus Internship (3)
Internship program for selected students who perform supervised biological work in conjunction with professionals at local government, academic or private institutions. Employers coordinate with the University to evaluate student performance in the workplace. Students will be assigned a grade of Satisfactory or Unsatisfactory after completion of the internship.
Prerequisites: (BIOL 1108 and BIOL 1108L) and (BIOL 1107 and BIOL 1107L)

BIOL 3223. On-Campus Internship (3)
This is an internship program for selected students who will perform supervised work related to biology and/or pedagogy in conjunction with biology faculty at Clayton State University. Students will be assigned a grade for this course based on an evaluation by the faculty supervisor.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 3224. Introductory Research (3)
This course is a supervised introductory research experience with Biology faculty at Clayton State University. Students must articulate clear project goals and objectives. Students will learn to demonstrate use of scientific literature, and document their progress using a research notebook.
The project will be summarized in a written research paper and an oral presentation to the department faculty. Students will be assigned a grade for this course based on evaluation by the supervisor and other CSU faculty.
Prerequisites: (BIOL 1108 and BIOL 1108L and BIOL 1107 and BIOL 1107L)

BIOL 3230. Introductory Research I (3)
This course is a supervised introductory research experience with Biology faculty at Clayton State University. Students must articulate clear project goals and objectives. Students will learn to demonstrate use of scientific literature, and document their progress using a research notebook. The project will be summarized in a written research paper and an oral presentation or poster to the department faculty. Students will be assigned a grade for this course based on evaluation by the supervisor and other CSU faculty.
Prerequisites: (BIOL 1108 and BIOL 1108L and BIOL 1107 and BIOL 1107L)

BIOL 3231. Introductory Research II (3)
This course is a supervised introductory research experience with Biology faculty at Clayton State University. Students must articulate clear project goals and objectives. Students will learn to demonstrate use of scientific literature, and document their progress using a research notebook. The project will be summarized in a written research paper and an oral presentation or poster to the department faculty. Students will be assigned a grade for this course based on evaluation by the supervisor and other CSU faculty.
Prerequisites: (BIOL 1108 and BIOL 1108L and BIOL 1107 and BIOL 1107L)

BIOL 3250. Introductory Microbiology (3)
This course explores the structural, metabolic, genetic, molecular, ecological, biochemical, growth and pathological aspects of the Bacteria, Archaea, viruses and microscopic Eukarya.
Prerequisites: BIOL 1108 and BIOL 1108L and CHEM 2411 and CHEM 2411L and BIOL 1107 and BIOL 1107L

BIOL 3250L. Introductory Microbiology Lab (1)
Laboratory experiences which address topics including, sterile technique, microscopy, identification of micro- organisms, microbial metabolism, and microbial genetics.
Prerequisites: BIOL 3250 (may be taken concurrently)

BIOL 3300. Vertebrate Natural History (3)
The behavior, ecology, and evolution of vertebrate animals.
Prerequisites: BIOL 172 or BIOL 1108 and BIOL 1108L and BIOL 1107 and BIOL 1107L

BIOL 3310. Hormones and Behavior (3)
In this course, students will learn about the interactions among hormones, brain, and behavior with emphasis on the brain regulation of hormone-behavior interactions in different animal phyla.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 3320. Invertebrate Biology (3)
Invertebrate Biology includes the study of the different phyla of invertebrates; their anatomy and physiology and evolutionary relationships. Invertebrate behavior and their interactions within different ecosystems will be examined.
Prerequisites: (BIOL 1107 and BIOL 1107L) and (BIOL 1108 and BIOL 1108L) and BIOL 3380

BIOL 3320L. Invertebrate Biology Lab (1)
Students will study live and preserved invertebrate organisms, as well as models and/or prepared microscope slides. Activities will include lab experiments, dissections, and other activities covering different invertebrate phyla.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L and BIOL 3320 (may be taken concurrently)

BIOL 3340. Entomology (3)
This course will cover insect taxonomy, morphology, and physiology with a focus on those insects most commonly found in our environment.
It will also explore how insect morphology and physiological systems function in producing and shaping such insect behavior as navigation, reproduction, feeding, oviposition, defense, learning, and sociality.
Prerequisites: (BIOL 1108 and BIOL 1108L) and (BIOL 1107 and BIOL 1107L)

BIOL 3340L. Entomology Lab (1)
This lab covers insect taxonomy, evolution, physiology, medicinal use and generation of museum-quality insect collection.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L and BIOL 3340 (may be taken concurrently)

BIOL 3375. Animal Behavior (3)
This course will focus on observations of animal behaviors and introductory analysis of their adaptive value and evolution. This course will also include a comparative study of mechanisms, ontogeny, function, and evolution of behavior in its ecological and social contexts.
Prerequisites: BIOL 172 or BIOL 1108 and BIOL 1108L and BIOL 1107 and BIOL 1107L

BIOL 3380. Evolution (3)
Principles of evolutionary biology including discussions of natural selection, adaptation, population genetics, speciation, and phylogeny reconstruction. The applications of evolutionary biology to various fields will be discussed.
Prerequisites: BIOL 1108 and BIOL 1108L and BIOL 1107 and BIOL 1107L

BIOL 3500. Ecology (3)
The environment is made of both living and non-living components. This course examines the relationships between these various components in the biosphere. Students will learn how complex natural cycles and chains can be perturbed by small disturbances, and conversely, how life adapts to these changes.
Prerequisites: (MATH 1231 or MATH 1401) and (BIOL 1108 and BIOL 1108L and BIOL 1107 and BIOL 1107L) or BIOL 1112

BIOL 3500L. Ecology Laboratory (1)
Laboratory to accompany BIOL 3500, Ecology.
Prerequisites: BIOL 3500 (may be taken concurrently)

BIOL 3520. Conservation Biology (3)
This course will explore the fundamentals and theory behind conservation biology. We will explore threats to biodiversity and approaches to conserving and restoring biodiversity.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 3550. Tropical Ecology (3)
This study abroad course covers major tropical ecotypes and encompasses the ecology of terrestrial, aquatic, and marine tropical organisms. Emphasis will be on coral reef ecosystems, including taxonomy and identification of common invertebrates and vertebrates found in the Caribbean basin. Issues pertaining to coral reef conservation will be discussed. The majority of the course will take place at the Gerace Research Centre on the island of San Salvador in the Bahamas.
Prerequisites: (BIOL 1108 and BIOL 1108L and BIOL 1107 and BIOL 1107L)

BIOL 3570. Rainforest Ecology (3)
This program is designed primarily for biology majors to expose them to field work in the biological sciences. The program will utilize Costa Rica as a base for the field portion of the course. Students will have the opportunity to work with researchers on various projects concerning tropical rain forest ecology, conservation, and sustainable agriculture. In addition, students will travel to various sites around the country encompassing the typical ecological zones of Costa Rica, including additional field work opportunities, excursions into the rainforests, as well as lectures from experts. The trip will be supplemented by pre-trip lectures and exams, as well as student projects to be completed upon returning from Costa Rica.

BIOL 3650. Comparative Vertebrate Anatomy (3)
This course will consist of study of selected vertebrate taxa with emphasis on anatomy and evolution of a variety of body systems such as the skeletal, muscular, cardiovascular, digestive, nervous, urinary, and reproductive systems.
Prerequisites: (BIOL 1108 and BIOL 1108L) and (BIOL 1107 and BIOL 1107L)

BIOL 3650L. Comparative Vert Anatomy Lab (1)
This laboratory course is complementary to the Comparative Vertebrate Anatomy lecture course. Course modules will address a variety of topics covered in the course (e.g., biophysics, phylogeny, etc.) and will include dissection of model organisms. Dissections will examine a variety of systems such as the skeletal, muscular, cardiovascular, digestive, nervous, urinary, and reproductive systems.
Prerequisites: (BIOL 1107 and BIOL 1107L) and (BIOL 1108 and BIOL 1108L) and BIOL 3650 (may be taken concurrently)

BIOL 3700. Plant Physiology (3)
Plant Physiology will explore plant physiological processes, stress physiology, plant response to disease, the biology of native plants, and the interactions between plants and the environment.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 3700L. Plant Physiology Lab (1)
Plant Physiology Laboratory will be a hands-on exploration of plant physiological processes, stress physiology, plant metabolites, and the interactions between plants and their environment.
Prerequisites: BIOL 3700 (may be taken concurrently)

BIOL 3720. Plant Taxonomy (3)
Plant Taxonomy will explore the relationships between major plant families, the naming and classification of plants, plant identification procedures, and the relevance of plant taxonomy to other fields of science. relevance of plant taxonomy to other fields of science.
Prerequisites: BIOL 2500

BIOL 3740. Economic Botany (3)
Economic Botany explores the intimate relationship between plants and our lives. Topics that will be covered in this course include our use of plants as medicines, food, beverages, and textiles. We will also explore our use of plants in ornamental gardening and forensics.
Prerequisites: (BIOL 1108 and BIOL 1108L)

BIOL 3760. Plant Biology (3)
Plant Biology will explore basic plant anatomy, morphology, and physiology. The course will also touch on the many connections between plants and people such as plants as providers of food and medicine to forming the foundation of our ecosystems.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 3760L. Plant Biology Lab (1)
Plant Biology Laboratory will be a hands-on exploration of basic plant anatomy, morphology, and physiology. The course will also explore plants as food and medicine to how they form the foundation of our ecosystems.
Prerequisites: BIOL 1107 and BIOL 1108 and BIOL 1107L and BIOL 1108L and (BIOL 2500 (may be taken concurrently) or BIOL 3760 (may be taken concurrently))

BIOL 3900. Experimental Design (3)
This course will give students additional exposure to scientific experiments, including designing experiments, collecting data, analyzing data, and presenting it to colleagues/peers.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 4100. Animal Physiology (3)
This course will examine the mechanisms that underlie different physiological functions and their evolutionary origins. The course will also explore how different animals, both invertebrate and vertebrate, perform the same basic physiological functions and how various environments impact an animal's physiology. The course focuses on topics such as food and energy, integrating systems, muscular systems, oxygen and carbon dioxide physiology, and water and salt physiology.
Prerequisites: (BIOL 1107 and BIOL 1107L) and (BIOL 1108 and BIOL 1108L) and BIOL 3380

BIOL 4100L. Animal Physiology Lab (1)
This laboratory course is complementary to the Animal Physiology lecture course, and allows students to perform lab exercises that reinforce basic and fundamental principles of physiology. Course modules will include exercises that examine topics such as cell physiology, muscle physiology, cardiovascular physiology, respiratory system, and nervous system.
Prerequisites: (BIOL 1107 and BIOL 1107L) and (BIOL 1108 and BIOL 1108L) and BIOL 4100 (may be taken concurrently)

BIOL 4120. Neurobiology (3)
This class is an in-depth discussion of the biology of the nervous system. Topics include neuronal structure and function, communication at the synapse (electrical and action potentials), membrane receptors and intra- and intercellular signaling systems, gene regulation, gross organization of the brain and spinal cord, the processing of sensory information and development of the nervous system.
Prerequisites: BIOL 3200

BIOL 4160. Endocrinology (3)
This course covers the major vertebrate endocrine systems, the effects of different hormones on cellular and organismal levels of physiology, and disorders of the endocrine system. This course utilizes lectures, classroom discussion of research papers, and student presentations. A major emphasis is placed on student participation.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 4200. Biochemistry I (3)
A study of the chemistry of biological systems. Topics typically include proteins, enzymes, carbohydrates, lipids and metabolism pathways.
Prerequisites: CHEM 2412 and (CHEM 2412L or CHEM 252) and BIOL 1107 and BIOL 1107L

BIOL 4202L. Biotechnology Laboratory (3)
An experiment-based course in which students use DNA technology to explore topics such as DNA fingerprinting, cloning, DNA amplification, genetic therapies, sex determination, inheritance and paternity, and human genetic disease.
Prerequisites: (BIOL 3250 and BIOL 3250L) and (BIOL 4201 or BIOL 3201)

BIOL 4222. Biology Research Pract (3)
Research experience for students in Biology.
Prerequisites: (BIOL 1108 and BIOL 1108L or BIOL 172) and (BIOL 1107 and BIOL 1107L) and (MATH 1231 or MATH 231) or MATH 1401 and (CHEM 2412 and CHEM 2412L or CHEM 252)

BIOL 4230. Biol Research Pract I (3)
This course is a supervised research experience with Biology faculty at Clayton State University. Students must articulate clear project goals and objectives. Students will learn to demonstrate use of scientific literature, and document their progress using a research notebook. The project will be summarized in a written research paper and an oral presentation to the department faculty. Students will be assigned a grade for this course based on evaluation by the supervisor and other CSU faculty.
Prerequisites: (BIOL 1108 and BIOL 1108L or BIOL 172) and (BIOL 1107 and BIOL 1107L) and (MATH 1231 or MATH 1401 or MATH 231) and (CHEM 2412 and CHEM 2412L or CHEM 252)

BIOL 4231. Biol Research Pract II (3)
This course is a supervised research experience with Biology faculty at Clayton State University. Students must articulate clear project goals and objectives. Students will learn to demonstrate use of scientific literature, and document their progress using a research notebook. The project will be summarized in a written research paper and an oral presentation to the department faculty. Students will be assigned a grade for this course based on evaluation by the supervisor and other CSU faculty.
Prerequisites: (BIOL 1108 and BIOL 1108L or BIOL 172) and (BIOL 1107 and BIOL 1107L) and (MATH 1231 or MATH 1401 or MATH 231) and (CHEM 2412 and CHEM 2412L or CHEM 252)

BIOL 4232. Biol Research Pract III (3)
This course is a supervised research experience with Biology faculty at Clayton State University. Students must articulate clear project goals and objectives. Students will learn to demonstrate use of scientific literature, and document their progress using a research notebook. The project will be summarized in a written research paper and an oral presentation to the department faculty. Students will be assigned a grade for this course based on evaluation by the supervisor and other CSU faculty.
Prerequisites: (BIOL 1108 and BIOL 1108L or BIOL 172) and (BIOL 1107 and BIOL 1107L) and (MATH 1231 or MATH 1401 or MATH 231) and (CHEM 2412 and CHEM 2412L or CHEM 252)

BIOL 4325. Parasitology (3)
A study of the basic principles of parasitism and the morphology, taxonomy, and life cycles of important parasites of humans and other vertebrates.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 4325L. Parasitology Lab (1)
This lab covers basic principles of parasitism, parasite morphology, parasite life cycles, and ever-reaching influence to humans and other vertebrates.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L and BIOL 4325 (may be taken concurrently)

BIOL 4330. Developmental Biology (3)
This class will study cell differentiation and development using the tools of molecular genetics and cell biology. Some selected topics to be investigated are gametogenesis, fertilization, cell and tissue interactions and normal embryonic development.
Prerequisites: BIOL 3200 (may be taken concurrently) or BIOL 3201 (may be taken concurrently)

BIOL 4420. Histology (3)
This course will cover the microscopic structure of mammalian tissues and organs. Students will be taught how to recognize, using a light microscope, various tissues and organs. Emphasis will be placed on the relationship between the structure and functions of various tissues. The first part of the course will introduce basic histological procedures. This will include tissue and slide preparation. This is a junior or senior level intensive microanatomy course.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 4450. Immunology (3)
This course will include a comprehensive overview of the immune system and its functions within the context of cell to cell interaction and communication.
Prerequisites: BIOL 3200

BIOL 4460. Virology (3)
This course will focus on animal viruses and will discuss basic concepts in virology including viral taxonomy, structure, entry/exit, replication, quantitation, genetics, pathogenesis, and virus-host interaction. This course will use a textbook and the primary literature as course materials.
Prerequisites: BIOL 3200 and BIOL 4201

BIOL 4500. Biology Seminar I (1)
Experts from industry, government, and academe address current topics in Biology. Students enrolled in the seminar prepare for the talks by reading and presenting research papers. This course gives students the opportunity to meet with and question experts in the field. Career preparation is also covered in this course.
Prerequisites: (BIOL 1108 and BIOL 1108L and BIOL 1107 and BIOL 1107L) and (BIOL 2900 or SCI 2900)

BIOL 4501. Biology Seminar II (1)
Experts from industry, government, and academe address current topics in Biology. Students enrolled in the seminar prepare for the talks by reading and presenting research papers. This course gives students the opportunity to meet with and question experts in the field. Career preparation is also covered in this course.
Prerequisites: BIOL 4500

BIOL 4530. Ecology of Infectious Disease (3)
This course will explore our current understanding of the patterns and dynamics of infectious disease in human and non-human populations. Students will learn how evolutionary and ecological factors affect disease transmission and spread, and how disease ecologists and epidemiologists use theoretical models to understand and predict these patterns. We will use a variety of scientific and popular science sources explore the diversity of infectious diseases and the features of emerging infectious diseases.
Prerequisites: BIOL 3500

BIOL 4540. Biology of Climate Change (3)
This course explores the scientific evidence for anthropogenic climate change, as well as its effects upon nature and society. Topics include the climate system, natural climate variability, anthropogenic drivers of climate change, the carbon cycle, phenology, ecosystem changes, and other climate change impacts on biological systems. This course incorporates information from biology, chemistry, and physics to address these topics.
Prerequisites: (BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L and BIOL 3500 (may be taken concurrently))

BIOL 4600. Medical Microbiology (3)
This course will cover the principles of microbial virulence. It will include the identification of virulence factors, genetic regulation of virulence, and the complex interactions between bacterial, viral and fungal pathogens and their hosts.
Prerequisites: BIOL 3250 and BIOL 3250L

BIOL 4620. Applied and Environ Micro. (3)
This course is designed to expose students to the importance of microorganisms in industrial processes and in the environment. The course will also focus on the applications of microorganisms to solve environmental problems and public health aspects of environmental microbiology.
Prerequisites: BIOL 3250 and BIOL 3250L and BIOL 4620L (may be taken concurrently)

BIOL 4620L. Applied and Environ Micro. Lab (1)
Laboratory exercises focus on microbial growth, interactions between microorganism, microbial community analysis, impacts of environmental factors on microbial communities and use in industrial applications such as food production and sewage treatment.
Prerequisites: BIOL 3250 and BIOL 3250L and BIOL 4620 (may be taken concurrently)

BIOL 4630. Mycology (3)
The focus of this course is the taxonomy, structure, and function of the members of the Kingdom Fungi.
Prerequisites: BIOL 3250 and BIOL 3250L

BIOL 4650. Bioterrorism (3)
This course will provide students with a broad geo-political and historical understanding of health security. It will develop an awareness of the increased focus and attention on bioterrorism research and preparedness and explore the implications for the public health sector.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 4700. Special Topics in Biology (1-4)
Selected topics of current interest in biology. This course will be offered as fits the needs and interests of the student and faculty.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 4701. Special Topics in Biology (1-4)
Selected topics of current interest in biology. This course will be offered as fits the needs and interests of the student and faculty.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 4702. Special Topics in Biology (1-4)
Selected topics of current interest in biology. This course will be offered as fits the needs and interests of the student and faculty.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 4703. Special Topics in Biology (1-4)
Selected topics of current interest in biology. This course will be offered as fits the needs and interests of the student and faculty.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 4750L. Special Topics in Biology Lab (1-4)
Selected topics laboratory of current interest in biology. This course will be offered as fits the needs and interests of the student and faculty.
Prerequisites: BIOL 1107 and BIOL 1107L and BIOL 1108 and BIOL 1108L

BIOL 4900. Biocomputing (3)
The human genome project and the web revolution present new challenges and opportunities for biologists and biochemists. The only way to deal effectively with the information explosion in biology and related disciplines is to use computers. Students in this course will use computer applications to search databases, perform calculations, and develop models concerning biological problems. This course is considered a capstone course for the biology degree program. A student may not receive credit for both BIOL 4900 and CHEM 4900.
Prerequisites: (BIOL 4201 or BIOL 3201) and (BIOL 3250 (may be taken concurrently) and BIOL 3250L (may be taken concurrently)) and (MATH 1231 or MATH 1401)

BIOL 4920. Aquatic Ecology (3)
Relationships between organisms and their environment within freshwater streams, rivers, ponds, lakes, and wetlands.
Prerequisites: BIOL 3500

BIOL 4930. Environmental Toxicology (3)
This course will establish the scientific principles underlying the toxic actions of various substances and will introduce the various challenges within the field of toxicology. The chemical nature of injurious substances, their uptake and metabolism by non-target organisms, and their mode of toxic action will be studied in addition to the methods used in safety evaluations and risk assessment.
Prerequisites: BIOL 3200

BIOL 4999A. Senior Evaluation (0)
The purposes of this class are to assess the biology degree program and to assist students in seeking employment or further schooling. Students are required employment or further schooling. Students are required to attend three class meetings. Students will participate in a seminar on how to prepare for job searches and graduate and/or professional school. Students will complete a series of surveys to assess the quality of the biology degree program. Students will take a two-hour standardized subject test in biology to assess their knowledge in biology. Students will also participate in an individually scheduled senior exit interview. A fee is required to pay for the standardized exam. Current fee is $26.
Prerequisites: BIOL 3200 and BIOL 3250 and BIOL 3380 and BIOL 3500 and BIOL 3650 and BIOL 4100 and BIOL 4201

BIOL 4999B. Senior Evaluation (0)
The purposes of this class are to assess the biology degree program and to assist students in seeking employment or further schooling. Students are required to attend two class meetings. Students will participate in a seminar on how to prepare for job searches and graduate and/or professional school. Students will complete a series of surveys to assess the quality of the biology degree program. Students will also participate in an individually scheduled senior exit interview.