

# Biological Sci (BIOL)

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## Courses

### **BIOL 5500 Oral Histology and Embryology: 3 semester hours.**

The micro-anatomy and formative processes of the teeth and their surrounding structures. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5500L.

### **BIOL 5500L Oral Histology and Embryology Lab: 0 semester hours.**

Assignments to apply principles from BIOL 5500. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5500.

### **BIOL 5504 Plant Physiology: 3 semester hours.**

Study of plant physiological processes including water relations, mineral nutrition, photosynthesis, respiration, translocation of photosynthate, secondary compounds and phytohormones. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

### **BIOL 5504L Plant Physiology Lab: 1 semester hour.**

Assignments to apply principles from BIOL 5504. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

### **BIOL 5505 Plant Form and Function: 3 semester hours.**

Integrated studies of anatomical and physiological adaptations of plants to their natural environment. Data collection and analysis will be emphasized. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5505L.

### **BIOL 5505L Plant Form and Function Lab: 1 semester hour.**

Assignments to apply principles from BIOL 5505. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5505.

### **BIOL 5506 Plant Diversity and Evolution: 4 semester hours.**

Study of the reproduction, structure, development, evolution, and classification of the fungi, algae, bryophytes, and vascular plants. Lectures, laboratories. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5506L.

### **BIOL 5506L Plant Diversity and Evolution Lab: 0 semester hours.**

Assignments to apply principles from BIOL 5506. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5506.

### **BIOL 5508 Plant Ecology: 3 semester hours.**

Major factors limiting plant growth and distribution with emphasis on adaptation and response at the individual, population, and community levels. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

### **BIOL 5508L Plant Ecology Lab: 1 semester hour.**

Assignments to apply principles from BIOL 5508. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5508.

### **BIOL 5512 Systematic Botany: 4 semester hours.**

Study of classification and evolution of flowering plants; techniques of phylogeny reconstruction based on molecular and morphological characters. Collection/identification of local flora. Field trips. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5512L.

### **BIOL 5512L Systematic Botany Lab: 0 semester hours.**

Assignments to apply principles from BIOL 5512. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5512.

### **BIOL 5513 Biology Teaching Methods: 3 semester hours.**

Designed for prospective or practicing biology educators to learn how to design science lessons and units that are aligned with the three dimensions of national and state science standards: Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas Specific, evaluated graduate-level activities are identified in the course syllabus.

### **BIOL 5514 Graduate Teaching Assistant Seminar: 2 semester hours.**

Introduction to college science teaching, with an emphasis on inquiry-based methods in the laboratory setting. Topics include how people learn, classroom management, professional ethics, peer evaluation of teaching. Required for all new graduate Teaching Assistants. Graded S/U. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

### **BIOL 5515L Human Neurobiology Lab: 1 semester hour.**

Detailed examination of the gross anatomy and pathways of the human central nervous system. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: Permission of instructor.

### **BIOL 5516 Population Ecology: 3 semester hours.**

Introduces quantitative analysis of populations and communities, emphasizing demography, distribution, abundance, spatial and temporal dynamics, biodiversity, coexistence, and applications to conservation and land use decision-making. Includes data collection and analysis. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5516L. PREREQ: BIOL 2209.

### **BIOL 5516L Population Ecology Lab: 1 semester hour.**

Assignments to apply principles from BIOL 5516. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5516. PREREQ: BIOL 2209.

### **BIOL 5517 Organic Evolution: 3 semester hours.**

An integrated study of evolution as a unifying concept in biology. An examination of patterns and processes that affect the origin and diversification of species through time. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

### **BIOL 5518 Ecological Topics: 1 semester hour.**

Flexible use of seminars, lectures, and laboratory/field work dealing with current issues in ecology. Topic/emphasis varies. May be repeated until a maximum of 3 credits is earned. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

### **BIOL 5519 Mammalian Histology: 4 semester hours.**

Study of human animal tissues, including structural and functional characteristics of tissues and organs. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5519L.

### **BIOL 5519L Mammalian Histology Lab: 0 semester hours.**

Assignments to apply principles from BIOL 5519. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5519.

**BIOL 5520 Musculo-Skeletal Anatomy: 2 semester hours.**

Study of human body structure emphasizing muscular system and its relationship to axial and appendicular skeleton. Focus on extremities, thorax, and pelvis with applications toward normal, diseased and rehabilitative functions. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5521 Ecological Concepts: 3 semester hours.**

Major concepts in ecology in relation to environmental degradation, pollution, hazardous materials, and environmental management. Credit may not be used for a graduate degree in biology. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5523 General Parasitology: 3 semester hours.**

Student of parasitic symbiotes of animals, plants and other organisms focusing on concepts, principles, and consequences of such interactions and the coevolutionary processes by which they are created. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5526 Herpetology: 3 semester hours.**

The biology of amphibians and reptiles: lecture topics include evolutionary history, functional morphology, physiological ecology, biogeography, reproductive, and population ecology. Laboratories and field trips cover systematic, natural history, and collecting/sampling techniques. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5526L.

**BIOL 5526L Herpetology Lab: 1 semester hour.**

Assignments to apply principles from BIOL 5526. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5526.

**BIOL 5527 Ichthyology: 3 semester hours.**

The biology of fishes; lecture topics include evolutionary history, functional morphology, physiological ecology, and biogeography. Laboratory and weekend field trips cover identification, life history and collecting techniques. Emphasis on Idaho species. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5527L.

**BIOL 5527L Ichthyology Lab: 1 semester hour.**

Assignments to apply principles from BIOL 5527. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5527.

**BIOL 5528 Medical Parasitology and Entomology: 3 semester hours.**

Study of animal parasites, with an emphasis on protists, helminths and arthropods affecting human health and welfare by their presence or indirectly via pathogens they transmit. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5528L.

**BIOL 5528L Medical Parasitology and Entomology Lab: 0 semester hours.**

Assignments to apply principles from BIOL 5528. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5528.

**BIOL 5529 Regional Anatomy and Histology: 3 semester hours.**

Regional approach to gross human anatomy emphasizing the use of prosected materials and microscopic anatomy. Designed primarily for students in the Physician Assistant Program. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5529L.

**BIOL 5529L Regional Anatomy and Histology Lab: 1 semester hour.**

Assignments to apply principles from BIOL 5529. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5529.

**BIOL 5530 Bioethics: 3 semester hours.**

Examines the roles and responsibilities of science in society and the ethical considerations for current and future practices in biology and medicine. Topics include genetic engineering and reproductive science, animals and humans as research subjects, medical treatments, and environmental issues. Also discusses practices used within research settings including cost, waste, publishing and power dynamics. PREREQ: BIOL 1102 and BIOL 1102L. EF

**BIOL 5531 General Entomology: 3 semester hours.**

Study of structure, development, classification, and life histories of insects, including ecological, economic and management considerations. An insect collection may be required. Field trips. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5531L.

**BIOL 5531L General Entomology Lab: 1 semester hour.**

Assignments to apply principles from BIOL 5531. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5531.

**BIOL 5532 Biochemistry: 3 semester hours.**

Comprehensive discussion/presentation of structure, function and metabolism of biological macromolecules and their constituents, including energetics, regulation, and molecular biology, with emphasis on critical analysis of biochemical issues. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: Organic Chemistry or Introduction to Biology or permission of instructor.

**BIOL 5533 Microbial Physiology: 3 semester hours.**

Comparative physiology of microorganisms, including structure/function, metabolic diversity, enzyme mechanisms of microbial metabolism, and physiology of extreme organisms. Lectures, Class Exercises. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5533L. PREREQ: Microbiology and Bio-chemistry or permission of instructor.

**BIOL 5533L Microbial Physiology Lab: 1 semester hour.**

Laboratory exercises in comparative physiology of microorganisms. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5533.

**BIOL 5534 Microbial Diversity: 3 semester hours.**

Enrichment, cultivation, and isolation of prokaryotes from various metabolic groups and environments. Microorganisms will be identified using classical microbial techniques and modern molecular methodologies. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5534L. PREREQ: Microbiology and BIOL 5533 or permission of instructor.

**BIOL 5534L Microbial Diversity Lab: 1 semester hour.**

Enrichment, cultivation and isolation of prokaryotes from various metabolic groups and environments. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5534.

**BIOL 5535 Vertebrate Paleontology: 4 semester hours.**

Phylogenetic history of the vertebrates outlined in the light of morphology, classification, evolution, paleoecology, and the significance of fossils. Field trips. Specific, evaluated graduate-level activities are identified in the course syllabus. Equivalent to GEOL 4435. PREREQ: BIOL 1102. ES

**BIOL 5537 Experimental Biochemistry: 1 semester hour.**

Laboratory course including both qualitative and quantitative experiments. Equivalent to CHEM 5538. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ or COREQ: BIOL 5532 or BIOL/CHEM 5545.

**BIOL 5538 Ornithology: 4 semester hours.**

Study of the origin, evolution, structure, habits, adaptations, distribution, and classification of birds. Field trips. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5539 Principles of Taphonomy: 3 semester hours.**

Effects of processes which modify organisms between death and the time the usually fossilized remains are studied. Emphasis on vertebrates. Equivalent to ANTH 5539 and GEOL 5539. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: Permission of instructor.

**BIOL 5540 Human Gross Anatomy: 4 semester hours.**

Comprehensive regional study of gross human anatomy with emphasis on the upper limb, thorax, abdomen, pelvis and perineum. Designed for the first year dental students and complements BIOL 5550. Lecture and laboratory. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5540L.

**BIOL 5540L Human Gross Anatomy Lab: 0 semester hours.**

Assignments to apply principles from BIOL 5540. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5540.

**BIOL 5541 Mammalogy: 3 semester hours.**

General study of mammals including classification, identification, habits, ecology, economics, and techniques of study, with emphasis on North American forms. Field trips. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5541L.

**BIOL 5541L Mammalogy Lab: 1 semester hour.**

Assignments to apply principles from BIOL 5541. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5541.

**BIOL 5542 Plant-Animal Interactions: 3 semester hours.**

Coevolution of plant and animal form and function emphasizing pollination, herbivory, parasitism, frugivory/seed dispersal, and optimal foraging. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5543 Endocrinology: 3 semester hours.**

Study of the anatomy and physiology of the ductless glands and the properties and uses of natural and synthetic hormones. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5544 Cell and Molecular Biology: 4 semester hours.**

Fundamental principles of molecular biology: DNA replication, repair, and recombination, transcriptional and post-transcriptional regulation of gene expression, RNA metabolism, protein synthesis, targeting and turnover, post-translational modifications, signal transduction, regulation of the cell division cycle, and molecular genetics of development. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: Introductory Biology and Organic Chemistry. COREQ: BIOL 5544L.

**BIOL 5544L Cell and Molecular Biology Lab: 1 semester hour.**

Laboratory techniques in molecular biology, including cloning, PCR and DNA sequencing. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5544.

**BIOL 5545 Biochemistry I: 3 semester hours.**

Introduction to basic aspects of biochemical systems, including fundamental chemical and physical properties of biomolecules. Enzymology including allosterism, metabolic regulation, bioenergetics, and carbohydrate metabolism. Equivalent to CHEM 5545. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: Introduction to Biology and Organic Chemistry or permission of instructor.

**BIOL 5546 Selected Topics in Physiology: 1 semester hour.**

Selected topics in physiology for dental students: blood coagulation-complement-kinin systems, prostaglandin and related substances, vitamins, steroids, mucopolysaccharides, collagen and other extracellular matrix molecules and cyto- and molecular genetics. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5547 Biochemistry II: 3 semester hours.**

Functional continuation of BIOL 5545. Lipid, amino acid and nucleotide metabolism. Emphasis is on metabolic regulation, metabolic dysfunction, biochemical mechanism of hormone action, biochemical genetics, protein synthesis, and metabolic consequences of genetic defects. Equivalent to CHEM 5547. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: BIOL/CHEM 5545.

**BIOL 5548 Advanced Experimental Biochemistry: 2 semester hours.**

Advanced laboratory projects designed to emphasize techniques of qualitative and quantitative biochemical analysis. Equivalent to CHEM 5548. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: BIOL 5537/CHEM 5538. COREQ: BIOL/CHEM 5547.

**BIOL 5549 Human Physiology I: 4 semester hours.**

First of a two-course sequence. Physiology of the nervous, muscular, circulatory, respiratory, and excretory systems. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5525.

**BIOL 5550 Head and Neck Anatomy: 4 semester hours.**

Comprehensive presentation of the anatomy of the head and neck as it applies to the practice of dentistry. Lecture and laboratory. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5550L.

**BIOL 5550L Head and Neck Anatomy Lab: 0 semester hours.**

Assignments to apply principles from BIOL 5550. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5550.

**BIOL 5551 Immunology: 3 semester hours.**

Fundamental concepts of antibody-mediated and cell-mediated mechanisms of immunity. In-vivo and invitro antigen-antibody interactions are discussed. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: Microbiology or permission of instructor.

**BIOL 5551L Immunology Laboratory: 1 semester hour.**

Selected laboratory experiments to accompany BIOL 5551 Immunology. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. Open to non-majors by special permission. PREREQ or COREQ: BIOL 5551.

**BIOL 5553 Foundations in Neuroscience: 3 semester hours.**

Organizing principles in neuroscience including biological signaling of excitable cells, neuroanatomy and regional brain functions, and sensorimotor integration of behavior. Specific, graduate-level activities and/or performances are identified in the course syllabus. PREREQ: Permission of instructor.

**BIOL 5554 Advanced Immunology: 3 semester hours.**

Detailed study of selected areas of immunobiology. Course content will vary with current demand. Students will lead discussions and present current literature. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: BIOL 5551 and permission of instructor.

**BIOL 5555 Pathogenic Microbiology: 3 semester hours.**

How the medically important bacteria, viruses and fungi interact with the host to produce disease, including microbe characteristics, pathogenesis, pathological processes, prevention, and treatment methods. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: Microbiology or permission of instructor.

**BIOL 5555L Pathogenic Microbiology Laboratory: 2 semester hours.**

Will emphasize procedures for the isolation and identification of pathogenic bacteria. Clinical specimens will be provided for use in identification of unknowns. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ or COREQ: BIOL 5555.

**BIOL 5556 Human Physiology II: 4 semester hours.**

Physiology of gastrointestinal, endocrine, and reproductive systems. Includes studies of acid-base balance, peripheral circulation, shock, and temperature regulation. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: BIOL 5549 or equivalent.

**BIOL 5559 Fish Ecology: 3 semester hours.**

Study of the behavior, habitat use, population dynamics, and management of freshwater fishes, especially salmon and trout. Laboratory and weekend field trips emphasize sampling techniques and data analysis. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5559L. PREREQ: BIOL 5527.

**BIOL 5559L Fish Ecology Lab: 1 semester hour.**

Assignments to apply principles from BIOL 5559. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5559. PREREQ: BIOL 5527.

**BIOL 5560 Neuroscience: 4 semester hours.**

Comprehensive presentation of the anatomy of the central nervous system, the brain and spinal cord. Combined lecture and laboratory demonstration. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: Permission of instructor.

**BIOL 5560L Neuroscience Lab: 1 semester hour.**

Detailed examination of the gross anatomy and pathways of the human central nervous system. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: Permission of instructor.

**BIOL 5561 Advanced Genetics: 3 semester hours.**

Detailed and critical consideration of selected genetic topics with emphasis of recent advances. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: Permission of instructor.

**BIOL 5562 Freshwater Ecology: 3 semester hours.**

Study of the interaction of physical and biotic factors in aquatic communities. Field trips. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5562L.

**BIOL 5562L Freshwater Ecology Lab: 1 semester hour.**

Assignments to apply principles from BIOL 5562. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5562.

**BIOL 5563 Human Pathophysiology: 4 semester hours.**

The study of basic processes underlying diseases with an emphasis on correlating anatomical, functional, and biochemical alterations with clinical manifestations. Laboratory required. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5563L.

**BIOL 5563L Human Pathophysiology Lab: 0 semester hours.**

Assignments to apply principles from BIOL 5563. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5563.

**BIOL 5564 Lectures in Human Physiology: 4 semester hours.**

Physiology of the nervous, muscular, circulatory, respiratory, and excretory systems. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5566 Medical Mycology: 3 semester hours.**

Lecture/Laboratory course addressing medically important fungi. Taxonomy, clinical disease, pathogenesis, immunological diagnosis and laboratory identification of contaminants, opportunists, superficial, cutaneous, subcutaneous and systemic mycoses. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5568 Oral Microbiology: 1 semester hour.**

Study of microbiology of plaque, caries, periodontal disease, immunobiology of oral disease and control of microorganisms with antimicrobial agents. Four periods devoted to laboratory study of medically important oral microbes. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ or PREREQ: BIOL 5555.

**BIOL 5569 Special Topics in Microbiology: 1-4 semester hours.**

Study of selected topics in microbiology. Course contents will vary with topics selected. May be repeated with departmental approval for non-repetitive course content. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: Permission of instructor.

**BIOL 5570 Cross-Sectional Anatomy: 2 semester hours.**

Applied regional anatomy as viewed in sectional planes, emphasizing topographic relationships of organs and surface anatomy, with interpretation of correlated CT and MRI imaging. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5571 Biological Imaging: 3 semester hours.**

Microscopy with an emphasis on image formation, documentation, interpretation and analysis relevant to experimental applications in the biological sciences. Lecture and laboratory with independent research component. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5573 Applied and Environmental Microbiology: 3 semester hours.**

Concepts in applied microbiology and microbial ecology, including fermentation, biotechnology, and ecophysiology. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5573L.

**BIOL 5573L Applied and Environmental Microbiology Lab: 1 semester hour.**

Laboratory exercises in applied and environmental microbiology. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5573.

**BIOL 5574 Human Anatomy-Occupational Therapy and Physical Therapy: 5 semester hours.**

Applied regional anatomy emphasizing the development, histology and gross anatomy of the musculoskeletal, peripheral nervous, and cardiopulmonary systems. Includes laboratory with cadaver dissection. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: Permission of instructor. COREQ: BIOL 5574L.

**BIOL 5574L Human Anatomy-Occupational Therapy and Physical Therapy Lab: 0 semester hours.**

Assignments to apply principles from BIOL 5574. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5574.

**BIOL 5575 General Virology: 3 semester hours.**

Introduction to the general principles of virology through consideration of structure, genetics, replication, and biochemistry of animal and bacterial viruses. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5577 Bacterial Virology Laboratory: 1 semester hour.**

Designed to acquaint students with the techniques and experimental principles used in the study of bacterial viruses. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5575.

**BIOL 5578 Animal Virology Laboratory: 1 semester hour.**

Introduces tissue culture methods and other techniques employed in the study of animal viruses. Must be accompanied by BIOL 5575. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5580 Mentored Research Alliance: 2 semester hours.**

Discovery research in life sciences conducted in a cooperative learning community that includes mentoring undergraduates. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. May be repeated. PREREQ: Permission of the instructor.

**BIOL 5581 Independent Problems: 1-4 semester hours.**

Individual problems will be assigned to students on the basis of interest and previous preparation. May be repeated. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: A minimum of two courses in Biological Sciences and permission of instructor.

**BIOL 5582 Independent Problems: 1-4 semester hours.**

Individual problems will be assigned to students on the basis of interest and previous preparation. May be repeated. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: A minimum of two courses in Biological Sciences and permission of instructor.

**BIOL 5586 Human Systemic Physiology: 5 semester hours.**

One semester human physiology course emphasizing the function and regulation of the muscular, skeletal, circulatory, respiratory, urinary, reproductive, and immune systems. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5586L.

**BIOL 5586L Human Systemic Physiology Lab: 0 semester hours.**

Assignments to apply principles from BIOL 5586. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: BIOL 5586.

**BIOL 5588 Advanced Radiobiology: 3 semester hours.**

An advanced-level class covering aspects of molecular radiobiology, teratogenesis, oncogenesis, and acute radiation illnesses. It also considers nonstochastic radiation effects and the epidemiology of radiation exposures. Equivalent to HPHY 5588. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: Permission of instructor.

**BIOL 5589 Field Ecology: 4 semester hours.**

An intensive field of study of at least one biogeographical region to increase students' knowledge of and skill with field sampling techniques, field-study design, data collection and analysis, and report preparation. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5590 Ecosystem Ecology and Global Change: 4 semester hours.**

Examination of the structure and function of ecosystems and their responses to natural and anthropogenic changes emphasizing energy, water, carbon, and nitrogen cycling. Field trips. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5595 Animal Behavior: 4 semester hours.**

Behavior of animals and the evolutionary mechanisms that dictate behavioral patterns. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5598P Prof Development Workshop: 3 semester hours.**

New methods and opportunities to enhance and supplement skills. Subject to the approval of the Dean of the student's college, a maximum of eight credits earned in workshops may be applied toward a degree; students taking the courses only for personal development may choose the 0-credit option; those seeking professional development must choose a for-credit option. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus.

**BIOL 5599 Experimental Course: 1-6 semester hours.**

The content of this course is not described in the catalog. Title and number of credits are announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.

**BIOL 6601 Advanced Animal Behavior: 3 semester hours.**

Behavior and social organization of animals with particular attention to the vertebrates. Lecture, laboratory, and field work. PREREQ: Graduate standing and permission of department.

**BIOL 6602 Advanced Plant Physiology: 3 semester hours.**

Study of interrelationships of soil, water, and minerals in the nutrition of plants. PREREQ: BIOL 5504.

**BIOL 6603 Comparative Physiology: 3 semester hours.**

Study of the ways in which organisms meet their functional requirements. Lecture and laboratory. PREREQ: Permission of department.

**BIOL 6604 Advanced Ecology of Streams and Rivers: 3 semester hours.**

Study of the ecology of streams; chemical, physical, and geological aspects in relation to biota. The production of organic matter in flowing water is emphasized, including the tracing of food chains and food webs and the construction of energy budgets. Field trips. PREREQ: Permission of instructor.

**BIOL 6605 Biometry: 4 semester hours.**

Application of descriptive and analytical statistical methods to experimental design and biological research.

**BIOL 6606 Scientific Writing: 3 semester hours.**

Review of basic principles of grammar, organization, style, and persuasive argument as applied to specific areas of scientific writing. Each student will write proposals, technical reports and review manuscripts, and reviews of proposals and manuscripts.

**BIOL 6607 Environmental Physiology: 3 semester hours.**

Study of the physiological mechanisms and interrelated behavioral patterns by which animals respond to environmental factors. PREREQ: Graduate standing and permission of instructor.

**BIOL 6608 Stable Isotopes in Environmental Science: 4 semester hours.**

Theory and use of stable isotopes in natural sciences, with an emphasis towards the fields of ecology, geology and archeology. Basic principles of stable isotope analysis and applications towards understanding cycles of C, N, S and water, food web analysis, and paleoclimate. Individual student laboratory projects developed and carried out.

**BIOL 6610 Principles of Molecular Biology: 3 semester hours.**

Introduction to subcellular biology and molecular genetics. DNA replication, cell division, the genetic code, transcription, translation, enzyme function, and control mechanisms in procaryotic and eucaryotic cells. PREREQ or COREQ: BIOL 5532.

**BIOL 6613 Biogeography: 3 semester hours.**

Discussion of patterns of distribution of species and their historical and ecological causes. Includes research project.

**BIOL 6614 Evolutionary Ecology: 3 semester hours.**

Evolutionary theory applied to ecological processes, including selection theory, ecological genetics, life-history evolution and coevolution. PREREQ: BIOL 5517.

**BIOL 6616 Advanced Community Ecology: 4 semester hours.**

Historical and contemporary concepts and methods in community ecology and its interface with other fields, including molecular biology, informatics, conservation, social sciences, and landscape and ecosystem ecology. Emphasizes quantitative models and data analysis.

**BIOL 6621 Advanced Methods in Microbiology: 3 semester hours.**

PREREQ: Graduate standing and permission of instructor.

**BIOL 6623 Soil and Ground Water Bioremediation: 3 semester hours.**

Theoretical and applied aspects of biological treatment for contaminated subsurface systems.

**BIOL 6624 Microbial Ecology: 3 semester hours.**

Ecological principles applied to microorganisms. PREREQ: Course in Microbiology.

**BIOL 6628 Cytology and Cell Physiology: 4 semester hours.**

Advanced study of the functions and structural components of cells. Lecture and laboratory. PREREQ: Permission of instructor.

**BIOL 6629 Basic Concepts in Biology: 3 semester hours.**

Considerations of fundamental concepts of biology, their origin and development. PREREQ: Permission of the instructor.

**BIOL 6631 Advanced Systematic Botany: 3 semester hours.**

Classification of plants as it rests on morphological, chemical, ecological, and genetic bases. PREREQ: BIOL 5512.

**BIOL 6632 Advanced Systematic Botany: 3 semester hours.**

Classification of plants as it rests on morphological, chemical, ecological, and genetic bases. PREREQ: BIOL 5512.

**BIOL 6633 Advanced Microbial Physiology: 3 semester hours.**

Advanced topics in microbial physiology and biochemistry. PREREQ: BIOL 5532 and permission of instructor.

**BIOL 6634 Intermediary Metabolism: 3 semester hours.**

Theory, reactions, and methods pertinent to research in intermediary metabolism. PREREQ: BIOL 5532 and permission of instructor.

**BIOL 6636 Experimental Intermediary Metabolism: 2 semester hours.**

Must be accompanied by or preceded by BIOL 6634.

**BIOL 6641 Adv Topics in Immunology: 1-4 semester hours.**

Current research and practice in immunology and immunohematology (transfusion medicine) including molecular approach to diagnosis and treatment. May be repeated for a maximum of 4 credits.

**BIOL 6648 Graduate Problems: 1-9 semester hours.**

Thesis related research. May be repeated. Graded S/U. PREREQ: Graduate standing and permission of instructor.

**BIOL 6650 Thesis: 1-6 semester hours.**

1 to 6 credits. May be repeated. Graded S/U

**BIOL 6651 Advanced Studies in Ecology: 2-6 semester hours.**

Flexible use of seminars, lectures, and laboratory work dealing with ecological relationships. May be repeated.

**BIOL 6652 Advanced Studies in Physiology: 2-6 semester hours.**

Flexible use of seminars, lectures, and laboratory work dealing with problems in physiology. May be repeated.

**BIOL 6653 Advanced Studies in Vertebrate Zoology: 2-6 semester hours.**

Flexible use of seminars, lectures, and laboratory work dealing with problems in vertebrate zoology. May be repeated.

**BIOL 6654 Advanced Studies in Invertebrate Zoology: 2-6 semester hours.**

Flexible use of seminars, lectures, and laboratory work dealing with problems in invertebrate zoology. May be repeated.

**BIOL 6655 Advanced Studies in Vertebrate Paleontology: 2-6 semester hours.**

Flexible use of seminars, lectures, and laboratory work dealing with problems in vertebrate paleontology. May be repeated.

**BIOL 6656 Advanced Studies in Systematic Biology: 2-6 semester hours.**

Flexible use of seminars, lectures, and laboratory work dealing with problems in systematic biology. May be repeated.

**BIOL 6657 Advanced Studies in Plant Biology: 2-6 semester hours.**

Flexible use of seminars, lectures, and laboratory work dealing with problems in plant biology. May be repeated.

**BIOL 6658 Advanced Studies in Limnology: 2-6 semester hours.**

Flexible use of seminars, lectures, and laboratory work dealing with problems in limnology. May be repeated.

**BIOL 6659 Advanced Studies in Genetics: 2-6 semester hours.**

Flexible use of seminars, lectures, and laboratory work dealing with problems in genetics. May be repeated.

**BIOL 6660 Selected Topics in Biochemistry: 3 semester hours.**

Detailed study of selected areas of biochemistry. Course content will vary with current demand. PREREQ: BIOL 5532 or permission of instructor.

**BIOL 6661 Advanced Studies in Environmental Physiology: 2-6 semester hours.**

Flexible use of seminars, lectures, and laboratory work dealing with problems in environmental physiology. May be repeated.

**BIOL 6662 Advanced Studies in Developmental Biology: 2-6 semester hours.**

Flexible use of seminars, lectures, and laboratory work dealing with problems in developmental biology. May be repeated.

**BIOL 6670 Selected Topics Microbiology: 1-4 semester hours.**

Detailed study of selected areas of microbiology. Course content will vary with current demand. May be repeated. PREREQ: Permission of instructor.

**BIOL 6675 Advanced Bacterial Virology: 3 semester hours.**

Detailed study of selected areas of bacterial virology. Course content will vary with current demand. PREREQ: BIOL 5575 and permission of instructor.

**BIOL 6676 Advanced Animal Virology: 3 semester hours.**

Detailed study of selected areas of animal virology. Course content will vary with current demand. PREREQ: BIOL 5575 and permission of instructor.

**BIOL 6687 Environmental Science and Pollutants: 3 semester hours.**

Structure and function of ecosystems, sources and characteristics of hazardous materials, mechanisms and pathways of pollutant transport and degradation, mechanisms of pollutant impact on ecosystems and human health. PREREQ: BIOL 5521, an undergraduate or graduate ecology course or equivalent.

**BIOL 6690 Introduction to Graduate Studies: 1 semester hour.**

An advanced level graduate course for all first year graduate students. This course will introduce students to policies and procedures used by the department. Students will begin developing the structure of their graduate research project.

**BIOL 6691 Seminar: 1 semester hour.**

Review of current research and literature. May be repeated until a maximum of 4 credits is earned. Graded S/U .

**BIOL 6692 Seminar: 1 semester hour.**

Review of current research and literature. May be repeated until a maximum of 4 credits is earned. Graded S/U .

**BIOL 6693 Seminar in College Teaching: 2 semester hours.**

Review of current research and literature. Rotation of topics will include professional development, theory and practice of science education, and current issues in biology instruction. May be repeated for up to 6 credits. Graded S/U.

**BIOL 6694 Advanced Study in College Teaching: 2-6 semester hours.**

Rotating topics on practical approaches to teaching college-level biology and conducting research in science education. May be repeated for up to 6 credits.

**BIOL 6695 Seminar in Microbiology: 1-3 semester hours.**

Review of current research and literature in Microbiology. May be repeated until 6 credits are earned. Graded S/U.

***BIOL 6699 Experimental Course: 1-6 semester hours.***

The content of this course is not described in the catalog. Title and number of credits are announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.

***BIOL 7700 Supervised Teaching Internship: 1-9 semester hours.***

Up to 9 credits per semester. May be repeated. Graded S/U

***BIOL 8850 Doctoral Dissertation: 1-12 semester hours.***

Dissertation. Variable credit. May be repeated. Graded S/U