

BEHV 5810. Practicum. 2 hours. (0;0;2) Students work in a small group in a field setting under the immediate supervision of a faculty member in the department. The purpose of this practicum is to provide experience in applying behavioral principles in a setting where faculty feedback is continuously available.

BEHV 5815. Practicum. 1 hour. (0;0;1) Students work individually or in pairs on a project in any of a variety of applied settings. They are supervised by faculty through weekly meetings and occasional on-site observation. Project must be pre-approved, in writing, by faculty supervisor before registration. Practicum projects typically require about 100 clock hours (including time in the field and time meeting with supervisor). The purpose of this practicum is to provide the student with experience in planning and implementing behavior change. This course may be repeated for credit. Prerequisite(s): BEHV 5810.

BEHV 5820. Internship. 3 hours. (0;0;3) Students work in the field, under the supervision of a qualified behavior analyst, in a setting of their choice for a period of 6 weeks. Internship settings include (but are not limited to) agencies serving persons with developmental disabilities, business and industry, consulting firms, research facilities, schools and offices of physicians, psychologists and other private practitioners. Prerequisite(s): BEHV 5810 and BEHV 5815.

BEHV 5900-BEHV 5910. Special Problems. 1–3 hours each. Open to graduate students who are capable of independent work in a specific area of interest. Outline of problem and proposed activities must be submitted in writing to faculty and approved in advance of registration.

BEHV 5950. Master's Thesis. 3 or 6 hours. To be scheduled only with consent of department. 6 hours credit required. No credit given until thesis has been completed and filed with the graduate dean. Continuous enrollment required once work on thesis has begun. May be repeated for credit.

BEHV 6400. Behavioral Interventions in Health and Medicine. 3 hours. Course is constructed around a series of cases in which behavioral interventions are planned to improve health, prevent disease, or mitigate the effects of chronic health problems of individuals. A behavioral analysis of the problem in the context of individuals' overall repertoire and life circumstances is followed by design of an intervention plan based on behavioral principles. Problems likely to need resolution for successful intervention are identified and addressed.

Bilingual and English as a Second Language Education

see Teacher Education and Administration

Biochemistry

see Biological Sciences

Biological Sciences

Biochemistry, BIOC

BIOC 5340. Biochemistry and Molecular Biology of the Gene. 3 hours. Mechanisms and regulation of genetic expression, chromosome replication, mutagenesis and DNA repair, and gene cloning in prokaryotic and eukaryotic systems. Prerequisite(s): at least one of the following: BIOL 3510/BIOL 3520, BIOL 3451/BIOL 3452, BIOC 3621, BIOC 4540. Meets with BIOC 4570/BIOL 4570. (Same as BIOL 5340.)

BIOC 5540. Biochemistry I. 3 hours. (3;0;1) Chemistry and biochemistry of carbohydrates, lipids, amino acids and proteins, and nucleic acids; biochemical energetics, enzyme catalysis, vitamins and coenzymes, and their inter-relationships in energy-producing cycles and pathways. A recitation period is scheduled for problem-solving and student reports from the current biochemical literature. Prerequisite(s): CHEM 2380 or consent of department.

BIOC 5550. Biochemistry II. 3 hours. (3;0;1) Continuation of BIOC 5540. Metabolic pathways in biosynthesis and degradation of lipids, nucleic acids, proteins and carbohydrates, photosynthesis, nitrogen cycle, biochemical genetics and metabolic regulation. A recitation period is scheduled for problem-solving and student reports from the current biochemical literature. Prerequisite(s): BIOC 5540 or consent of department.

BIOC 5560. Biochemistry Laboratory. 2 hours. (1;3) Analysis and characterization of amino acids, peptides, enzymes, lipids, nucleic acids, carbohydrates, and metabolic pathways and processes. Techniques include a variety of chromatographic methods, electrophoresis, UV-vis spectroscopy and radiochemistry. Prerequisite(s): BIOC 5540 (may be taken concurrently). (Same as BIOC 4560.)

BIOC 5580. Molecular Biology and Biotechnology Laboratory. 2 hours. Experiments in recombinant DNA techniques, gene regulation and other areas of molecular biology. Prerequisite(s): BIOC or BIOL 5340 (may be taken concurrently). (Same as BIOC 4580 and BIOL 5580.)

BIOC 5680. Selected Topics in Biochemistry. 1–3 hours. Current research interests in the field of biochemistry. Prerequisite(s): consent of department. May be repeated for credit as topics vary.

BIOC 5900-BIOC 5910. Special Problems. 1–3 hours each. Independent study or laboratory research for the master's level. Problem must be approved by the major professor.

BIOC 5940. Seminar in Current Biochemistry. 1 hour. A study of current literature; current research emphasized. May be repeated for credit.

BIOC 5950. Master's Thesis. 3 or 6 hours. To be scheduled only with consent of department. 6 hours credit required. No credit assigned until thesis has been completed and filed with the graduate dean. Continuous enrollment required once work on thesis has begun. May be repeated for credit. Prerequisite(s): approved thesis proposal must be filed with department graduate office prior to enrollment.

BIOC 6010. Seminar for Doctoral Candidates. 3 hours. Demonstration of competence in a specific area of biochemistry and/or molecular biology as evidenced by criteria established by the faculty. May be repeated for credit.

BIOC 6600. Advanced Molecular Biology. 3 hours. Genetic structure and regulation of gene expression in prokaryotic and eukaryotic organisms; mechanisms of gene action, gene/enzyme relationships and metabolic control; bio-chemical manipulation and characterization of genetic macromolecules. Prerequisite(s): BIOL 4570 or BIOL 5340 or equivalent. (Same as BIOL 6600.)

BIOC 6610. Advanced Metabolism. 3 hours. Advanced intermediary metabolism of carbohydrates, lipids, nitrogenous compounds and nucleic acids. Relevant new findings particularly regarding the regulation of these pathways are also covered. Prerequisite(s): BIOC 4550/BIOC 5550 or consent of department.

BIOC 6620. Advanced Cell Biology. 3 hours. Structure and function of animal and plant cells with emphasis on cell membranes, cytoplasmic organelles and the nucleus; readings in current literature. Prerequisite(s): biochemistry, BIOL 3510/BIOL 3520 or equivalent, or consent of department. (Same as BIOL 6620.)

BIOC 6630. Protein Structure and Function. 3 hours. An introduction to protein structure. Coverage of recurring structural motifs and the determination of protein structure as it determines enzyme function. Catalytic reaction mechanisms, protein-substrate interactions and the kinetics of enzyme catalyzed reactions. Prerequisite(s): BIOC 4550 or BIOC 5550.

BIOC 6640. Biochemical Regulation and Signal Transduction. 3 hours. A study of regulation in metabolic processes and pathways, emphasizing theories of metabolic flux and enzyme regulation in the context of cellular signaling processes. Signal transduction pathways fundamental regulatory mechanisms, such as allosterism, induction and protein degradation are discussed. Prerequisite(s): BIOC 4550 or BIOC 5550, or consent of department.

BIOC 6650. Plant Biochemistry and Biotechnology. 3 hours. Contemporary plant biochemistry, with a focus on the major pathways for carbon and nitrogen metabolism and the acquisition of mineral nutrients, is integrated with plant physiology. The biotechnology component focuses on metabolic engineering and secondary metabolites (also called natural products) that help plants cope with their environments and provide compounds that improve quality of life for humans. Prerequisite(s): consent of department.

BIOC 6680. Advanced Techniques in Biochemistry. 1–3 hours. Methods and instrumentation currently used in biochemical analyses. Presented in four-week minicourses consisting of 8 hours of lecture and 24 hours of laboratory. Topics vary from year to year but include, among others, protein sequencing and amino acid analysis, nucleic acid sequencing, tissue culture, monoclonal antibody production, column chromatography, radioisotopes, peptide synthesis, and gel electrophoresis and electrofocusing. Prerequisite(s): consent of department. May be repeated for credit as topics vary.

BIOC 6900-BIOC 6910. Special Problems. 1–3 hours each. Independent study or laboratory research for doctoral students. Problem must be approved by the major professor.

BIOC 6940. Individual Research. 1–12 hours. Doctoral research of independent nature. Number of hours counted toward the PhD determined by major professor and graduate advisory committee.

BIOC 6950. Doctoral Dissertation. 3, 6 or 9 hours. To be scheduled only with consent of department. 12 hours of credit required. No credit assigned until dissertation has been completed and filed with the graduate dean. Doctoral students must maintain continuous enrollment in this course subsequent to passing qualifying examination for admission to candidacy. May be repeated for credit. Prerequisite(s): approved dissertation research proposal must be filed with department graduate office prior to registration.

BIOC 6990. Postdoctoral Research. 1–3 hours. For post-doctoral fellows to further training and research experience in developing and solving research problems independently. Prerequisite(s): consent of department. May be repeated for credit.

Biological Sciences, BIOL

BIOL 5001. Contemporary Topics in Molecular Biology. 1–3 hours. Contemporary topics in molecular biology and biochemistry. Topics may vary from semester to semester and may include eukaryotic and prokaryotic molecular genetics, DNA profiling, physiology and metabolism and application of recombinant DNA technologies. May be repeated for credit as topics vary.

BIOL 5002. Contemporary Topics in Microbiology. 1–3 hours. Contemporary topics in microbiology. Topics vary from semester to semester and may include bacterial physiology or metabolism and microbial chemistry. May be repeated for credit as topics vary.

BIOL 5003. Contemporary Topics in Neuroscience. 1–3 hours. Contemporary topics in neuroscience and physiology. Topics vary from semester to semester and may include neuro-physiology, computational neuroscience, neurotransmitters, central nervous system trauma. May be repeated for credit as topics vary.

BIOL 5005. Contemporary Topics in Biology. 1–3 hours. Contemporary topics in the biological sciences. Topics may vary from semester to semester and may include topics such as human development, epidemiology or plant physiology. May be repeated for credit as topics vary.

BIOL 5006. Topics in Forensic Biology. 1–3 hours. Specific titles vary but may include forensic entomology, forensic toxicology or forensic biology of the human skeleton. May be repeated for credit as topics vary.

BIOL 5030. Foundations of Environmental Science. 1 hour. Course lays the foundation for graduate studies in environmental science. Introduces graduate students to the faculty, research expertise and resources available in environmental sciences at UNT. Covers topics essential to a successful graduate experience and career in environmental science.

BIOL 5040. Contemporary Topics in Environmental Science and Ecology. 1–3 hours. Contemporary topics and issues in environmental science and ecology. Topical themes include global climate change, biodiversity, wetlands, population and aquatic, terrestrial or plant ecology. May be repeated for credit as topics vary.

BIOL 5050. Foundations of Ecological Theory. 3 hours. Background and concepts of ecological theory are reviewed through the survey of both original and current literature. Prerequisite(s): statistics and ecology or consent of instructor.

BIOL 5051. Community Ecology. 3 hours. Structure, dynamics and diversity of biotic communities and ecosystems. Focus on population interactions, niche relationships and processing of matter and energy. Prerequisite(s): 6 hours of biology including BIOL 2140.

BIOL 5052. Community Ecology Laboratory. 1 hour. Field and laboratory exercises on distribution, dispersion, abundance and diversity of organisms and their populations. Focus on quantitative description of biotic communities and ecosystems. Prerequisite(s): concurrent enrollment in or credit for BIOL 5051, or consent of department.

BIOL 5060. Electron Microscopy. 4 hours. (2;6) Theory and application of scanning and transmission electron microscopy, including sample preparation and analytical techniques.

BIOL 5070. Insect Biology. 4 hours. (3;3) Morphology, physiology, ethology, classification and control of insects and related arthropods. Prerequisite(s): 6 hours of biology.

BIOL 5080. Radiation Safety. 1 hour. Radiation sources, interaction of radiation with matter and human tissues, radiation measurement and dosage, instrumentation, regulations and practical safety procedures.

BIOL 5100. Introduction to Environmental Impact Assessment. 3 hours. Principles and practices of preparing environmental impact assessments and statements. Addresses how to understand the effects that projects, plans and policies have on the environment and the impact those effects have on specific resources, ecosystems and human communities. Methods for identifying impacts, describing the affected environment, predicting and assessing impacts and selecting the proposed action from a group of alternatives for meeting specific needs will be examined. A detailed review of an environmental assessment and environmental impact statement are required.

BIOL 5110. Endocrinology. 3 hours. Regulation of physiological processes in animals by hormones and related chemical agents. Prerequisite(s): BIOL 3800 or equivalent, or consent of department.

BIOL 5120. Environmental Chemistry. 3 hours. Presents a scientific overview of environmental contaminants, their occurrence, sources and impact on humans and the environment. Prerequisite(s): 8 hours of chemistry. Meets with BIOL 4120.

BIOL 5130. Biostatistics I. 3 hours. Introduction to statistical methods, experimental design, data presentation and hypothesis testing in biological research. Statistical inference includes tests for normality, skewness, kurtosis, and two-sample data sets for goodness of fit, contingency, means, medians and non-parametric methods. Introduces probability and SAS software. Prerequisite(s): MATH 1100.

BIOL 5140. Biostatistics II. 3 hours. Continuation of Biostatistics I. Statistical methods and experimental designs in biological research. Coverage of parametric and non-parametric correlation, multi-sample inference tests (ANOVA) including one-way, block, nested and factorial designs; multiple range (comparison) analyses; simple linear, non-linear and multiple regressions; ANCOVA. Introduces multiple variable approaches including discriminate, factor and cluster analysis. Prerequisite(s): MATH 1100 and BIOL 5130.

BIOL 5150. Pharmacology: The Biological Basis of Drug Action. 3 hours. An overview of pharmacology for graduate students, based on principles of drug action. The course emphasizes drugs by class, not specific drugs per se. Course covers general principles, antibiotics and pharmacology of the autonomic, cardiovascular, central nervous and endocrine systems.

BIOL 5160. Advanced Techniques in Microbiology and Molecular Biology. 6 hours. (0;6) Intensive laboratory exercises in cultivation, analysis and gene transfer in bacterial mutants. Further emphasis on techniques for studying macromolecular and enzyme synthesis, preparation and analysis of plasmid DNA, cloning and gene expression. Prerequisite(s): microbiology, biochemistry or BIOL 3510.

BIOL 5180. Techniques in Molecular Biology. 6 hours. (1;6) Teaches advanced molecular biology laboratory methodology. Techniques include gene cloning, plasmid purification, restriction analysis, DNA fingerprinting and DNA sequencing. Prerequisite(s): BIOL 4570/BIOC 4570, or BIOL 5340, or consent of instructor.

BIOL 5200. Environmental Health. 3 hours. An introduction to the environmental determinants of health that focuses on health risks of human-mediated changes to the environment, as well as the regulatory framework that directs decision making on environmental issues. Consideration given to health implications of growing populations, available food quantity and quality, loss of habitat and biodiversity, radiation, toxins in the environment, sanitation, solid and hazardous waste disposal and environmental degradation including noise, air and water pollution.

BIOL 5220. Neuropsychopharmacology. 3 hours. A comprehensive examination of the physiological effects on major psychotropic drug classes that affect the central nervous system, including the interactions between neurotransmitter systems and physiology; neuroanatomical pathways and behavior; synaptic functions and behavioral disorders.

BIOL 5221. Experimental Methodologies in Neuropsychopharmacology. 1 hour. Critical examination of scientific methodologies in studying the effectiveness of psychotropic medicine in treating mental disorders and other mental conditions. Students discuss and apply the methodologies to test hypotheses and present research findings reviewed in neuropsychopharmacological literature. Prerequisite(s): BIOL 5220 or consent of instructor. Meets with BIOL 4221.

BIOL 5250. Advanced Human Physiology. 3 hours. Physiological mechanisms in humans, with emphasis on medical physiology.

BIOL 5260. Principles of Evolution. 3 hours. Genetic, systematic, ecological, historical and geographical concepts of evolution. Prerequisite(s): consent of department.

BIOL 5270. Limnology. 4 hours. (2;4;1) Physical, chemical and biological factors that affect productivity in reservoirs, lakes and ponds. Field studies using current limnological methods and instruments. For biologists, chemists, teachers and sanitarians. Prerequisite(s): 12 hours biology or 6 hours biology plus 6 hours of another science.

BIOL 5280. Aquatic Botany. 3 hours. (2;3) Ecology, identification and management of aquatic plants and algae. Special emphasis on the role of aquatic plants in reservoir and river ecosystems. Prerequisite(s): 8 hours of biology.

BIOL 5290. Marine Biology. 3 hours. Covers the basics of marine biology with a global approach, using examples from numerous regions and ecosystems worldwide. Highlights interactions of physical and chemical factors and habitat diversity with the biological components of the world's oceans. Environmental topics such as fisheries, mariculture, pollution and conservation. Prerequisite(s): 8 hours each of biology and chemistry. Meets with BIOL 4290.

BIOL 5300. Physiological Ecology. 3 hours. Physiological, behavioral and biochemical adaptations of animals to environmental limiting factors, including temperature, oxygen, water, salinity, light and toxic chemicals.

BIOL 5310. Experimental Design in Biology. 3 hours. Optimizing the design of field and laboratory experiments to aid in data analysis. Develops concepts of statistical power, efficiency, and univariate and multivariate tools of use in biological sampling programs. Prerequisite(s): BIOL 5130 or equivalent or consent of department. Meets with BIOL 4310.

BIOL 5330. Developmental Biology. 3 hours. Mechanisms of development, differentiation, and growth in animals at the molecular, cellular, and genetic levels. Areas of emphasis include transcriptional control mechanisms, embryonic patterning, cell–cell interactions, growth factors and signal transduction, and regulatory hierarchies. Includes the roles that environmental factors play in development, the medical applications of our knowledge of development, and the roles that development plays in evolution. Prerequisite(s): 16 hours of biology or consent of department. Meets with BIOL 4330.

BIOL 5340. Biochemistry and Molecular Biology of the Gene. 3 hours. Mechanisms and regulation of genetic expression, chromosome replication, mutagenesis and DNA repair, and gene cloning in prokaryotic and eukaryotic systems. Meets with BIOC 4570/BIOL 4570. Prerequisite(s): at least one of the following: BIOL 3510/BIOL 3520, BIOL 3451/BIOL 3452, BIOC 3621, BIOC 4540. (Same as BIOC 5340).

BIOL 5370. General Toxicology. 3 hours. Introduction to the basic principles of toxicology. Focus on absorption, distribution, metabolism and elimination of toxicants; target organ toxicity; mechanisms of toxic action; carcinogenesis; and risk assessment. Prerequisite(s): 8 hours each of biology and chemistry. Meets with BIOL 4370.

BIOL 5380. Fundamentals of Aquatic Toxicology. 3 hours. (2;3) Theory and methodologies used by scientists, regulatory agencies and industry to measure the impact of man's activities on freshwater aquatic ecosystems. The course has its foundations in history, but concentrates on current methodologies and theories.

BIOL 5400. Wetland Ecology and Management. 4 hours. (3;4) Ecology and management of various types of wetlands with emphasis on the role of aquatic and wetland plants in determining wetland structure and function. Wetland restoration and creation for wildlife habitat or water quality benefits are reviewed.

BIOL 5420. Industrial Microbiology. 3 hours. Use of micro-organisms and microbial processes in the pharmaceutical, chemical and food industries. Prerequisite(s): biochemistry.

BIOL 5440. Stream Ecology. 4 hours. (3;4) Ecological principles of how stream dynamics influence the biological and hydrologic patterns and processes occurring in stream

ecosystems. Laboratory studies designed to teach techniques and to test hypotheses related to environmental assessment. Prerequisite(s): 3 hours of ecology. (Same as BIOL 4440.)

BIOL 5460. Eukaryotic Genetics. 3 hours. Research and theory in eukaryotic genetics with an emphasis in metazoan genetic model systems and human genetics, including chromosome structure, genomic analysis, developmental genetics and diseases. Prerequisite(s): BIOL 3451/BIOL 3452 and BIOL 3510/BIOL 3520; molecular biology or biochemistry suggested (may be taken concurrently).

BIOL 5470. Laboratory Techniques in Cytology. 1 hour. (0;3;1) Cytological techniques in plants, animals and humans, including karyotyping, cell and tissue culture, and sex chromatin analysis. Prerequisite(s): consent of department. May be taken with or without BIOL 5490.

BIOL 5490. Cytology and Cytogenetics. 3 hours. Cell structure and function in plants and animals with emphasis on genetic and chromosomal aberrations. Prerequisite(s): consent of department.

BIOL 5501. Bacterial Diversity and Physiology. 3 hours. Comparative survey of bacteria. Growth, ecology, metabolism, energy transformations, differentiation and adaptive mechanisms.

BIOL 5502. Bacterial Diversity and Physiology Laboratory. 1 hour. Isolation of bacteria from nature. Enrichment methods, morphology, enumeration of bacterial growth and enzymes. Prerequisite(s): BIOL 5501 (may be taken concurrently).

BIOL 5503. Plant Physiology. 3 hours. Plant physiology from the molecular to organismal level with ecosystem considerations. Topics include nutrient acquisition and distribution, biochemistry and metabolism, growth and development.

BIOL 5505. Comparative Animal Physiology. 3 hours. Comparison of structure and physiological function in a wide variety of animals. Emphasis on thermoregulation and on respiratory, circulatory, excretory, endocrine and digestive systems. Prerequisite(s): 8 hours of biology.

BIOL 5520. Invertebrate Biology. 4 hours. (3;3) Biology of non-vertebrate animals with emphasis on anatomical, physiological and behavioral adaptations to varied environments and phylogenetic relationship. Prerequisite(s): 6 hours of biology.

BIOL 5570. Aquatic Insects of North America. 4 hours. (3;4) Ecology, sampling methods, systematics and classification of Nearctic aquatic insects at the family level; use of keys and key terminology in aquatic insect identification. Prerequisite(s): invertebrate zoology or entomology, or consent of instructor.

BIOL 5580. Molecular Biology and Biotechnology Laboratory. 2 hours. (0;5) Experiments in recombinant DNA techniques, gene regulation and other areas of molecular biology. Prerequisite(s): BIOL 5340 or BIOC 5340 (may be taken concurrently). (Same as BIOC 5580.)

BIOL 5650. Environmental Science Field Course. 6 hours. (3;5) Advanced field methods and approaches for analysis of the physical, chemical and ecological aspects of aquatic, terrestrial and estuarine ecosystems are covered. On a rotating basis, the field course focuses on alpine lakes, deserts and estuaries. Prerequisite(s): consent of instructor. May be repeated for credit as topics vary.

BIOL 5670. Natural History and Philosophy of Rivers. 6 hours. (3;5) Ecological, geological and philosophical history of arid watersheds of the western United States. Extended field trip required. Desert canyons are geologically unique and present wonderful opportunities to study interactions of geology, fauna, flora, environment, cultural development and environmental ethics. Prerequisite(s): consent of instructor. (Same as PHIL 5670.)

BIOL 5700. Procedures and Materials for Science

Instruction. 3 hours. (2;4) Problems, techniques and procedures for classroom and laboratory experiences based on current science education research. Recommended for students who desire secondary teacher certification in a science field. Field experience in the public schools is a required component. Prerequisite(s): completion of undergraduate science courses required for certification and consent of department.

BIOL 5701. Biotechnology and Society. 3 hours. Survey of major advances in biotechnology. Emphasis on the development of the technology, underlying biological principles, historical context, current practices and societal implication. Prerequisite(s): genetics or biochemistry or consent of department.

BIOL 5720. Sediment Toxicology. 3 hours. Mechanisms of contaminant transport and fate in freshwater and marine sediments and pollutant effects at the individual, population and biotic community levels. Sediment contaminant bioavailability and bioaccumulation into food webs and the scientific aspects of legal control and remediation of hazardous sediments. Prerequisite(s): one year of chemistry and biology or consent of department.

BIOL 5751. Neuroscience I: Cells and Circuits. 3 hours. Neuroscience research strategies, neurons and glia, synaptic transmission, neurotransmitters, developmental brain anatomy, sensory and motor systems. Prerequisite(s): 12 hours of biology or consent of department. Meets with BIOL 4751.

BIOL 5752. Neuroscience II: Brain and Plasticity. 3 hours. Brain basis of motivation, sex, emotion, sleep, mental illness, memory; plasticity in developing and adult brains. Prerequisite(s): 12 hours of biology or consent of department. BIOL 5751 recommended. Meets with BIOL 4752.

BIOL 5760. Neurobiology Laboratory. 1 hour. (0;3) Vertebrate neuroanatomy and experimental neurobiology using electrophysiological and behavioral methods. Prerequisite(s): concurrent enrollment in BIOL 6460 or consent of department.

BIOL 5800. Microbial Genetics. 3 hours. Genetic structure, inheritance and gene expression in microorganisms and their viruses. Prerequisite(s): consent of department.

BIOL 5810. Biocomputing. 3 hours. Introduction to computational problems inspired by the life sciences and overview of available tools. Methods to compute sequence alignments, regulatory motifs, phylogenetic trees and restriction maps. Prerequisite(s): CSCE 3810 or consent of instructor. Meets with BIOL 4810 and CSCE 4810. (Same as CSCE 5810.)

BIOL 5820. Computational Epidemiology. 3 hours. Application of computational methods to problems in the fields of public health. Design and implementation of disease outbreak models. Meets with BIOL 4820 and CSCE 4820. (Same as CSCE 5820.)

BIOL 5830. Advanced Genetics. 3 hours. Genetic structure and inheritance in viruses, bacteria and higher organisms, including gene biochemistry, gene expression, population genetics, cytogenetics and organelle genetics. Prerequisite(s): consent of department.

BIOL 5840. Medical Genetics and Genetic Counseling.

3 hours. Human genetics, including cytogenetics, immunogenetics, population genetics, molecular genetics, human biochemical genetics and genetic counseling. Prerequisite(s): BIOL 3350 or equivalent.

BIOL 5860. Biological Sciences Seminar Series. 1 hour. A weekly seminar series covering a broad range of biological research topics. Invited speakers are prominent local, regional or national researchers. May be repeated for credit. Pass/no pass only.

BIOL 5880. Environmental Sciences Seminar Series.

1 hour. A weekly seminar series covering a broad range of environmental research topics. Invited speakers are prominent local, regional or national researchers. May be repeated for credit. Pass/no pass only.

BIOL 5900-BIOL 5910. Special Problems. 1–3 hours each. Independent study or laboratory research for the master's level. Problem must be approved by the major professor. No more than 6 hours can be counted toward a master's degree.

BIOL 5920-BIOL 5930. Research Problems in Lieu of Thesis. 3 hours each.

BIOL 5950. Master's Thesis. 3 or 6 hours. To be scheduled only with consent of department. 6 hours credit required. No credit assigned until thesis has been completed and filed with the graduate dean. Continuous enrollment required once work on thesis has begun. May be repeated for credit. Prerequisite(s): approved thesis proposal must be filed with department graduate office prior to enrollment.

BIOL 5960. Science Institute. 1–6 hours. For students who assist in instruction or participate in special research workshops. Prerequisite(s): consent of department. No more than 6 hours may be counted toward a degree.

BIOL 6010. Biology Seminar. 1 hour. Weekly lectures on research in biology and related disciplines. Prerequisite(s): consent of department. May be repeated for credit as topics vary.

BIOL 6070. Ecology of Benthic Organisms. 4 hours. (3;2;1) Adaptations, biotic interrelationships and population characteristics of bottom-dwelling aquatic organisms. Field techniques, population analysis and dynamics in both lentic and lotic habitats. Prerequisite(s): BIOL 2140 or equivalent, and a minimum of 7 hours advanced or graduate ecology.

BIOL 6080. Current Advances in Pharmacology. 3 hours. Course covers the latest advances in pharmacology on a rotating basis, with emphasis on neuropharmacology, autonomic pharmacology and biochemical/molecular pharmacology. May be repeated up to a total of three times to cover all aspects.

BIOL 6150. Communication in Scientific Teaching and Research. 3 hours. A seminar and workshop that cover lecture course techniques, laboratory preparation and teaching, seminar techniques, research presentations at scientific meetings, research publications, research proposals, scientific illustration, photography, departmental and university services for teaching and research, and job-seeking techniques in academe, government and industry.

BIOL 6200. Bioinstrumentation and Analytical Techniques. 4 hours. (3;0;1) Current research instrumentation and techniques in biological sciences. Prerequisite(s): consent of department.

BIOL 6240. Multivariate Biostatistics. 2 hours. Application of techniques, e.g., multiple regression, discriminate, factor and cluster analyses, to explore multivariable biological and environmental data in a seminar setting. Emphasis is placed on concepts and applications rather than theory and development. Prerequisite(s): BIOL 6620 or graduate-level statistics and familiarity with either SAS or SPSS statistical software.

BIOL 6320. Remote Sensing. 4 hours. (3;3) The theoretical bases and practical aspects of digital remote sensing. Remote sensing technology is reviewed and data analysis techniques are presented. Approaches to the development of a remote sensing project are given. Hands-on experience is provided in the laboratory. Prerequisite: GEOG 5170 is recommended.

BIOL 6341. Advanced Environmental Impact Assessment. 3 hours. Advanced topics in preparing environmental impact assessments and statements by examining deficiencies and inadequacies of environmental assessments and impact statements (i.e., was the analysis adequate), as defined by U.S. District, Appeals and Supreme Court decisions. Prerequisite(s): BIOL 5100 or equivalent.

BIOL 6360. Environmental Engineering. 4 hours. (3;3) Water, land and air pollution control technologies are presented. Engineering approaches to pollution problems are demonstrated by considering technical feasibility and economic constraints. Laboratory exercises provide instruction for quantitative analysis of water and waste water; field trips to various pollution-control facilities. Prerequisite(s): CHEM 1410/CHEM 1430 and CHEM 1420/CHEM 1440.

BIOL 6390. Techniques in Environmental Analysis. 4 hours. (3;3) Theory and application of advanced analytical chemistry techniques for metals and organics in environmental and biological samples. Introduces methods for trace metals analysis and identification, and organics separation and identification techniques. Laboratory teaches state-of-the-art spectroscopic and chromatographic techniques.

BIOL 6400. Ecological Risk Assessment. 3 hours. A detailed treatment of aquatic and terrestrial methods and procedures used to assess the ecological hazard of chemicals in the environment. Emphasizes quantitative methods in testing site assessment, monitoring procedures, regulatory requirements and field and laboratory techniques useful to assess damage to aquatic, terrestrial and avian resources. Prerequisite(s): ecology, statistics, general chemistry (8 hours), or consent of instructor.

BIOL 6460. Cellular Neuroscience. 3 hours. Detailed examination of the nervous system, specifically neuroanatomy, neurophysiology, neurochemistry and sensory transduction. Prerequisite(s): consent of department.

BIOL 6480. Systems Neuroscience. 3 hours. A detailed examination of the major brain functions, including sensation, perception, movement, emotions, language, thought and memory. Prerequisite(s): BIOL 6460 or equivalent, or consent of department.

BIOL 6500. Brain Development and Plasticity. 3 hours. Development of the nervous system from early embryo through adulthood; neurogenesis, cell migration, differentiation, synaptogenesis; similarities among mechanisms of ontogeny, learning and regeneration; emphasis on experimental approaches. Prerequisite(s): BIOL 4750 or BIOL 6480 or equivalent is recommended.

BIOL 6540. Neurochemistry. 3 hours. Chemistry of the nervous system and behavior; pharmacology, anatomy and physiology of neurotransmitter systems; current techniques in neurochemistry and neuropharmacology. Prerequisite(s): BIOL 4750 or BIOL 6460 or equivalent, and one term/semester of undergraduate biochemistry are recommended.

BIOL 6600. Advanced Molecular Biology. 3 hours. Genetic structure and regulation of gene expression in prokaryotic and eukaryotic organisms; mechanisms of gene action, gene/enzyme relationships and metabolic control; biochemical manipulation and characterization of genetic macromolecules. Prerequisite(s): BIOL 4570 or BIOL 5340 or equivalent. (Same as BIOC 6600.)

BIOL 6620. Advanced Cell Biology. 3 hours. Structure and function of animal and plant cells with emphasis on cell membranes, cytoplasmic organelles and the nucleus; readings in current literature. Prerequisite(s): biochemistry, BIOL 3510/BIOL 3520 or equivalent, or consent of department. (Same as BIOC 6620.)

BIOL 6810. Advanced Topics in Computational Life Science. 3 hours. Current research topics related to computational life sciences such as bioinformatics, computational epidemiology and population models. May be repeated for credit as topics vary. (Same as CSCE 6810.)

BIOL 6900-BIOL 6910. Special Problems. 1–3 hours each. Independent study or laboratory research for doctoral students. Problem must be approved by major professor. No more than 6 hours may be counted toward a degree.

BIOL 6940. Individual Research. 1–12 hours. Doctoral research of independent nature. Number of hours counted toward the PhD determined by major professor and graduate advisory committee. Pass/no pass only.

BIOL 6950. Doctoral Dissertation. 3, 6 or 9 hours. To be scheduled only with consent of department. 12 hours of credit required. No credit assigned until dissertation has been completed and filed with the graduate dean. Doctoral students must maintain continuous enrollment in this course subsequent to passing qualifying examination for admission to candidacy. May be repeated for credit. Prerequisite(s): approved dissertation research proposal must be filed with department graduate office prior to registration.

Molecular Biology

Related Courses Offered at Texas Woman's University

Students who wish to enroll in the following TWU courses may do so through a cross-registration mechanism administered by the Toulouse School of Graduate Studies at UNT.

BACT 6534. Plasmids as Vectors for Recombinant DNA. 4 hours. Molecular structure and replication of plasmids. Utilization of plasmids for isolation, characterization, and expression of prokaryotic and eukaryotic genes. One lecture, 6 laboratory hours a week.

BACT 6544. Viruses as Vectors for Recombinant DNA. 4 hours. Replicative cycle of viruses utilized in recombinant DNA technology. Viruses used to isolate genetic material from other sources and characterization of the recombinant DNA by size, restriction endonuclease mapping and nucleic acid sequencing. One lecture, 6 laboratory hours a week.

BIOL 5123. Biostatistics. 3 hours. Advanced studies in biometric systems, experimental design and data analysis. 3 lecture hours a week. Prerequisite(s): 12 hours of biology and permission of instructor.

BIOL 5653. Human Development. 3 hours. Fundamentals of human embryology, the anatomy of human development and pathology of development. Emphasis on normal and pathological aspects of human gestation. Lectures, films, student reports and tests. 3 lecture hours a week.

BIOL 5703. Radiation, Protection and Dosimetry. 3 hours. Interactions of ionizing radiations and matter, radiation instrumentation, determination of radiation, case and principles of radiation protection. 3 lecture hours a week. Prerequisite(s): one year of physics and permission of instructor.

BIOL 6334. Advanced Cell Biology. 4 hours. Survey of current understanding of biogenesis, architecture and function of cellular organelles. The cell cycle and regulation of cell growth. 4 lecture hours. Prerequisite(s): permission of instructor.

BIOL 6513. Molecular Biology. 3 hours. Survey of current understanding of DNA structure, organization, chromosome replication, gene transcription, ribosome assembly and translation. Emphasis is on molecular processes and their regulation in both prokaryotes and eukaryotes. 3 lecture hours a week. Prerequisite(s): CHEM 5613 and CHEM 5623 or permission of instructor.

ZOOL 5423. Endocrinology. 3 hours. Advanced studies of biology and biochemistry of the glands of internal secretion. 3 lecture hours a week. Prerequisite(s): ZOOL 4243.

Business, College of

Business, Interdepartmental, BUSI

BUSI 5190. Administrative Strategy. 3 hours. Capstone course providing the integration of functional areas of business administration. Requires students to determine policy at the general- or top-management level. Students address strategic organizational problems and the optimization of the total enterprise. Includes the use of lectures, case analysis and special topics. Must be taken in the student's last term/semester of course work.

BUSI 5200. Professional Ethics and Corporate Governance. 3 hours. Examination of professional ethics from both a philosophical and business perspective. Ethical reasoning, moral character and moral decision making provide a framework for examining the importance of ethics in an individual's personal life and professional career. Exploration of the concept of corporate governance and the direction business entities are taking in establishing a sound governance framework. Designed to meet the ethics requirement of the Texas State Board of Public Accountancy, as well as the ethics educational needs of the larger business community. Prerequisite(s): ACCT 5130 or consent of instructor.

BUSI 5410. Creative Thinking and the Business Idea. 3 hours. Introduces the professional MBA to students with the major themes developed for the program. The course discusses the essential of entrepreneurship, risk taking and market opportunity. Students are expected to develop a major, discussing the market opportunities for a business product or service. Corequisite(s): FINA 5170.

BUSI 5420. Assessing the Business Opportunity. 3 hours. Investigates what a business professional needs to conduct a thorough industry, market and competitor analysis and to determine the degree of match between the opportunity and the firm. Topics developed are mission and vision, understanding corporate strategy and structure, market segments and demand factors, etc. Prerequisite(s): BUSI 5410. Corequisite(s): must take ACCT 5130 in the same term/semester.

BUSI 5430. Designing, Creating and Managing the Delivery Systems. 3 hours. Focuses on the essentials of designing, creating and managing the business firm's delivery system. Topics include designing value into products and services, creating and managing distribution channels, quality management ideas, process planning and facility layout. Prerequisite(s): BUSI 5420. Corequisite(s): BCIS 5120.

BUSI 5440. Growing Business in Changing Environments. 3 hours. Studies the essentials of managing the business firm within evolving environments. Concepts required for monitoring and control, along with tools for decision making. Sets the foundation for other topics such as organizational structures, redesign, threats and opportunities, and adjusting delivery and communications systems to dynamic environments. Prerequisite(s): BUSI 5430. Corequisite(s): DSCI 5180.

BUSI 5900. Special Problems. 1–3 hours. Open to graduate students who are capable of developing a problem independently. Problem chosen by the student and developed through conferences and activities under the direction of the instructor. Prerequisite(s): approved applications for special problems/independent research/dissertation credit must be submitted to the CoB Graduate Programs Office prior to registration.

BUSI 5920-BUSI 5930. Problems in Lieu of Thesis. 3 hours each.

BUSI 6100. Seminar in University Teaching for Business Administration. 3 hours. Topics in teaching methodologies. Focus on those topics that provide doctoral students with practical teaching tips to help them become more effective teachers. Different learning styles are addressed and frameworks, theories and teaching models are presented that help doctoral students continually improve their teaching throughout their career.

BUSI 6220. Applied Regression Analysis. 3 hours. Applications of multivariate regression analysis, canonical correlation analysis and nonparametric statistical procedures to issues in business research involving multivariate data. Topics include building, evaluating and validating a regression model; analyzing models using hierarchical regression, contrast coding, partial correlations and path analysis; and comparing parametric and corresponding nonparametric tests. Prerequisite(s): DSCI 5180 or equivalent and BUSI 6450 (may be taken concurrently).