**BIOLOGY (BIO) Courses**

**BIO 5001. Ethical Conduct in Research. (1-0) 1 Credit Hour.**
Prerequisite: Graduate standing. This course provides a basic overview of the requirements for ethical conduct within the research laboratory. The grade report for this course is either "CR" (satisfactory completion) or "NC" (unsatisfactory completion). (Credit cannot be earned for both BIO 5001 and BIO 7413.) Differential Tuition: $50. Course Fees: GS01 $30.

**BIO 5003. Epigenetics and Metabolism. (3-0) 3 Credit Hours.**
This course offers a scientific overview and discussion of course-related topics including stem cells, diseases, and interaction between metabolism and different epigenetic mechanisms. Differential Tuition: $150. Course Fee: GS01 $90.

**BIO 5013. Survey Topics in Ecology. (3-0) 3 Credit Hours.**
Prerequisite: Graduate standing. This course provides an overview of ecology from the individual organism to populations, communities, and ecosystems. It examines the physical, chemical, and biological components of ecological interactions, and includes a comparative treatment of terrestrial and aquatic ecosystems. (Same as ES 5013. Credit cannot be earned for both ES 5013 and BIO 5013.) May require field trips. Differential Tuition: $150. Course Fee: GS01 $90.

**BIO 5033. Biotechnology Laboratory. (0-6) 3 Credit Hours.**
Prerequisite: Graduate standing. An organized course offering an introduction to routine procedures employed in the modern research laboratory. (Same as NDRB 5033. Credit cannot be earned for both BIO 5033 and NDRB 5033.) Differential Tuition: $150. Course Fees: GS01 $90; IUS1 $15; L001 $30.

**BIO 5043. Global Change. (3-0) 3 Credit Hours.**
Prerequisite: Graduate standing in the program or consent of instructor. Changes in the global distribution of plants and animals and the causes of the changes will be examined. Factors that are apparently coupled to changes in the atmosphere and environmental temperature will be examined. (Formerly EES 5043. Same as CE 6383 and GEO 5043. Credit can be earned for only one of the following: CE 6113, CE 6383, EES 5043, ES 5043, or GEO 5043.) Differential Tuition: $150. Course Fee: GS01 $90.

**BIO 5063. Environmental Microbiology. (3-0) 3 Credit Hours.**
Prerequisite: BIO 3713 or consent of instructor. To provide a basic understanding of environmental microbiology primarily from two aspects: microbial interactions with chemical pollutants in the environment and the fate of microbial pathogens in the environment. Topics covered include microbial environments, detection of bacteria and their activities in the environment, microbial biogeochemistry, bioremediation, and water quality. (Same as ES 5063. Credit cannot be earned for both BIO 5063 and ES 5063.) Differential Tuition: $150. Course Fees: GS01 $90; LRS1 $46.20; STSI $21.60.

**BIO 5083. Mammalogy. (3-0) 3 Credit Hours.**
Prerequisite: Graduate Standing. An advanced course covering various aspects of the biology of mammals, including anatomy, physiology, systematics, evolution, behavior, ecology, and biogeography. Field trips may be required. Same as ES 5083. Credit cannot be earned for both ES 5083 and BIO 5083. Differential Tuition: $150. Course Fee: GS01 $90.

**BIO 5093. Herpetology. (3-0) 3 Credit Hours.**
Prerequisite: Graduate Standing. An advanced course covering various aspects of the biology of herpetofaunal, including anatomy, physiology, systematics, evolution, behavior, ecology, and biogeography. Field trips may be required. (Same as ES 5093. Credit cannot be earned for both ES 5093 and BIO 5093.) Differential Tuition: $150. Course Fee: GS01 $90.

**BIO 5103. River Ecosystems. (3-0) 3 Credit Hours.**
Prerequisite: Graduate standing in biology or environmental science, or consent of instructor. This course examines the physical, chemical, and biological factors that determine biodiversity and the distribution of freshwater ecosystems. Key ecological and hydrogeomorphology concepts and their application to environmental concerns are covered. Field trip required. (Same as ES 5113. Credit cannot be earned for both BIO 5103 and ES 5113.) Differential Tuition: $150. Course Fees: GS01 $90; LRS1 $46.20; STSI $21.60.

**BIO 5123. Principles of Molecular Biology. (3-0) 3 Credit Hours.**
Prerequisite: BIO 3513 or an equivalent. Molecular structure and function of genes and nucleic acids, and the processes of DNA replication, mutation and repair, as well as transcription and translation of genetic material. Genome projects, functional genomics and the genetic control of development will also be covered. Differential Tuition: $150. Course Fees: GS01 $90.

**BIO 5133. Principles of Cell Biology. (3-0) 3 Credit Hours.**
Prerequisite: BIO 3513 and BIO 3813, or their equivalents. Basic structure, organization, and differentiation of cells. Cell cycle, signaling, growth, and movement of cells, as well as cellular immunology and cellular aspects of infectious disease will also be covered. Same as NDRB 5133. Credit cannot be earned for both NDRB 5133 and BIO 5133. Differential Tuition: $150. Course Fee: GS01 $90.

**BIO 5143. Advanced Nucleic Acids Laboratory. (0-6) 3 Credit Hours.**
Prerequisite: BIO 3913 or an equivalent, BIO 5033 recommended. An introduction to advanced techniques of molecular biology dealing with manipulations and analyses of DNA, including preparation and analysis of genomic DNA, genomic cloning, the polymerase chain reaction (PCR), Southern blotting, DNA sequencing and computational analysis of DNA sequence data. Same as NDRB 5143 credit cannot be earned for both BIO 5143 and NDRB 5143. Formerly titled "Advanced Molecular Biology Laboratory – DNA Techniques." Differential Tuition: $150. Course Fee: GS01 $90; IUS1 $15; L001 $30.

**BIO 5163. Recombinant Protein Biotechnology Laboratory. (0-6) 3 Credit Hours.**
Prerequisite: Satisfactory completion of BIO 5033. Small- to large-scale growth of microorganisms and eukaryotic cells followed by downstream processing of supernatants and/or cell pellets, protein purification, and protein analysis. Same as NDRB 5163. Formerly BIO 7542 and BIO 7543. Credit can only be earned for one of the following: BIO 5163, BIO 7542, BIO 7543, or NDRB 5163. Differential Tuition: $150. Course Fees: GS01 $90; IUS1 $15; L001 $30.

**BIO 5173. Principles of Chemical Biology. (3-0) 3 Credit Hours.**
Prerequisite: BIO 3513 and BIO 3813, or equivalents. This course covers cell- and organism-level functions viewed from a chemical perspective. Studies of molecular interactions of metabolites, pharmaceuticals, proteins, polysaccharides, lipids, and nucleic acids, including protein folding and unfolding, protein modification, ligand binding, proteomics, metabolomics, lipidomics, glycoproteins, and nucleotide modification. Differential Tuition: $150. Course Fee: GS01 $90.

**BIO 5223. Applied Ecology. (3-0) 3 Credit Hours.**
Prerequisite: Graduate Standing. This course covers the impact of humanity's activities on the environment: their effect on water, land, animal, and human resources. An evaluation of present and future strategies to preserve a healthy environment. (Formerly EES 5103. Same as ES 5103. Credit can only be earned for one of the following: EES 5103, ES 5103, or BIO 5223.) Differential Tuition: $150. Course Fee: GS01 $90.
BIO 5233. Medicinal Plants. (3-0) 3 Credit Hours.
Prerequisite: Graduate standing in Biology or Chemistry. An overview of plant secondary metabolism, and the ethnobotany, biochemistry, and pharmacology of some of our most important plant-derived pharmaceuticals. Differential Tuition: $150. Course Fees: GS01 $90.

BIO 5243. Advanced Plant Ecology. (3-0) 3 Credit Hours.
Prerequisites: BIO 3283 and BIO 3292, or consent of instructor. A study of the major biomes of the world, including North America and Texas, and the factors that influence the development of these biomes. Special consideration is given to species interactions that lead to high and low density species. (Same as ES 5243. Credit cannot be earned for both BIO 5243 and ES 5243.) Differential Tuition: $150. Course Fees: GS01 $90; LRS1 $46.20; STSI $21.60.

BIO 5253. Technical Writing Ecologists. (3-0) 3 Credit Hours.
Prerequisite: Graduate Standing. This course focuses on rhetoric, ecology, and technical/scientific communication in order to develop interdisciplinary, team-based, and applied research projects. This advanced professional writing and rhetoric course will examine ecological communications as an archetypal example of specialized technical communication. Differential Tuition: $150. Course Fee: GS01 $90.

BIO 5343. Proteins and Nucleic Acids. (3-0) 3 Credit Hours.
Prerequisite: BIO 3513 or equivalent. Protein sequences, domains, folding, proteomics, glycoproteins, protein-DNA interaction, RNA conformations. Differential Tuition: $150. Course Fees: GS01 $90.

BIO 5383. Aquatic Ecology. (3-0) 3 Credit Hours.
Prerequisite: Graduate Standing. Study of aquatic ecosystems including streams, wetlands, and lakes. Topics include watershed processes, biological communities, physical habitats, nutrient cycling, energy flow, and management issues. The course culminates with individual research projects focused on local watersheds. Field trips may be required. (Same as ES 5513. Credit cannot be earned for both ES 5513 and BIO 5383.) Differential Tuition: $150. Course Fee: GS01 $90.

BIO 5523. Enzymes. (3-0) 3 Credit Hours.
Prerequisite: BIO 3513 or an equivalent. A study of enzyme structure and mechanism, inhibitors, cofactor, kinetics, and regulation. Differential Tuition: $150. Course Fees: GS01 $90; LRS1 $46.20; STSI $21.60.

BIO 5543. Pharmacology and Toxicology. (3-0) 3 Credit Hours.

BIO 5571. Experimental Techniques in the Life Sciences. (0-2) 1 Credit Hour.
Prerequisite: Consent of Instructor. Course topics include research methods in cell and molecular biology, molecular neurobiology, microbiology, and ecology. May be repeated for credit as topics vary. (Formerly BIO 7571. Credit cannot be earned for both BIO 7571 and BIO 5571.) Differential Tuition: $50. Course Fees: L001 $8.

BIO 5572. Experimental Techniques in the Life Sciences. (0-4) 2 Credit Hours.
Prerequisite: Consent of Instructor. Course topics include research methods in cell and molecular biology, molecular neurobiology, microbiology, and ecology. May be repeated for credit as topics vary. (Same as BIO 7572. Credit cannot be earned for both BIO 7572 and BIO 5572.) Differential Tuition: $100. Course Fees: L001 $8.

BIO 5643. Introduction to Bioinformatics. (3-0) 3 Credit Hours.
The course will cover how the ability to sequence and analyze genomes has transformed biology. The genomic revolution has been made possible by the development of bioinformatics tools that combine computation with principles of molecular biology. In this course, students will have the opportunity to learn how to use some of the major bioinformatics tools and will examine a few genomes to understand the vast amount of information present in them. Differential Tuition: $150. Course Fee: GS01 $90; LRS1 $46.20; STSI $21.60.

BIO 5663. Applications of Recombinant DNA Technology. (3-0) 3 Credit Hours.
A course on recombinant DNA technology, concentrating on major DNA manipulation methods, including their use in vaccine and bioactive protein production, gene therapy, plant genetic engineering along with ethical and safety considerations. Differential Tuition: $150. Course Fees: GS01 $90; LRS1 $46.20; STSI $21.60.

BIO 5713. Ornithology. (3-0) 3 Credit Hours.
A course covering various aspects of the biology of birds, including anatomy, physiology, systematics, evolution, behavior, ecology, and biogeography. Field trips may be included. (Same as ES 5763. Credit cannot be earned for both BIO 5713 and ES 5763.) Differential Tuition: $150. Course Fees: GS01 $90.

BIO 5733. Advanced Medical Mycology. (3-0) 3 Credit Hours.
Prerequisites: BIO 3522 and BIO 3722. This course is a comprehensive study of the etiological agents and host factors that lead to fungal disease in humans. Differential Tuition: $150. Course Fees: GS01 $90.

BIO 5743. Advanced Virology. (3-0) 3 Credit Hours.
Prerequisite: Graduate standing in Biology. A detailed study of the diversity of viruses and biochemical mechanisms for their replication. (Formerly titled "Biochemical Virology"). Differential Tuition: $150. Course Fees: GS01 $90.

BIO 5753. Conservation Biology. (3-0) 3 Credit Hours.
Prerequisite: Graduate Standing. The class topics will include the nature of the biosphere, threats to its integrity, and ecologically sound responses to these threats. Also included will be the origin and preservation of biotic diversity, how the rich variety of plant and animal life arose, how it has been maintained by natural processes, and how its destruction can be prevented. (Same as ES 5753. Credit cannot be earned for both BIO 5753 and ES 5753.) Differential Tuition: $150. Course Fee: GS01 $90.

BIO 5762. Fundamentals of Immunology for Biotechnology. (2-0) 2 Credit Hours.
An integrated examination of the principles of immunology pertaining to the Biotechnology Industry. An emphasis on current immunological techniques, including: recombinant antibody, flow cytometry and elispot technology. Issues related to vaccine production and therapeutics will also be considered. Differential Tuition: $100. Course Fees: GS01 $60.

BIO 5763. Ichthyology. (3-0) 3 Credit Hours.
Prerequisite: Graduate standing. Study of fishes, and includes a wide range of topics including taxonomy, systematics, and biogeography, anatomy and physiology, and behavior and ecology. This course will focus on form and function, behavior, life history, ecology, and key taxonomic characteristics of most of the orders of fishes. Field trips may be required. (Same as ES 5743. Credit cannot be earned for both ES 5743 and BIO 5763.) Differential Tuition: $150. Course Fee: GS01 $90.
BIO 5783. Introduction to Good Manufacturing Practices and Good Laboratory Practices. (3-0) 3 Credit Hours.
Review of FDA and U.S. Pharmacopia regulations. Practical considerations for the implementation of GMP/GLP systems; data management and reporting, as well as problem solving and interpretive skills, will be emphasized. Differential Tuition: $150. Course Fees: GS01 $90.

BIO 5843. Wildlife Ecology. (3-0) 3 Credit Hours.
Prerequisite: Graduate Standing. Topics covered in this course include: major environmental factors affecting wildlife, structure and behavior of wildlife populations, and regional wildlife communities and their conservation. Field studies will allow students to observe and apply classroom topics. (Same as ES 5773. Credit cannot be earned for both ES 5773 and BIO 5843.) Differential Tuition: $150. Course Fee: GS01 $90.

BIO 5853. Biostatistics. (3-0) 3 Credit Hours.
Prerequisite: Graduate Standing. This course includes the collection, analysis, presentation, and interpretation of biological data, and probability. Analysis includes descriptive statistics, correlation and regression, confidence intervals, and hypothesis testing. Use of appropriate technology, including statistical software. (Same as ES 5023. Credit cannot be earned for both ES 5023 and BIO 5853.) Differential Tuition: $150. Course Fee: GS01 $90.

BIO 5873. Plant Biotechnology. (3-0) 3 Credit Hours.
Prerequisite: BIO 3513 or equivalent, BIO 5123 is recommended. The principles of plant physiology and genetics, and techniques used in plant modification, and principles of plant breeding and quantitative genetics as applied to plant biotechnology. Differential Tuition: $150. Course Fees: GS01 $90.

BIO 5971. Directed Research. (0-0) 1 Credit Hour.
Prerequisites: Admission to either the Biology or Biotechnology Master's program or admission as a special graduate or non-degree-seeking student, and permission in writing (form available) from the instructor and the student's Graduate Advisor of Record. The directed research course may involve either a laboratory or a theoretical problem. May be repeated for credit, but not more than 6 hours, regardless of discipline, in combination with BIO 6951-3 (Independent Study), will apply to the Master's degree. Differential Tuition: $50. Course Fees: GS01 $30.

BIO 5972. Directed Research. (0-0) 2 Credit Hours.
Prerequisites: Admission to either the Biology or Biotechnology Master's program or admission as a special graduate or non-degree-seeking student, and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record. The directed research course may involve either a laboratory or a theoretical problem. May be repeated for credit, but not more than 6 hours, regardless of discipline, in combination with BIO 6951-3 (Independent Study), will apply to the Master's degree. Differential Tuition: $100. Course Fees: GS01 $60.

BIO 5973. Directed Research. (0-0) 3 Credit Hours.
Prerequisites: Admission to either the Biology or Biotechnology Master's program or admission as a special graduate or non-degree-seeking student, and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record. The directed research course may involve either a laboratory or a theoretical problem. May be repeated for credit, but not more than 6 hours, regardless of discipline, in combination with BIO 6951-3 (Independent Study), will apply to the Master's degree. Differential Tuition: $150. Course Fees: GS01 $90.

BIO 5981. Graduate Seminar in Ecology. (1-0) 1 Credit Hour.
Prerequisite: Graduate Standing. Topical issues of current research will be examined in this course. Presentations will be by current faculty, invited guests, and master's or doctoral candidates. May be repeated for credit but only 2 hours may be applied toward the Master's degree. The grade report for this course is either “CR” (satisfactory) or “NC” (unsatisfactory). (Formerly EES 5981 and ES 5991. Same as CE 6621. Credit can only be earned for one of the following courses: EES 5981, ES 5991, CE 6621, or BIO 5981.) Differential Tuition: $50. Course Fee: GS01 $30.

BIO 6113. Plant Ecophysiology. (3-0) 3 Credit Hours.
Prerequisite: Graduate Standing. This course is a survey of physiological approaches to understanding plant-environment interactions from the functional perspective. Lectures cover physiological adaptation, limiting factors, resources acquisition/allocation, photosynthesis, carbon and energy balance, water use relations, nutrient relations, linking ecophysiology and stable isotopes, stress physiology, life history physiology, evolution of physiological performance, and ecophysiology at the population, community, and ecosystem levels. (Formerly EES 6113 and ES 6113. Same as ES 6023. Credit can only be earned for one of the following: ES 6023, ES 6113, and BIO 6113.) Differential Tuition: $150. Course Fees: GS01 $90; LRS1 $46.20; STSI $21.60.

BIO 6133. Methods in Field Biology. (3-0) 3 Credit Hours.
Prerequisite: BIO 3283 or an equivalent. Examination of techniques to collect, identify, and preserve plants and animals. Field methods used in the analysis of populations and communities are considered. (Same as ES 6133. Credit cannot be earned for both BIO 6133 and ES 6133.) Differential Tuition: $150. Course Fees: GS01 $90; LRS1 $46.20; STSI $21.60.

BIO 6142. Methods in Field Ecology Laboratory. (0-6) 2 Credit Hours.
This course introduces students to field ecology methodologies. Topics may include physiological field measurements (in situ photosynthesis, respiration, water relations), population assessment (quadrats, transects, mark-recapture), community-level assessment (measuring density and diversity, benthic analyses), and/or ecosystem process field assessment (carbon or nutrient flux, whole system metabolism, and watershed studies). Differential Tuition: $100. Course Fee: L001 $8.

BIO 6213. Advanced Ecology. (3-0) 3 Credit Hours.
Prerequisite: BIO 3283 or an equivalent. Interaction of organisms with their environment, allelopathy, competition, distribution, succession, and factors that control growth and dispersal. Special consideration is given to the concepts of climax, succession, and land management. (Same as ES 6213. Credit cannot be earned for both BIO 6213 and ES 6213.) Differential Tuition: $150. Course Fees: GS01 $90; LRS1 $46.20; STSI $21.60.

BIO 6222. Advanced Plant Ecology Laboratory. (0-6) 2 Credit Hours.
This course includes physiological field measurements, population assessment, community-level assessment, and ecosystem process field assessment of plants. Differential Tuition: $100. Course fee: L001 $8.

BIO 6233. Quantitative Biology. (3-0) 3 Credit Hours.
Prerequisite: Graduate standing or consent of instructor. This course is an introduction of quantitative analysis of biological data and design of experiments. Topics include probability theory and distributions, descriptive statistics, hypothesis testing and confidence intervals for means, variances, and proportions, chi-square statistic, categorical data analysis, linear correlation and regression model, analysis of variance, and nonparametric methods. (Same as NDRB 6233. Credit cannot be earned for both NDRB 6233 and BIO 6233.) Differential Tuition: $150. Course Fee: GS01 $90.
BIO 6262. Advanced Animal Ecolology Laboratory. (0-6) 2 Credit Hours. This course includes physiological field measurements, population assessment, community-level assessment, and ecosystem process field assessment of animals. Differential Tuition: $100. Course Fee: L001 $8.

BIO 6323. Essentials of Biostatistics for Biotechnology. (3-0) 3 Credit Hours. Basic, intermediate, and advanced (but not bioinformatics) statistical vocabulary, concepts, and methods commonly used in the biotechnology industry. A focus on tests for quality control and assurance of equipment and test systems to assess accuracy, precision, and bias related to test validations. Concepts and appropriate selections of test/study design using power analyses and estimations of sample sizes; also for clinical trials. Analytical calibration statistics, frequency distributions, descriptive statistics, measures of central tendency and dispersion/ error, probability, paired and unpaired, one-tailed and two-tailed t-tests, correlations, regression, one-way and two-way analysis of variance with repeated measures, parametric and nonparametric tests, post hoc tests for significance, reporting and interpretations of statistical results, validations of clinical tests for specificity, sensitivity, predictive values, likelihood ratios, receiver operating characteristic curves. Differential Tuition: $150. Course Fees: GS01 $90.

BIO 6513. Drug Development. (3-0) 3 Credit Hours. This course will provide students with an overview of the early drug discovery process, including target identification, validation, assay development and high throughput screening up to pre-clinical trials. Differential Tuition: $150. Course Fees: GS01 $90; LRS1 $46.20; STSI $21.60.

BIO 6543. Vaccine Development. (3-0) 3 Credit Hours. Prerequisites: BIO 5762 and permission of instructor. This course will provide students with an overview of issues about the roles of vaccines in the control of infectious diseases, vaccine development, clinical trials and implementation of vaccine programs. Differential Tuition: $150. Course Fees: GS01 $90.

BIO 6573. Microbial Pathogenesis. (3-0) 3 Credit Hours. The student will gain an understanding of the cellular and molecular mechanisms by which eukaryotic and viral pathogens cause disease and the host immune responses against these pathogens. Differential Tuition: $150. Course Fees: GS01 $90.

BIO 6803. Advanced Immunology and Immunochemistry. (3-0) 3 Credit Hours. Prerequisite: BIO 4743 or consent of instructor. The study of current concepts of humoral and cell-mediated immunity, with emphasis on molecular mechanisms. Differential Tuition: $150. Course Fees: GS01 $90.

BIO 6883. Bacterial Pathogenesis. (3-0) 3 Credit Hours. Prerequisites: BIO 3713 and BIO 4743, or consent of instructor. This course will present a selection of topics in the field of bacterial pathogenesis. Lectures will cover regulation of virulence; colonization and host tissue damage; vaccines, antibiotics and novel antimicrobials; evasion of the immune system; intracellular pathogens; pathogenic mechanisms of Gram-negative and Gram-positive bacteria; pathogenic mycobacteriology; and experimental tools in bacterial pathogenesis. Differential Tuition: $150. Course Fees: GS01 $90.

BIO 6941. Ecology Colloquium. (1-0) 1 Credit Hour. Prerequisite: Graduate Standing. This course includes discussions of current journal articles, reviews, and recent advances in specialized areas of the biological sciences. May be repeated for credit as topics vary. The grade report for this course is either “CR” (satisfactory participation in the colloquium) or “NC” (unsatisfactory participation in the colloquium). (Formerly EES 6941. Same as BIO 7041 and ES 6941. Credit can only be earned for one of the following: ES 6941, EES 6941, BIO 7041, and BIO 6941.) Differential Tuition: $50. Course Fee: GS01 $30.

BIO 6951. Independent Study. (0-0) 1 Credit Hour. Prerequisites: Graduate standing and permission in writing of the instructor and the student's Graduate Advisor of Record. Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline. In combination with BIO 5971-3 Directed Research will apply to the Master's degree. Differential Tuition: $50. Course Fees: GS01 $30.

BIO 6952. Independent Study. (0-0) 2 Credit Hours. Prerequisites: Graduate standing and permission in writing of the instructor and the student's Graduate Advisor of Record. Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline. In combination with BIO 5971-3 Directed Research will apply to the Master's degree. Differential Tuition: $100. Course Fees: GS01 $60.

BIO 6953. Independent Study. (0-0) 3 Credit Hours. Prerequisites: Graduate standing and permission in writing of the instructor and the student's Graduate Advisor of Record. Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline. In combination with BIO 5971-3 Directed Research will apply to the Master's degree. Differential Tuition: $150. Course Fees: GS01 $90.

BIO 6961. Comprehensive Examination. (0-0) 1 Credit Hour. Prerequisite: Approval of the appropriate Graduate Program Committee to take the Comprehensive Examination. Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination). Differential Tuition: $50. Course Fees: GS01 $30.

BIO 6973. Special Problems. (3-0) 3 Credit Hours. Prerequisite: Consent of instructor. An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but not more than 6 hours, regardless of discipline, may be applied to the Master's degree. Differential Tuition: $150. Course Fees: GS01 $90.
BIO 6981. Master's Thesis. (0-0) 1 Credit Hour.
Prerequisites: Permission of the Graduate Advisor of Record and thesis director. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment in BIO 6981, BIO 6982, or BIO 6983 is required each term in which the thesis is in progress. Differential Tuition: $50. Course Fees: GS01 $30.

BIO 6982. Master's Thesis. (0-0) 2 Credit Hours.
Prerequisites: Permission of the Graduate Advisor of Record and thesis director. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment in BIO 6981, BIO 6982, or BIO 6983 is required each term in which the thesis is in progress. Differential Tuition: $100. Course Fees: GS01 $60.

BIO 6983. Master's Thesis. (0-0) 3 Credit Hours.
Prerequisites: Permission of the Graduate Advisor of Record and thesis director. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment in BIO 6981, BIO 6982, or BIO 6983 is required each term in which the thesis is in progress. Differential Tuition: $150. Course Fees: GS01 $90.

BIO 7041. Biology Colloquium. (1-0) 1 Credit Hour.
Prerequisite: Graduate standing. Oral presentations, discussions, critical evaluation of students' research in progress, or discussions of current journal articles or reviews of recent scientific advances. May be repeated for credit. The grade report for this course is either "CR" (satisfactory participation in the colloquium) or "NC" (unsatisfactory participation in the colloquium). (Formerly BIO 5041. Same as ES 6941. Unless topic varies, credit cannot be earned for both BIO 7041 and ES 6941.) Differential Tuition: $50. Course Fees: GS01 $30.

BIO 7051. Seminar in Life Sciences. (1-0) 1 Credit Hour.
Prerequisite: Graduate standing. Formal presentations of research by outside authorities in the biological sciences. May be repeated for credit. The grade report for this course is either "CR" (satisfactory participation in the seminar) or "NC" (unsatisfactory participation in the seminar). Differential Tuition: $50. Course Fees: GS01 $30.

BIO 7211. Doctoral Research. (0-0) 1 Credit Hour.
Prerequisite: Admission to either the Neurobiology or Cell and Molecular Biology Doctoral program. May be repeated for credit, but no more than 52 hours may be applied to the Doctoral degree. Differential Tuition: $50. Course Fees: GS01 $30.

BIO 7212. Doctoral Research. (0-0) 2 Credit Hours.
Prerequisite: Admission to either the Neurobiology or Cell and Molecular Biology Doctoral program. May be repeated for credit, but no more than 52 hours may be applied to the Doctoral degree. Differential Tuition: $100. Course Fees: GS01 $60.

BIO 7213. Doctoral Research. (0-0) 3 Credit Hours.
Prerequisite: Admission to either the Neurobiology or Cell and Molecular Biology Doctoral program. May be repeated for credit, but no more than 52 hours may be applied to the Doctoral degree. Differential Tuition: $150. Course Fees: GS01 $90.

BIO 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.
Prerequisites: Admission to candidacy for the Doctoral degree and completion of at least 18 semester credit hours of BIO 7211-3. May be repeated for credit. Differential Tuition: $50. Course Fees: GS01 $30.

BIO 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.
Prerequisites: Admission to candidacy for the Doctoral degree and completion of at least 18 semester credit hours of BIO 7211-3. May be repeated for credit. Differential Tuition: $100. Course Fees: GS01 $60.

BIO 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.
Prerequisites: Admission to candidacy for the Doctoral degree and completion of at least 18 semester credit hours of BIO 7211-3. May be repeated for credit. Differential Tuition: $150. Course Fees: GS01 $90.

BIO 7563. Practicum in Biotechnology. (0-0) 3 Credit Hours.
Prerequisites: Enrollment in Master's in Biotechnology program and at least 18 hours credit including satisfactory completion of BIO 5033 and one other organized laboratory course. An internship in a Biotechnology company. Must have approval of Biotechnology Graduate Studies Committee. Differential Tuition: $150. Course Fees: GS01 $90.

BIO 7572. Experimental Techniques in Biology. (0-4) 2 Credit Hours.
Prerequisite: Consent of instructor. Course topics include research methods in cell and molecular biology, molecular neurobiology, and microbiology. May be repeated for credit as topics vary. (Same as NDRB 7572. Credit cannot be earned for both NDRB 7572 and BIO 7572.) Differential Tuition: $100. Course Fee: GS01 $60.