

BIOLOGY AND CHEMISTRY

Degrees

Master's Degrees

- Master of Science in Biology (MS) (<https://catalog.tamtu.edu/graduate-information/arts-sciences/biology-chemistry/master-science-biology-ms/>)
- Master of Science in Biology Non-Thesis (MS) (<https://catalog.tamtu.edu/graduate-information/arts-sciences/biology-chemistry/master-science-biology-non-thesis-ms/>)

Courses

BIOL 5197 Biology Research

Continuation of thesis or non-theses research by the students under the supervision of the student's advisor. Can be repeated other semesters. Cannot be substituted for required or elective graduate biology courses. Evaluation of performance in this course is on CR/NC basis.

Prerequisites: Graduate standing and permission of the instructor.

BIOL 5290 Graduate Seminar in Biology

A seminar on current topics in biology. Emphasis will be on recent research in a field of biology. May be repeated once when topic changes.

Prerequisites: Graduate standing and permission of the instructor.

BIOL 5297 Biology Research

Continuation of thesis or non-thesis research by the students under the supervision of the student's advisor. Can be repeated other semesters. Cannot be substituted for required or elective graduate biology courses. Evaluation of performance in this course is on CR/NC basis.

Prerequisites: Graduate standing and permission of the instructor.

BIOL 5371 Special Topics in Biology

A seminar course on topics of interest in biology. Laboratory section at discretion of instructor. May be repeated when topic changes. Laboratory fee, if applicable.

Prerequisites: Graduate standing and permission of the instructor.

BIOL 5397 Biology Research

Continuation of thesis or non-thesis research by the students under the supervision of the student's advisor. Can be repeated other semesters. Cannot be substituted for required or elective graduate biology courses. Evaluation of performance in this course is on CR/NC basis.

Prerequisites: Graduate standing and permission of the instructor.

BIOL 5398 Thesis I

This course is the first step in the Biology thesis and includes the thesis proposal and research. The course is to be scheduled by the student in consultation with student's major professor. Evaluation of this course is on CR/NC basis. The student will receive credit when the thesis proposal is approved by the student's thesis committee. If the proposal is not completed, then a grade of IP is received and the student must enroll again for credit. Laboratory fee applicable.

Prerequisites: Approval of the major professor and the Department Chair.

BIOL 5399 Thesis II

This course is the final step in the Biology thesis and includes research, the thesis and the thesis defense. The course is to be scheduled by the student in consultation with student's major professor. The student will receive credit when the thesis has been written and defended successfully. Evaluation of performance in this course is on CR/NC basis. If a grade of IP is received, the student must enroll again for credit. Laboratory fee applicable.

Prerequisites: Approval of the major professor and the Department Chair and credit in BIOL 5398.

BIOL 5401 Biometry

A course in experimental design and statistical analysis. The course will include techniques used in different fields of biological research and the application of these techniques for the student's own research.

Prerequisites: Graduate standing and permission of the instructor.

BIOL 5402 Advanced Mammalogy

A study of the anatomy, evolution, distribution, systematics, ecology, and physiology of mammals - with special emphasis on local representatives. Saturday field trips required. Laboratory fee applicable.

Prerequisites: Graduate standing and permission of instructor.

BIOL 5404 Advanced Herpetology

A study of the anatomy, evolution, distribution, systematics, ecology, and physiology of amphibians and reptiles; primarily North American species with special emphasis on local representatives. Saturday field trips required. Laboratory fee applicable.

Prerequisites: Graduate standing and permission of instructor.

BIOL 5407 Behavioral Ecology

A course in the function of behavior in the context of ecology and evolution. Topics will include foraging behavior, habitat selection, mating behavior, parental care, and social behavior.

Prerequisites: Graduate standing and permission of the instructor.

BIOL 5408 Advanced Entomology

An advanced study of insects (and arachnids). Topics will include anatomy and physiology, evolution, ecology, and behavior. Special emphasis will be placed on insect diversity and identification of local insects (and arachnids) to family and species. A collection of local representatives is required. Saturday field trips required. Laboratory fee applicable.

Prerequisites: Graduate standing and permission of the instructor.

BIOL 5409 Molecular Sys Biol&Chem Gens

A course dedicated to the discussion of current approaches to study "Omics" or systems biology, and the impact of chemical genetics in understanding how to activate or inactivate gene products as a way to determine the cellular function of proteins. Molecular Systems Biology and Chemical Genetics covers topics at the molecular level, including research in the evolving areas of genomics, proteomics, metabolomics, bioinformatics, microbial systems, and the integration of cell signaling and regulatory networks. Laboratory fee applicable. (Cross-listed with BIOL 4409 and CHEM 4409)

Prerequisites: Graduate standing and permission of instructor.

BIOL 5410 Advanced Ecology-Pop&Com

An advanced study of biotic and abiotic ecosystem interactions emphasizing field measurements, statistical procedures, and computer simulations of the growth of populations. Topics will include social and species interactions within populations, analysis of population composition and change, the distribution of communities, and the functioning of ecosystems. Independent study of a selected ecological topic required. Laboratory fee applicable.

BIOL 5415 Population Genetics

A study of population genetics models, including genetic variation, selection, inbreeding, genetic drift, mutation, gene flow, linkage disequilibrium and recombination. Lecture/laboratory. Laboratory fee applicable.

Prerequisites: Graduate standing and permission of instructor.

BIOL 5418 Advanced Community Ecology

A study of biotic and abiotic interactions determining community structure emphasizing models, observations and field experiments on communities. Topics will include diversity, food webs, succession, the factors determining the composition of communities, and the functioning of ecosystems. Independent study of a selected community ecology topic required.

BIOL 5420 Adv Environmental Microbiology

An overview of the relationship between microbial metabolism, physiology, and the environment with a discussion of the primary literature. The application of modern microbiological concepts to address and solve current environmental problems is emphasized. Topics include air, water and soil microbiology, geochemical activities of microbes, biotransformations, pollution, and pollution abatement using microbes. Laboratory fee applicable. (Cross-listed with ENSC 4420/BIOL 4420)

Prerequisites: Graduate standing and permission of instructor.

BIOL 5424 Advanced Medical Microbiology

This is an advance course which explores the infectious diseases and health relationships between microorganisms and humans. Students will learn the biology of medically important bacterial, viral, fungal, and parasitic pathogens and the disease etiology, epidemiology, host defenses, identification and diagnosis, prevention, and control of each microorganism. No laboratory section included. This is an applied microbiology course.

Prerequisites: Graduate standing and permission of instructor.

BIOL 5425 Advanced Immunology

A detailed study of the immune response and related events, with a discussion of primary literature. Emphasis is placed on cellular and humoral branches of immunity, including the study of blood (serology) as a diagnostic tool. Laboratory fee applicable. (Cross-listed with BIOL 4425)

Prerequisites: Graduate standing and permission of instructor.

BIOL 5432 Adv Biodiversity and Conservat

Biodiversity is an emerging and highly integrative field of research dealing with all aspects of biological diversity and its relationship to the functioning of earth's ecosystems. This course will address approaches and techniques for the measurement, assessment, monitoring, and management of biodiversity from genes to ecosystems. We will incorporate social, ecological, and evolutionary perspectives to understand patterns, structure, and drivers of biodiversity and its importance to human health and society. Laboratory fee applicable.

Prerequisites: Graduate standing and permission of instructor.

Corequisites: BIOL 5032.

BIOL 5434 Advanced Range Plant Ecology

Plants are essential organisms on this planet and as a species we have a direct dependence on plants for our survival. This course is designed for students seeking to enhance their working knowledge of plant anatomy, plant physiology, plant nutrition, and soil characteristics. Students will investigate theoretical concepts and empirical studies of plant ecology and their application at the individual, population, and community levels. Although this course will explore global vegetation patterns, special focus will be on semi-arid environments found within the Tamaulipan Biotic Province.

Prerequisites: Graduate standing and permission of instructor.

Corequisites: BIOL 5034.

BIOL 5436 Advanced Wildlife Ecology

The course will focus on the application of ecological principles of the management and conservation of wildlife. We will cover the history and development of wildlife ecology as a science; characteristics of, and factors affecting wildlife populations; techniques and theories of management; ecology of wildlife species; and wildlife conservation. This course will use a wide array of scientific literature within a discussion format to expose students to theoretical principles of the ecology and management of wildlife resources. Additionally, we will delve into different techniques, perspectives, and approaches to both identify and achieve wildlife management goals. Laboratory fee applicable.

Corequisites: BIOL 5036.

Prerequisites: Graduate standing and permission of instructor.

Corequisites: BIOL 5036.

BIOL 5440 Adv Plant Systematics

An introduction to plant systematics with an emphasis on flowering plants. Topics will include principles of classification, rules of nomenclature, plant identification and the use of keys, the evolutionary relationships among plant groups, species concepts, and experimental approaches to systematics. Laboratory fee applicable. (Cross-listed with BIOL 4440)

Prerequisites: Graduate standing and permission of the instructor.

BIOL 5441 Adv Plant Physiological Ecolo

This course will examine plant physiological mechanisms that explain ecological patterns. Topics will include the physiological characteristics of plants (photosynthesis, energy balance, water relations, mineral nutrition, growth, and development) and how those characteristics are adaptive to various environments.

Prerequisites: Graduate standing and permission of the instructor.

BIOL 5450 Molecular Gen&Reg Gen Exp

An advanced course on the molecular mechanisms by which genes are controlled and regulated. Topics include induction, activation, repression and RNA interference of gene function.

Prerequisites: Graduate standing and permission of the instructor.

BIOL 5452 Advanced Biochemistry

A detailed study, using primary literature sources, of carbohydrate, amino acids, nucleic acids, and lipid metabolic pathways. Special attention is given to human metabolism in health and disease.

Prerequisites: one semester (3 SCH or more) of biochemistry for majors or permission of instructor.

BIOL 5455 Advanced Bioinformatics

Advanced bioinformatics introduces general bioinformatics concepts and their practice. Students will be introduced to current techniques in generation and storage of biological information, biological databases, sequence alignments, molecular phylogeny. They will also learn modern Genomic/proteomic concepts, and the use of publicly available software in biological data analysis. Students will gain practical experience with bioinformatics tools and develop basic skills in the collection and presentation of bioinformatics data. Lab fee: \$30.00.

Prerequisites: Graduate standing and permission of instructor.

Corequisites: BIOL 5055.

BIOL 5460 Adv Geographic Info Systems

This course will explore fundamental concepts of geographic information technologies with a focus on applications within the geosciences and natural sciences in general. Students will be exposed to the power of geographic information systems to elucidate complex problems. (Cross-listed with GEOL 4460 and BIOL 4460)

Prerequisites: Graduate standing.

BIOL 5470 Adv Developmental Biology

A study of the molecular and cellular events that lead to the generation of a multicellular organism from a fertilized egg. Emphasis on cell differentiation, development of an entire organism from a single cell involving several stages of differentiation and cell interaction. The course will investigate the cellular and molecular processes involved in generating an embryo, in creating various tissues and organs. Laboratory fee applicable.

Prerequisites: BIOL 3413.

BIOL 5471 Special Topics in Biology

A seminar course on topics of current biological interest. May be repeated when topic changes. Laboratory section included and fee applicable.

Prerequisites: Graduate standing and permission of the instructor.

BIOL 5472 Special Topics in Biology

A seminar course on topics of current biological interest. May be repeated when topic changes. No laboratory section included.

Prerequisites: Graduate standing and permission of the instructor.

BIOL 5475 Adv Evolutionary Dev Biology

The objective of this course is to integrate two disciplines, evolutionary biology and developmental biology into a common framework of genetics. The focus will be on evolution of developmental genetic pathways in order to explain the evolution of animal development. This course will explore how our growing knowledge of developmental circuits, and their variation, affects our understanding of how organisms evolve.

Prerequisites: BIOL 3413

BIOL 5480 Field Biology

A field course on the diversity and ecology of populations and communities along the Rio Grande. A field trip of two to three weeks will be required. Laboratory fee applicable.

Prerequisites: Graduate standing and permission of the instructor.

BIOL 5497 Biology Research

Continuation of thesis or non-thesis research by the students under the supervision of the student's advisor. Can be repeated other semesters. Cannot be substituted for required or elective graduate biology courses. Evaluation of performance in this course is on CR/NC basis.

Prerequisites: Graduate standing and permission of the instructor.

BIOL 5597 Biology Research

Continuation of thesis or non-thesis research by the students under supervision of the student's advisor. Can be repeated other semesters. Cannot be substituted for required or elective graduate biology courses. Evaluation of performance in this course is on CR/NC basis.

Prerequisites: Graduate standing and permission of the instructor.

BIOL 5697 Biology Research

Continuation of thesis or non-thesis research by the students under the supervision of the student's advisor. Can be repeated other semesters. Cannot be substituted for required or elective graduate biology courses. Evaluation of performance in this course is on CR/NC basis.

Prerequisites: Graduate standing and permission of the instructor.

CHEM 5451 Adv Surv of Chem&Bio Proc

This course focuses on new trends in the elimination of pollutants involving recently developed methodologies. The course requires extensive knowledge on general and organic chemistry as well as biochemistry.

Prerequisites: Graduate standing and permission of instructor.