

BIO - Biology

Biology: BIO

Lower-Division Courses

BIO 101C, 301C, 401C, 601C. Topics in Biology.

Topics in biology that are especially relevant to current issues and problems in modern society. For each semester hour of credit earned, one lecture hour a week for one semester. Some topics require one additional discussion hour or three or four additional laboratory hours a week. May not be counted toward a degree in biology. May be repeated for credit when the topics vary. Prerequisite: Varies with the topic.

Topic 1: The Biology of Being Human. Introductory biology course that covers human evolution, genetics and genomics, behavior, population growth and environmental issues. May not be counted toward a degree in the College of Natural Sciences.

BIO 301E. Problems in Modern Biology.

An introduction to major concepts in biology, with emphasis on topics, such as genetics, that are relevant to current issues in the field. Three lecture hours and one discussion hour a week for one semester. Biology 301E and 301L may not both be counted; Biology 301E and 301M may not both be counted. May not be counted toward a degree in biology. Prerequisite: Admission to the Plan II Honors Program.

BIO 102C, 202C, 302C, 402C. Conference Course.

Supervised study of selected subjects in biology, by individual arrangement with the instructor. Conference course. May be repeated for credit. Prerequisite: Varies with instructor.

BIO 302D (TCCN: BIOL 1309). Science Literacy and Numeracy: Ecology and Evolution.

Explore science literacy and numeracy skills through methods of inquiry; dealing with quantitative data; and correcting common misconceptions regarding rational and quantitative thought. Examine these skills in the context of news events that include reference to some or all of the following: Mendelian genetics; microevolution; macroevolution; population ecology; community ecology; ecosystem ecology. Three lecture hours and one discussion hour a week for one semester.

BIO 302E (TCCN: BIOL 1308). Science Literacy and Numeracy: Genetics and Genomics.

Explore science literacy and numeracy skills through methods of inquiry, dealing with quantitative data and correcting common misconceptions regarding rational and quantitative thought. Examine these skills in the context of news events that include reference to some or all of the following: human genetics; analysis and manipulation of DNA; genetic testing; assisted reproductive technology; human ancestry; personalized medicine; forensic genetics. Three lecture hours and one discussion hour a week per semester

BIO 302F. Science Literacy and Numeracy: Human Health and Disease.

Explore science literacy and numeracy skills through methods of inquiry, dealing with quantitative data and correcting common misconceptions regarding rational and quantitative thought. Examine these skills in the context of news events that include reference to some or all of the following: metabolic diseases, infectious diseases, genetic diseases - causes, prevention, and treatments. Three lecture hours and one discussion hour a week for one semester.

BIO 302G. Science Literacy and Numeracy: Biotechnology and the Future.

Explore science literacy and numeracy skills through methods of inquiry, dealing with quantitative data and correcting common misconceptions regarding rational and quantitative thought. Examine these skills in the context of news events that include reference to some or all of the following: climate change; genetically modified organisms; biomedical technology. Three lecture hours and one discussion hour a week for one semester

BIO 206L. Introductory Laboratory Experiments in Biology.

The organizing principles of biology (such as molecular and cellular functions, reproduction, development, homeostatic mechanisms, and organismal physiology and behavior) are used within a comparative and evolutionary framework to train students in modern laboratory techniques, bioinformatics, experimental design, and interpretation of results. One lecture hour and four laboratory hours a week for one semester. Biology 106M and 206L may not both be counted. Prerequisite: Credit or registration for one of the following: Biology 311C, 311D, 315H, or 325H

BIO 106M (TCCN: BIOL 1106). Introduction to Lab Experiments in Biology.

Explore the organizing principles of biology (such as, molecular and cellular functions, reproduction, development, homeostatic mechanisms, and organismal physiology and behavior) and how they are used within a comparative and evolutionary framework in modern laboratory techniques, bioinformatics, experimental design, and interpretation of results. One lecture hour and three laboratory hours a week for one semester. Biology 106M and 206L may not both be counted.

BIO 106N (TCCN: BIOL 1107). Introduction to Lab Experiments in Biology II.

One lecture hour and three laboratory hours a week for one semester. Biology 206L and 106N may not both be counted.

BIO 311C (TCCN: BIOL 1306). Introductory Biology I.

Introduction to biological energy transformation, cell structure and physiology, and gene expression. Three lecture hours and one discussion hour a week for one semester. Only one of the following may be counted: Biology 301L, 211, 311C. Biology 311C and 212 may not both be counted. Prerequisite: Credit or registration for Chemistry 301, 301C, or 301H.

BIO 311D (TCCN: BIOL 1307). Introductory Biology II.

Introduction to mechanisms of inheritance, evolution, physiology, and species interactions. Three lecture hours and one discussion hour a week for one semester. Biology 301L and 311D may not both be counted. Biology 301M and 311D may not both be counted. Prerequisite: Biology 311C with a grade of at least C- and credit or registration for Biology 206L.

BIO 315H. Advanced Introduction to Genetics: Honors.

Basic principles of genetics and cell biology. Emphasis on gene structure and regulation; transmission of heritable traits; structure and function of cells; bacterial and viral genetics; and recombinant DNA technology. Three lecture hours and one discussion hour a week for one semester. Prerequisite: A score of 4 or 5 on the College Board Advanced Placement Examination in Biology and credit or registration for Chemistry 301, 301C, or 301H.

BIO 119S, 219S, 319S, 419S, 519S, 619S, 719S, 819S, 919S. Topics in Biology.

This course is used to record credit the student earns while enrolled at another institution in a program administered by the University's Study Abroad Office. Credit is recorded as assigned by the study abroad adviser

in the Biology Instructional Office. University credit is awarded for work in an exchange program; it may be counted as coursework taken in residence. Transfer credit is awarded for work in an affiliated studies program. . May be repeated for credit when the topics vary.

Upper-Division Courses

BIO 325. Genetics.

Basic principles of Mendelism, molecular genetics, structure and function of genes and chromosomes, populations and evolution. Three lecture hours and one discussion hour a week for one semester. Biology 325 and 325H may not both be counted. Prerequisite: Biology 311C and 311D with a grade of at least C- in each and credit or registration for Statistics and Data Sciences 320E, 321, or 302F.

BIO 325H. Genetics: Honors.

Basic principles of genetics and evolution. Emphasis on population genetics and natural selection; structure and function of organ systems; behavioral ecology; and mutational analysis of organismal development. Three lecture hours and one discussion hour a week for one semester. Biology 325 and 325H may not both be counted. Prerequisite: Biology 315H with a grade of at least C-.

BIO 325L. Laboratory Experience in Genetics.

Experimentation and direct observation in fundamental aspects of transmission genetics. One lecture hour and four laboratory hours a week for one semester. Prerequisite: The following with a grade of at least C-: Biology 325 or 325H, and Biology 206L, 208L, 226L, or Environmental Sciences 311.

BIO 129S, 229S, 329S, 429S, 529S, 629S, 729S, 829S, 929S. Topics in Biology.

This course is used to record credit the student earns while enrolled at another institution in a program administered by the University's Study Abroad Office. Credit is recorded as assigned by the study abroad adviser in the Biology Instructional Office. University credit is awarded for work in an exchange program; it may be counted as coursework taken in residence. Transfer credit is awarded for work in an affiliated studies program. May be repeated for credit when the topics vary.

BIO 137, 237, 337, 437. Selected Topics in Biology.

Recent developments and research methods in the biological sciences. For each semester hour of credit earned, one lecture hour a week for one semester. Some topics may require additional hours. May be repeated for credit when the topics vary. Prerequisite: Biology 325 or 325H with a grade of at least C-; additional prerequisites vary with the topic.

Topic 2: Research Methods: UTeach. Restricted to students in the UTeach-Natural Sciences program. Students perform independent inquiries and use skills from mathematics and science to solve research problems.

BIO 337J. Computational Biology Laboratory.

Overview of computational biology, with emphasis on nucleic acid sequence analysis and databases. Class projects and self-learning exercises. Two lecture hours and three computer laboratory hours a week for one semester. Prerequisite: Biology 325 or 325H, and Statistics and Data Sciences 328M with a grade of at least C- in each.

BIO 456L. Limnology and Oceanography.

Same as Marine Science 440. An introduction to the study of the interactions between aquatic organisms and their environments. Two lecture hours and six laboratory hours a week for one semester. Prerequisite: Chemistry 302, 302C, or 302H; and the following with a

grade of at least C-: Biology 325 or 325H, and Biology 206L, 208L, 226L, or Environmental Science 311.

BIO 068. Peer Assistant.

May be repeated for credit. Offered on the pass/fail basis only.

BIO 170C, 270C, 370C, 470C. Topics in Conference Course.

Supervised study of selected topics in biology, by individual arrangement with the instructor. Conference course. May be repeated for credit when the topics vary. Prerequisite: Biology 325 or 325H with a grade of at least C-; additional prerequisites vary with the topic.

BIO 372C. Biology Peer Mentors in Research/Teaching.

Students work as peer mentors and assistants in the teaching of biology, with emphasis on developing instructional materials that teach fundamental biology with real world data. Students mentor students for at least three hours a week in addition to other weekly meetings. Biology 372C and Chemistry 372C may not both be counted. Prerequisite: Biology 311C, 311D, and 325, or Biology 315H and 325H, with a grade of at least B in each; and consent of the undergraduate adviser.

BIO 177, 277, 377. Undergraduate Research.

Laboratory or field research in the various fields of biological science under the supervision of one or more faculty members. Supervised individual research. Up to three semester hours may be counted toward the major requirement for the Bachelor of Arts degree with a major in biology. May be repeated for credit. Prerequisite: Biology 325 or 325H with a grade of at least C-, and written consent of instructor.

BIO 379H, 679H. Honors Tutorial Course.

Original laboratory or field research project under the direction of a faculty mentor, leading to a thesis or research presentation for students in the honors program in biology. The equivalent of three or six lecture hours a week for one semester. Only one of the following may be counted: Biology 379H, 679H, Integrative Biology 379H, 679H, Molecular Biosciences 379H, 679H. Prerequisite: Consent of the student's research supervisor and the departmental honors adviser.

Graduate Courses

BIO 380M. Topics in Biology (Cooperative Programs).

Formal, organized courses taught at institutions other than the University of Texas at Austin. Three lecture hours a week for one semester. Not all topics are offered every year. May be repeated for credit when the topics vary. Prerequisite: Graduate standing, consent of the student's graduate adviser or department chair and the University's graduate dean, and consent of the graduate dean at the host institution; additional prerequisites vary with the topic.

BIO 381. Advanced Plant Physiology.

Concepts in the broad field of plant physiology. Includes aspects of plant growth, development, cell signaling, and stress responses that are very similar to these processes in animals, but will also illustrate unique aspects of plants that exemplify the diversity of life strategies on earth. Explores the critical skills needed to evaluate the current literature, data interpretation, and methods for solving key questions in the field. Three lecture hours a week for one semester. Only one of the following may be counted: Biology 381, 381P, 389 (Topic 12), Plant Biology 381P. Prerequisite: Graduate standing.

BIO 381K. Topics in Ecology, Evolution, and Behavior: Physiology and Biophysics.

Lectures, conference discussion, and laboratory projects, depending on topic. Not all topics are offered every year. May be repeated for credit when the topics vary. Prerequisite: Graduate standing, and consent of

instructor and the graduate adviser; additional prerequisites vary with the topic.

Topic 3: Sensory Physiology. Physiology and biophysics of the transduction and peripheral processes of the major sensory systems. Three lecture hours a week for one semester.

Topic 4: Current Concepts in Neurobiology. A series of seminars designed to give students a broad background in neurobiology. Three lecture hours a week for one semester.

Topic 5: Laboratory in Neurophysiology. Training in research techniques useful for the neurophysiological study of vertebrate and invertebrate nervous systems. Three lecture hours a week for one semester.

Topic 6: Insect Physiology. An in-depth study of the physiology of insect organ systems, development, and behavior. Three lecture hours a week for one semester.

Topic 7: Developmental Neurobiology. Neuronal cell lineage and differentiation, neuronal migration, axon guidance, neural cell death, synapse formation and maintenance. Three lecture hours a week for one semester.

Topic 8: Addiction Biology. Three lecture hours a week for one semester. Biology 381K (Topic 8) and Neuroscience 385L (Topic 3: Addiction Biology) may not both be counted.

Topic 11: Current Concepts in Neurophysiology. Three lecture hours a week for one semester.

BIO 381N. Basic Processes of Nerve Cells.

Same as Neuroscience 381N. Degeneration and regeneration in nervous systems following traumatic injury; invertebrate versus vertebrate, peripheral nervous system versus central nervous system, axonal versus cell body, role of glia versus neurons. Three lecture hours a week for one semester. Only one of the following may be counted: Biology 381K (Topic 10), 381N, Neuroscience 381N, 385L (Topic 1). Prerequisite: Graduate standing.

BIO 383K. Topics in Ecology, Evolution, and Behavior: Development and Reproduction.

Three lecture hours a week for one semester, or as required by the topic. Not all topics are offered every year. May be repeated for credit when the topics vary. Prerequisite: Graduate standing, and consent of instructor and the graduate adviser.

Topic 1: Hormonal Control of Development and Reproduction. Three lecture hours a week for one semester.

Topic 2: Techniques in the Study of Development and Reproduction. Eight laboratory hours a week for one semester.

Topic 3: Comparative Endocrinology. Structure, function, and interrelationships of endocrine glands, with emphasis on the control of hormone synthesis and secretion and mechanisms of hormone action. Three lecture hours a week for one semester.

Topic 4: Recent Advances in Development and Reproduction. Discussion of recent scientific papers and their contribution to modern work in development and reproduction. Three lecture hours a week for one semester.

Topic 5: Molecular Analysis of Development. Lectures and discussion concerning the principles of animal development at the molecular level. Three lecture hours a week for one semester.

Topic 8: Development and Evolution. Three lecture hours a week for one semester.

BIO 384K. Topics in Ecology, Evolution, and Behavior.

Basic concepts and methods of laboratory and field analysis in various fields of biology; systematics and ecology of natural populations. Lectures, conference discussions, and laboratory work, depending on topic. May be repeated for credit when the topics vary. Prerequisite:

Graduate standing, and consent of instructor and the graduate adviser; additional prerequisites vary with the topic.

Topic 30: Recent Advances in Community Ecology. Seminar course. Faculty- and student-led lectures and discussions of current topics in community ecology. Some written assignments required. Three lecture hours a week for one semester. Additional prerequisite: Undergraduate upper-division ecology course (Biology 373 or similar course) required.

Topic 32: Recent Advances in Macroecology. Examines recent ideas and new findings in the fields of Macroecology, Biogeography, and Ecosystem Science. Three lecture hours a week for one semester.

Topic 33: Recent Advances in Conservation Biology. Seminar course. Faculty- and student-led discussions of current topics in population ecology. Some written assignments may be required. Three lecture hours a week for one semester. Additional prerequisite: Undergraduate upper-division ecology course (Biology 373 or similar course); undergraduate upper-division evolution course recommended.

Topic 34: Recent Advances in Microbial Ecology. Explores current subjects and controversies in microbial ecology, including community and ecosystem perspectives. Includes faculty- and student-led discussions of primary literature. Some written assignments required. Three lecture hours a week for one semester.

Topic 35: Global Environmental Change. Explores the knowledge of current environmental change and biological responses, efforts to understand and predict changes in the future through both experimental manipulations and models. Discussion of the scientific philosophy behind this work. Three lecture hours a week for one semester. Additional prerequisite: Undergraduate upper-division ecology course (Biology 373 or similar course); undergraduate upper-division evolution course recommended.

Topic 41: Recent Advances in Molecular and Genomic Evolution. Three lecture hours a week for one semester. Additional prerequisite: Undergraduate upper-division evolution course (Biology 370 or similar course).

Topic 42: Human and Primate Evolutionary Genetics. Three lecture hours a week for one semester. Anthropology 388 (Topic: Human/Primate Evolut Genetics) and Biology 384K (Topic 42) may not both be counted.

BIO 386. Topics in Plant Science: Ecology and Evolution.

Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing, and consent of instructor and the graduate adviser; additional prerequisites vary with the topic.

Topic 10: Recent Advances in Plant Systematics. Basic concepts and methods of laboratory and field analysis in various fields of biology; systematics and ecology of natural populations.

Topic 11: Advanced Subjects in Plant Ecology.

Topic 12: Advanced Subjects in Plant Evolution.

Topic 13: Advanced Subjects in Plant Molecular Biology.

BIO 487G. Taxonomic Plant Anatomy.

An advanced course that emphasizes those aspects of plant anatomy that are most reliable and useful for systematic purposes. Three lecture hours and two laboratory hours a week for one semester. Biology 472L and 487G may not both be counted. Prerequisite: Graduate standing, and consent of instructor and the graduate adviser.

BIO 389C. Chemistry and Biology of Membranes.

Consideration of the origin and structure of biological membranes at the microscopic and molecular levels; describes membrane function, especially with regard to transport properties. Three lecture hours a

week for one semester. Prerequisite: Graduate standing and consent of instructor and the graduate adviser.

BIO 389K. Advanced Cell Biology.

Three lecture hours a week for one semester. Prerequisite: Graduate standing, and consent of instructor and the graduate adviser.

BIO 190, 290. Topics in Microbiology.

Discuss current topics in microbiology. For each semester hour of credit earned, one lecture hour a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing and consent of instructor.

BIO 890G. Applied Public Health and Medical Microbiology.

One semester of full-time training in the Texas Department of Health Laboratories, with rotation in the divisions of medical microbiology, mycology, parasitology, virology, sanitary bacteriology, and biologics. Assigned reading and regular meetings with the Department of Health Laboratories staff and the molecular genetics and microbiology faculty. Forty hours of supervised fieldwork a week for one semester. Prerequisite: Graduate standing, consent of instructor and the graduate adviser, and courses in immunology, public health bacteriology, and virology.

BIO 290K. Scanning Electron Microscopy, Theory and Practice.

Theory of scanning electron microscopy and basic principles of instrument design; basic procedures in specimen preparation; hands-on experience. Two lecture hours and six laboratory hours a week for six weeks. Prerequisite: Graduate standing, and consent of instructor and the graduate adviser.

BIO 490M. Electron Microscopy I: Theory and Practice.

An introduction to electron optics; emphasis on basic operation and maintenance of the transmission microscope; theory and practice of basic preparative techniques. Two lecture hours and six laboratory hours a week for one semester. Prerequisite: Graduate standing, and consent of instructor and the graduate adviser.

BIO 390P. Techniques in Molecular Genetics.

Laboratory training in modern molecular genetics, with emphasis on the manipulation of bacterial plasmid DNA as a model system. DNA purification, gene mapping and cloning, site-directed mutagenesis, polymerase chain reaction, and DNA sequencing. One lecture hour and seven laboratory hours a week for one semester. Biology 368L and 390P may not both be counted. Prerequisite: Graduate standing, consent of instructor and the graduate adviser, and Biology 366.

BIO 391K. Cellular Immunology.

Cell-associated immune responses, with emphasis on transplantation, immunity, tumor immunology, delayed hypersensitivity, and acquired cellular resistance. Three lecture hours a week for one semester. Prerequisite: Graduate standing, consent of instructor and the graduate adviser, and Biology 360K and 260L.

BIO 391R. Advanced Metabolism and Biochemistry of Microorganisms.

Study of the metabolic processes of microorganisms, using a biochemical approach. Three lecture hours a week for one semester. Biology 339 and 391R may not both be counted. Prerequisite: Graduate standing and consent of instructor and the graduate adviser.

BIO 391S. Microbial Genetics.

Molecular biology of nucleic acids; biosynthesis of macromolecules, transfer of genetic material from cell to cell, recombination, mutagenesis,

and regulatory mechanisms. Three lecture hours a week for one semester. Biology 366 and 391S may not both be counted. Prerequisite: Graduate standing and consent of instructor and the graduate adviser.

BIO 392. Topics in Problems in Host-Parasite Biology.

Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing, and consent of instructor and the graduate adviser; additional prerequisites vary with the topic.

Topic 1: Current Topics in Virology and Immunology.

Topic 2: Current Topics in Pathogenic Mechanisms.

BIO 392D. DNA Repair.

Broad overview of the repair of DNA in archae, prokaryotes, eukaryotes, and viruses, focusing on the primary research literature, and developing critical thinking and presentation skills. Three lecture hours a week for one semester. Biology 392D and Biology 393 (Topic: DNA Repair) may not both be counted. Prerequisite: Graduate standing.

BIO 393. Topics in Problems in Molecular Genetics.

Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing, and consent of instructor and the graduate adviser; additional prerequisites vary with the topic.

Topic 1: Current Topics in DNA Transactions.

Topic 2: Current Topics in Fungal and Cell Molecular Biology.

Topic 3: Current Topics in Gene Regulation.

BIO 394. Topics in Problems in Microbial Physiology.

Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing, and consent of instructor and the graduate adviser; additional prerequisites vary with the topic.

Topic 1: Current Topics in Cell Envelope Structure and Functions.

Topic 2: Current Topics in Microbial Signal Transduction.

BIO 394T. Tumor Biology.

Explore core aspects of cancer pathology, treatment, epidemiology, the discovery of oncogenes and tumor suppressors, and the molecular genetics underlying the characteristic features of malignant tumors (including metastatic behavior, genomic instability, angiogenesis, cell cycle regulation, and apoptosis). Emphasize the biochemical functions of cancer-related proteins and enzymes and therapeutic approaches based on understanding of these proteins. Examine important experimental approaches that have influenced the current understanding of cancer. Three lecture hours a week for one semester. Biology 384M (Topic: Tumor Biology) and 394T may not both be counted. Prerequisite: Graduate standing; consent of instructor and the graduate adviser

BIO 395F. Genetics.

Same as Chemistry 395F and Molecular Biology 395F. Basic principles of Mendelian and molecular genetics, and an exploration of the genetic toolbox using examples of analytic methods and modern genetic manipulations. Focus on the genetic analysis of model organisms. Use of genetic tools in dissecting complex biological pathways, developmental processes, and regulatory systems. Three lecture hours a week for one semester. Prerequisite: Graduate standing. An introductory course in genetics, such as Biology 325, is strongly recommended.

BIO 395I. Advanced Biochemistry.

Same as Biochemistry 395F and Molecular Biology 395I. Explore advanced biochemistry concepts and the scientific process. Consider the structure and function of proteins, carbohydrates, lipids and nucleic

acids, and discuss enzyme mechanisms and kinetics. Three lecture hours a week for one semester. Only one of the following may be counted: Biochemistry 395F, 395G, Biology 395I, 395G, Molecular Biology 395I, 395G, Microbiology 395G. Prerequisite: Graduate standing; a one-year undergraduate sequence in biochemistry is strongly recommended.

BIO 396. Membranes and Walls of Bacteria.

Structure, biosynthesis, and function of bacterial envelopes and walls, including associated optional components. Three lecture hours a week for one semester. Prerequisite: Graduate standing, consent of instructor and the graduate adviser, and a course in general microbiology and a course in general biochemistry.

BIO 396R. Microbiology Research Seminar.

Students present their research findings and receive feedback from faculty and peers. Designed to help students refine their presentation techniques, practice giving critical feedback, and gain familiarity with a wide variety of research topics. Three lecture hours a week for one semester. Prerequisite: Graduate standing.

BIO 197. Seminar in Microbiology.

One lecture hour a week for one semester. Required of all molecular genetics and microbiology majors. May be repeated for credit. Offered on the credit/no credit basis only. Prerequisite: Graduate standing and consent of instructor and the graduate adviser.

BIO 397J. Advanced Genetics.

Intended mainly for first- and second-year graduate students. Selected related topics of current interest with an emphasis on molecular developmental genetics, and any needed review of classical genetics. Designed to help the student to read the literature critically, deliver a good seminar, and participate in thoughtful discussion. Three lecture hours a week for one semester. May not be counted toward the doctoral degree in microbiology. Prerequisite: Graduate standing, consent of instructor and the graduate adviser, and a course in genetics.

BIO 398T. Supervised Teaching in Biological Sciences.

Teaching under the close supervision of course instructors; weekly group meetings with the instructor, individual consultations, and reports throughout the teaching period. The equivalent of three lecture hours a week for one semester. Prerequisite: Graduate standing and appointment as a teaching assistant.

Professional Courses