BIOLOGY

BIO100 Ethics in Scientific Research (2 Credits)
Issues of scientific integrity with emphasis on investigators in the laboratory sciences, including mentoring, scientific record keeping, authorship and peer review, ownership of data, use of animals and humans in research, and conflict of interest.
Restriction: Must have completed at least one year of graduate study.
Credit Only Granted for: BIO100 or ZOO100.
Formerly: ZOO100.

BIO108 Biology Seminar (1-2 Credits)

BIO109 Special Problems in Biology (1-6 Credits)
One seminar per week for each subject selected: A-Cell Biology; B-Developmental Biology; C-Estuarine and Marine Biology; D-Gene Technologies; E-Parasitology; F-Physiology; G-Systems and Evolutionary Biology; H-Behavior; I-General; K-Endocrinology; L-Ecology.
Repeatability: 6 credits if content differs.
Formerly: ZOO109.

BIO113 Recombinant DNA (3 Credits)
An advanced course presenting the tools and procedures of genetic engineering. Theory and practical applications of recombinant DNA techniques to understanding eukaryotic gene structure and expression.
Prerequisite: BSCI330 or BSCI230; and BSCI222. Or permission of instructor required.
Credit Only Granted for: BIO113 or ZOO113.
Formerly: ZOO113.

BIO115 Developmental Genetics (3 Credits)
Prerequisite: Must have completed courses in molecular genetics and developmental or cell biology; or permission of instructor.
Credit Only Granted for: BIO115 or ZOO115.
Formerly: ZOO115.

BIO120 Cell Biology (3 Credits)
Offered with laboratory as BSCI 421. Molecular basis of cell structure and function in eukaryotes.

BIO122 Membrane Transport Phenomena (3 Credits)
The fundamental phenomena related to solute movement in bulk solution and across interfaces. Examination of natural and artificial membrane transport systems, with emphasis placed on their mechanism of action.
Prerequisite: (MATH120; or must have completed MATH220); and (BSCI330 or BSCI230). Or permission of instructor.
Credit Only Granted for: BIO122 or ZOO122.
Formerly: ZOO122.

BIO125 Biological Ultrastructure (3 Credits)
The ultrastructure of cells and tissues, with emphasis on interpretation and correlation of ultrastructure and function.
Prerequisite: Must have completed a course in Cell Biology or Histology; or permission of instructor.
Credit Only Granted for: BIO125 or ZOO125.
Formerly: ZOO125.

BIO131 Comparative Physiology (4 Credits)
Cellular and biochemical processes used by animals to interact with both the external and cellular environment. Water balance, intermediary metabolism, nitrogen metabolism, anaerobic metabolism, thermal regulation, nerve and muscle physiology in cells from a broad variety of animal species are considered.
Prerequisite: One year of biology, one year of organic chemistry, and one semester of physiology.
Credit Only Granted for: BIO131 or ZOO131.
Formerly: ZOO131.

BIO135 Hearing (3 Credits)
Principles of hearing, covering the auditory periphery, the physiology and anatomy of the central auditory system and psychoacoustics.
Prerequisite: BSCI330 or BSCI230; or permission of instructor.

BIO136 Theoretical Population and Community Ecology (3 Credits)
Application of simple dynamic systems and optimization models to understand the dynamics of populations and ecological communities; population growth, predator-prey interactions, competition, food webs, foraging theory, and evolution of life histories. Instruction and use of the program Mathematica.
Prerequisite: Must have completed one year of college calculus. And BSCI462; or students who have taken courses with comparable content may contact the department.
Credit Only Granted for: BIO136 or ZOO136.

BIO137 Mathematical Biology (4 Credits)
Mathematical methods of analyzing deterministic and stochastic biological processes from a variety of areas (including population and evolutionary biology, neurobiology, physiology, and morphogenesis). Qualitative aspects of dynamical systems which are usually given as difference or differential equations. The computer program Mathematica will be used to obtain the numerical solutions of these equations.
Credit Only Granted for: BIO137 or ZOO137.

BIO139 Molecular Evolution (3 Credits)
Basic foundations through advanced concepts in molecular evolution, including patterns and processes of DNA sequence variation, transposable element dynamics, gene duplication and loss, and genome organization. Relevant concepts from genetics, biochemistry, and phylogenetics also will be covered.
Credit Only Granted for: BIO139 or ZOO139.

BIO141 Teaching Biology (1 Credit)
Introduction to instructional methods and strategies, University and College policies, and campus resources for new LFSC graduate teaching assistants.
Credit Only Granted for: BIO141 or ZOOL141.
Formerly: ZOOL141.

BIO144 Cell Biology from a Biophysical Perspective (3 Credits)
An approach to cell biology by focusing on mechanisms and unifying paradigms. It will not assume a great deal of factual biological knowledge, but will expect a background that prepares students to think quantitatively and mechanistically.
Recommended: BSCI330, PHYS121, and PHYS122. Also offered as: BSCI404.
Credit Only Granted for: BSCI404, BIO144, BIO1704, or BIPH704.
Formerly: BIO1704.

BIO151 Comparative Physiology (4 Credits)
Cellular and biochemical processes used by animals to interact with both the external and cellular environment. Water balance, intermediary metabolism, nitrogen metabolism, anaerobic metabolism, thermal regulation, nerve and muscle physiology in cells from a broad variety of animal species are considered.
Prerequisite: One year of biology, one year of organic chemistry, and one semester of physiology.
Credit Only Granted for: BIO151 or ZOO151.
Formerly: ZOO151.

BIO155 Hearing (3 Credits)
Principles of hearing, covering the auditory periphery, the physiology and anatomy of the central auditory system and psychoacoustics.
Prerequisite: BSCI330 or BSCI230; or permission of instructor.

BIO156 Theoretical Population and Community Ecology (3 Credits)
Application of simple dynamic systems and optimization models to understand the dynamics of populations and ecological communities; population growth, predator-prey interactions, competition, food webs, foraging theory, and evolution of life histories. Instruction and use of the program Mathematica.
Prerequisite: Must have completed one year of college calculus. And BSCI462; or students who have taken courses with comparable content may contact the department.
Credit Only Granted for: BIO156 or ZOO156.

BIO157 Mathematical Biology (4 Credits)
Mathematical methods of analyzing deterministic and stochastic biological processes from a variety of areas (including population and evolutionary biology, neurobiology, physiology, and morphogenesis). Qualitative aspects of dynamical systems which are usually given as difference or differential equations. The computer program Mathematica will be used to obtain the numerical solutions of these equations.
Credit Only Granted for: BIO157 or ZOO157.

BIO159 Molecular Evolution (3 Credits)
Basic foundations through advanced concepts in molecular evolution, including patterns and processes of DNA sequence variation, transposable element dynamics, gene duplication and loss, and genome organization. Relevant concepts from genetics, biochemistry, and phylogenetics also will be covered.
Credit Only Granted for: BIO159 or ZOO159.

BIO161 Teaching Biology (1 Credit)
Introduction to instructional methods and strategies, University and College policies, and campus resources for new LFSC graduate teaching assistants.
Credit Only Granted for: BIO161 or ZOOL161.
Formerly: ZOOL161.

BIO164 Cell Biology from a Biophysical Perspective (3 Credits)
An approach to cell biology by focusing on mechanisms and unifying paradigms. It will not assume a great deal of factual biological knowledge, but will expect a background that prepares students to think quantitatively and mechanistically.
Recommended: BSCI330, PHYS121, and PHYS122. Also offered as: BSCI404.
Credit Only Granted for: BSCI404, BIO164, BIO1704, or BIPH704.
Formerly: BIO1704.
BIOL705 Statistics & Modeling for Biologists (3 Credits)
An overview of essential probability and statistics using R with a focus on biological problems. Topics include: parameter estimation (likelihood, Bayesian), confidence intervals and hypothesis testing, multiple testing, experimental design and power analysis, and resampling-based measures of uncertainty. Practical use of computers will be emphasized.
Credit Only Granted for: BIOL705 or BIOL709F.
Formerly: BIOL709F.

BIOL708 Advanced Topics in Biology (1-4 Credits)
Lectures, experimental courses and other special instructions in various zoological subjects.
Repeatable to: 8 credits if content differs.
Credit Only Granted for: BIOL708 or ZOOL708.
Formerly: ZOOL708.

BIOL709 Selected Advanced Topics in Biology (1-4 Credits)
Lectures, experimental courses and other special instructions in various biological subjects.
Repeatable to: 16 credits.

BIOL710 Plant Ecological Genetics (3 Credits)
Plant ecological genetics is focused on the processes responsible for evolution in plant populations. Covers the basic principle of population genetics, then quickly shifts towards understanding how allele frequencies can change in an ecological context. Emphasis is placed on the role of drift and selection in evolution, and particular attention is placed on plant mating system evolution.
Prerequisite: BSCI472 and BSCI222; or permission of instructor.
Credit Only Granted for: BIOL710 or PBIO745.
Formerly: PBIO745.

BIOL744 Neurophysiology (3 Credits)
The physiology of nerves, muscles, an sensory receptors, and aspects of central nervous system physiology.
Prerequisite: PHYS122.

BIOL762 Physiological Plant Ecology (2 Credits)
Environmental effects on plant ecophysiology. Microclimatology, leaf energy balance, plant responses to temperature and radiation, physiological adaptations, water relations and plant gas exchange.
Prerequisite: BSCI460; or students who have taken courses with comparable content may contact the department.
Credit Only Granted for: BIOL762 or PBIO755.
Formerly: PBIO755.

BIOL765 Sociobiology (4 Credits)
Deals with the description and analysis of animal social organizations the adaptive nature of animal societies, the effects of early experience, and the role of communication in the integration of animal groups.
Prerequisite: Must have completed a course in behavior.
Restriction: Permission of instructor.
Credit Only Granted for: BIOL765 or ZOOL665.
Formerly: ZOOL665.

BIOL767 Behavioral Endocrinology (3 Credits)
The interactive effects of hormones and behavior. Emphasis on the reproductive and stress hormones as they affect the brain and behavior.
Prerequisite: BSCI342 or BSCI447.
Credit Only Granted for: BIOL767 or ZOOL627.
Formerly: ZOOL627.

BIOL799 Master's Thesis Research (1-6 Credits)

BIOL898 Pre-Candidacy Research (1-8 Credits)

BIOL899 Doctoral Dissertation Research (1-8 Credits)