BIOLOGY

BIOLOGY (BIOL)

DIVISION: Natural Sciences

BIOL 002 ANIMAL BIOLOGY
4 unit
Transfer Credit: CSU; UC
Introduction to the major biological principles by exploration of diversity within the Kingdom Animalia. Satisfies the life sciences requirement for students not majoring in biology. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 003 HUMAN BIOLOGY
4 unit
Transfer Credit: CSU; UC credit limitations. See counselor.
Introduction to structures, functions, and processes of the human body systems and diseases of those systems from the molecular to whole body levels of organization. This course also includes brief coverage of human development, genetics, evolution and ecology. Specially designed for non-science majors. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 004 BOTANY/PLANT DIVERSITY AND ECOLOGY
4 unit
Transfer Credit: CSU; UC credit limitations. See counselor.
C-ID: BIOL 155
Prerequisite(s): *Intermediate Algebra or placement into any Math course numbered 001-099*

Comparative diversity, structure, and function of photosynthetic and fungal taxa. Topics include development, morphology and physiology, taxonomy and systematics. Principles of population and community ecology and ecosystem interactions are emphasized. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 005B TOPICS IN APPLIED BOTANY: PLANT BIOLOGY IN DEMONSTRATION GARDENS
1 unit
Transfer Credit: CSU
Field investigations in applied botany through the use of demonstration gardens and curricular development. Total of 9 hours lecture and 27 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 005C TOPICS IN APPLIED BIOLOGY – MEDICINAL PLANTS
1 unit
Transfer Credit: CSU
Lecture, laboratory and field investigations focusing on topics of current and general interest in applied botany. Total of 9 hours of lecture and 27 hours of laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 010A CELLULAR BIOLOGY, GENETICS AND EVOLUTION
5 unit
Transfer Credit: CSU; UC
C-ID: BIOL 190; BIOL SEQ 135S (WITH BIOL 010B)
Prerequisite(s): *CHEM 001A*

Investigation of the principles governing biochemistry, cell biology, metabolism, genetics, and evolution. This is the first course in a sequence for Biology majors. For majors in biological sciences, but open to all qualified students. Total of 54 hours lecture and 108 hours laboratory.
Grade Mode: *Letter Grade*

BIOL 010B THE DIVERSITY OF LIFE ON EARTH: STRUCTURE, FUNCTION AND ECOLOGY
4 unit
Transfer Credit: CSU; UC
C-ID: BIOL 140; BIOL SEQ 135S (with BIOL 010A)
Prerequisite(s): *CHEM 001A and BIOL 010A*

Exploration of the evolution and diversity of living organisms, the structure and function governing their form and function, and the ecological principles that guide their interactions. Second in a 3-course series for Biology majors (BIOL 010A, 010B, 010C). Total of 54 hours lecture and 72 hours laboratory
Grade Mode: *Audit, Letter Grade*

BIOL 010C GENETICS
3 unit
Transfer Credit: CSU; UC credit limitations. See counselor.
Prerequisite(s): *BIOL 010A*

Application of transmission genetics, molecular genetics, genomics, DNA technology, and bioinformatics to genetic analysis, problem solving, and current issues in genetics. Total of 54 hours lecture.
Grade Mode: *Audit, Letter Grade*

BIOL 010F BIOLOGICAL RESEARCH METHODS
1 unit
Transfer Credit: CSU; UC
Prerequisite(s): *Permission of Division Dean*

This course provides training in discipline specific research methods within the biological sciences. It is intended to prepare students for work on independent projects which will be mentored by a faculty member. Students will learn how to develop a project, collect and record data, conduct and analyze experiments, and communicate their findings. Recommended successful completion of any Natural Sciences course 001-099. Total of 54 hours laboratory.
Grade Mode: *Audit, Letter Grade*

BIOL 011 GENERAL BIOLOGY
4 unit
Transfer Credit: CSU; UC credit limitations. See counselor.
Basic concepts of biology, the cell, nutrition, a survey of physiological systems, reproduction, heredity, development, diversity of organisms, evolution, ecology and environmental biology. No credit if taken after BIOL 001A, 002, 003, 004, 005, 010A, 010B, 010C or 011H. For non-biology majors, but open to all qualified students. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 011H HONORS GENERAL BIOLOGY
4 unit
Transfer Credit: CSU; UC credit limitations. See counselor.
Enrollment Limitation: *Acceptance into the honors program*

Basic concepts of biology, the cell, nutrition, a survey of physiological systems, reproduction, heredity, development, diversity of organisms, evolution, ecology, and environmental biology. As an honors course, students will be expected to complete additional assignments to demonstrate stronger analytical skills and critical analysis of articles published in peer-reviewed journals and primary scientific literature.No credit if taken after BIOL 001A, 002, 003, 004, 005, 011, 010A, 010B, or 010C. For non-biology majors, but open to all qualified students. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Audit, Letter Grade*

BIOL 014 FIELD BIOLOGY
4 unit
Transfer Credit: CSU; UC
Birds, mammals, amphibians, reptiles, trees and shrubs of Southern California. Identification, ecology methods of observing and recording. Required instructional trips. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 016 MARINE BIOLOGY
4 unit
Transfer Credit: CSU; UC
Comparative survey of marine organisms and the ecosystems in which they live. Study of oceanography as a basis for exploring marine biodiversity. Biological concepts and human impact on marine ecosystems. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 020 INDEPENDENT STUDY
1 unit
Transfer Credit: CSU
Recommended Preparation: *Enrollment in or completion of any college level (1-99) course in the Natural Sciences*

Enrollment Limitation: *Permission of the Dean*

Independent, faculty-guided student inquiry, project, research, laboratory experiment and/or field investigation. Total of 54 hours laboratory.
Grade Mode: *Letter Grade, Pass/No-Pass*

BIOL 025 FIELD STUDIES
1 unit
Transfer Credit: CSU
Collection and use of field data to investigate ecological relationships. Required field trips. Total of 54 hours by arrangement. This course may be scheduled using the "To Be Assigned" (TBA) scheduling format.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 026 BIOLOGY FIELD STUDIES
2 unit
Transfer Credit: CSU
Full implementation of the scientific method to investigate ecological relationships in nature. Required instructional trips. Total of 18 hours lecture and 54 hours by arrangement. This course may be scheduled using the "To Be Assigned" (TBA) scheduling format.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 028 INTRODUCTION TO BIOINFORMATICS
3 unit
Transfer Credit: CSU
Prerequisite(s): *BIOL 011 or BIOL 011H*

Structure and function of nucleic acids and proteins including molecular modeling, sequence alignment, and database management. Use of computer programs to perform customized analyses of data. Design and manage biological databases using relational and other types of database applications. Data acquisition and analysis using spreadsheet applications. Recommended basic computer skills. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 030 FIELD BOTANY
4 unit
Transfer Credit: CSU
Collection, identification and classification of native California flowering plants. Field identification of trees, shrubs and wildflowers common in California plant communities. Required instructional trips. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 038 CELL AND MOLECULAR BIOLOGY
4 unit
Transfer Credit: CSU; UC
Prerequisite(s): *CHEM 001A and BIOL 102C and one of the following: BIOL 011 or MICR 002*

Basic principles of cell and molecular biology presented using mouse embryonic fibroblasts and mouse embryonic stem cells as model biological systems. Includes types, biochemical regulation, structure, and specialized functions of stem cells. Cell culture and manipulation techniques used to perform directed-differentiation of mouse embryonic stem cells to study the underlying cellular and molecular mechanisms guiding various in vivo differentiation and developmental processes. Representative methods used in biomedical and academic laboratories performing research in the field of stem cell biology and regenerative medicine. Total of 54 hours lecture and 72 hours laboratory.
Grade Mode: *Letter Grade, Pass/No-Pass*

BIOL 039 MODERN HUMAN GENETICS
4 unit
Transfer Credit: CSU, UC
Exploration of the theoretical and practical applications of human heredity, genetics and biotechnology. Introduction to cellular and molecular biology, Mendelian and molecular genetics, evolution, human genetics, applications of genetic engineering including biotechnology, forensics and molecular medicine. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 071A EXPLORING TOPICS IN BIOLOGY
3 unit
Transfer Credit: CSU
Exploratory course: Specific topic identified in Schedule of Classes. Lecture focusing on topics of current and general interest. Total of 54 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 071B EXPLORING TOPICS IN BIOLOGY
1 unit
Transfer Credit: CSU credit limitations.
Exploratory course: Specific topic identified in Schedule of Classes. Lecture focusing on topics of current and general interest. Total of 18 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 071C EXPLORING TOPICS IN BIOLOGY
1 unit
Transfer Credit: CSU credit limitations.
Exploratory course: Specific topic identified in Schedule of Classes. Lecture focusing on topics of current and general interest. Total of 18 hours lecture and 18 hours laboratory.
Grade Mode: *Audit, Letter Grade*

BIOL 102A BIOLOGICAL TECHNOLOGY – BASIC TECHNIQUES
3 unit
Prerequisite(s): *BIOL 110*

Introduction to the fundamental skills and competencies necessary for working in a biotechnology laboratory. Basic skills include use and maintenance of standard laboratory equipment, solution and reagent preparation, sterile technique, quality control protocols, basic cloning procedures, production of an industry standard notebook, and laboratory safety. Course is taught in a laboratory setting allowing students to develop workplace competencies. Total of 36 hours lecture and 72 hours laboratory.
Grade Mode: *Letter Grade, Pass/No-Pass*

BIOL 102B BIOLOGICAL TECHNOLOGY – ADVANCED TECHNIQUES
3 unit
Prerequisite(s): *BIOL 102A*

Advanced skills in applied biological technology with a focus on DNA and protein applications. Skills include: use and maintenance of standard laboratory equipment and scientific instruments; methods to purify, quantify, and analyze DNA and/or proteins including column chromatography, immunological assays (ELISA and Western blot analysis), PCR, and electrophoretic techniques; and the production of an industry standard laboratory notebook. DNA and protein sequence analysis performed using bioinformatics tools. Course is taught in a laboratory setting allowing students to develop workplace competencies. Total of 36 hours lecture and 72 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 102C BIOLOGICAL TECHNOLOGY – CELL CULTURE TECHNIQUES
3 unit
Prerequisite(s): *BIOL 102A*

Advanced skills in applied biological technology with a focus on basic mammalian cell culture techniques and specialized applications. Skills include: use and maintenance of standard cell culture laboratory equipment; aseptic techniques for cell culture; methods for the growth, propagation, and maintenance of cultured mammalian cells; cell quantitation; cell imaging; introduction of DNA into cultured mammalian cells; cell culture laboratory safety requirements; and the production of an industry standard laboratory notebook. Course is taught in a cell culture laboratory setting to allow students to develop workplace competencies. Total of 36 hours lecture and 72 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 102D BIOLOGICAL TECHNOLOGY - LABORATORY INTERNSHIP
3 unit
Prerequisite(s): *BIOL 102B or BIOL 102C*

Enrollment Limitation: *Instructor approval*

Advanced skills in applied biological technology with a focus on practical applications in a working biotechnology laboratory. Internship in the biotechnology industry or in an academic research laboratory. Total of 162 hours of laboratory practical experience.
Grade Mode: *Letter Grade, Pass/No-Pass*

BIOL 104A APPLICATIONS OF FLUORESCENCE MICROSCOPY
2 unit
Prerequisite(s): *BIOL 102C*

Introduction to the fundamental principles of fluorescence microscopy. Exploration of specialized methods and practical biological applications of fluorescence detection and imaging using microscopy techniques currently being performed in research laboratories. Total of 18 hours lecture and 54 hours of laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 104B MICROBIOLOGICAL APPLICATIONS USED IN BIOTECHNOLOGY
4 unit
Prerequisite(s): *BIOL 102B and BIOL 102C*

Overview of the development of the field of molecular biotechnology. Instruction on how utilization of microorganisms and their biological products led to the advent of recombinant DNA technology, molecular cloning, and genetic engineering. Demonstration of various applied molecular microbiological techniques routinely performed in biotechnology laboratories. Total of 54 hours lecture and 72 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 104C RESEARCH METHODOLOGY
3 unit
Prerequisite(s): *BIOL 102B and BIOL 038*

Capstone course integrates the use of a variety of research methodologies taught in existing biotechnology core courses to illustrate the interdisciplinary nature of scientific research. Coursework includes participation in hypothesis-driven research projects focused on the use of various gene regulatory mechanisms, including RNA interference and genome editing, to study the biology and function of mouse embryonic stem cells. Total of 36 hours lecture and 72 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 104D COLLABORATIVE RESEARCH EXPERIENCE
3 unit
Prerequisite(s): *BIOL 102B and 038*

Enrollment Limitation: *Permission of the instructor*

Opportunity to participate in scientific research projects in collaboration with a local research institute. Practical experience provided with basic research methodologies and strategies used in academic research, specifically in the field of stem cell biology. Total of 36 hours lecture and 72 hours laboratory.
Grade Mode: *Audit, Letter Grade*

BIOL 104E SPECIALIZED TECHNIQUES AND INSTRUMENTATION IN BIOTECHNOLOGY
1 unit
Prerequisite(s): *BIOL 038 and BIOL 102B*

Specialized techniques using instrumentation and equipment currently being performed in the biotechnology industry and in biomedical research laboratories. Advanced instrumentation techniques may include: gel documentation, analysis, and imaging; electroporation/transfection; reverse transcription quantitative real-time PCR (RT-qPCR); flow cytometry, cryostat sectioning, and emerging technologies. Emphasis on the scientific basis of the specialized techniques as well as the research and clinical importance. Total of 9 hours lecture and 27 hours laboratory.
Grade Mode: *Letter Grade, Pass/No-Pass*

BIOL 104F STEM CELL-BASED BIOMANUFACTURING
3 unit
Prerequisite(s): *BIOL 038*

Fundamental principles and practices for the production of stem cell therapy products including regulatory guidelines and standards. Stem cell-based biomanufacturing and related bioprocessing technologies to produce stem cell therapeutics include stem cell genetic manipulation, expansion, differentiation, characterization, selection, separation, formulation, and biopreservation. Total of 36 hours lecture and 72 hours laboratory.
Grade Mode: *Letter Grade, Pass/No-Pass*

BIOL 110 INTRODUCTION TO BIOTECHNOLOGY
3 unit
Research in the biotechnology industry and in academic research laboratories. Includes lectures on fundamentals of biotechnology combined with laboratory experiences to demonstrate research techniques, allowing an opportunity to explore various career pathways in the field of modern biotechnology. Total of 36 hours lecture and 72 hours laboratory.
Grade Mode: *Letter Grade, Pass/No-Pass*

BIOL 171A EXPLORING TOPICS IN BIOLOGY
3 unit
Exploratory course: Specific topic identified in Schedule of Classes. Lecture focusing on topics of current and general interest. Total of 54 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 171B EXPLORING TOPICS IN BIOLOGY
1 unit
Exploratory course: Specific topic identified in Schedule of Classes. Lecture focusing on topics of current and general interest. Total of 18 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

BIOL 171C EXPLORING TOPICS IN BIOLOGY
1 unit
Exploratory course: Specific topic identified in Schedule of Classes. Lecture focusing on topics of current and general interest. Total of 18 hours lecture and 18 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*