

BIOLOGY

Division: Natural Sciences

Division Dean

Bridget Salzameda

Faculty

Maala Allen
 Kenneth Collins
 Spiridon Dimitratos
 David Dorado
 Jeffery Feaster
 Anastasia Nagel
 Gitanjali Nilkanth
 Kimberly Rosales
 Jo Wen Wu
 Calvin Young
 Gilene Young

Biology Associate in Arts Degree (<https://catalog.nocccd.edu/fullerton-college/degrees-certificates/biology/biology-associate-arts-degree/>)

Biology Associate in Science Degree for Transfer (<https://catalog.nocccd.edu/fullerton-college/degrees-certificates/biology/biology-associate-in-science-degree-for-transfer/>)

Biotechnology Biomanufacturing Technician Certificate (<https://catalog.nocccd.edu/fullerton-college/degrees-certificates/biology/biotechnology-biomanufacturing-technician-certificate/>)

Biotechnology Lab Assistant Skills Certificate (<https://catalog.nocccd.edu/fullerton-college/degrees-certificates/biology/biotechnology-lab-assistant-skills-cert/>)

Biotechnology Laboratory Technician Certificate (<https://catalog.nocccd.edu/fullerton-college/degrees-certificates/biology/biotechnology-laboratory-technician-certificate/>)

Biological Technician Associate in Science Degree (<https://catalog.nocccd.edu/fullerton-college/degrees-certificates/biology/biological-technician-associate-science-degree/>)

BIOL 100 F Principles of Biology 4 Units

72 hours lecture per term. This course is an introductory non-majors course that will 1) emphasize the fundamental understanding of basic biological principles, 2) illustrate the structure and function of living organisms and their relationship to the physical world, and 3) develop the student's ability to make effective decisions regarding contemporary issues in natural sciences. Topics include 1) the structure and function of life at the cellular and organismic levels, 2) metabolism, photosynthesis and energetics, 3) cell division and animal development, 4) classical and molecular genetics, 5) biotechnical development and applications, 6) evolution and adaptations of living organisms, and 7) ecological relationship and environmental conservation. (Degree Credit) (CSU) (UC Credit Limitation: BIOL 100 F and 101 F combined: maximum credit one course; no UC credit if taken after BIOL 170 F or a 200-level biology course) AA GE, CSU GE, IGETC

BIOL 101 F General Biology 5 Units

72 hours lecture and 54 hours lab per term. This integrated lecture-lab course is an introductory non-majors course that will emphasize basic biological principles, illustrate the structure and function of living organisms and their relationship to the physical world, and develop the student's ability to make effective decisions regarding contemporary issues in natural sciences. Field trips may be required outside regularly-scheduled class times. (Degree Credit) (CSU) (UC; no UC credit if taken after BIOL 170 F or a 200-level biology course) AA GE, CSU GE, IGETC

BIOL 101HF Honors General Biology 5 Units

72 hours lecture and 54 hours lab per term. This Honors-enhanced course is an introductory non-majors course that will emphasize the fundamental understanding of basic biological principles, illustrate the structure and function of living organisms and their relationship to the physical world, and develop the student's ability to make effective decisions regarding contemporary issues in natural sciences. Lecture topics include the structure and function of life at the cellular and organismal level, metabolism, photosynthesis and energetics, cell division and animal development, classical and molecular genetics, developments and applications in biotechnology, evolution and adaptations of living organisms, and ecological relationships and environmental conservation. Field trips may be required outside regularly scheduled class times. (Degree Credit) (CSU) (UC; no UC credit if taken after a 200 level Biology) AA GE, CSU GE, IGETC

BIOL 102 F Human Biology 3 Units

54 hours lecture per term. This course is designed to study modern biological concepts presented in a human context. Concepts include biological chemistry, cellular basis of life, energetics, cell cycle, anatomy, physiology, reproduction, development, genetics, demography, ecology and evolution. Included in the course are discussions of current topics on environmental, nutritional and public health issues as they relate to the human condition. (Degree Credit) (CSU) (UC; no UC credit if taken after BIOL 170 F or a 200-level biology course) AA GE, CSU GE, IGETC

BIOL 102LF Human Biology Laboratory 1 Unit

Corequisite(s): BIOL 102 F with a grade of C or better.
 54 hours lab per term. This lab course supplements the BIOL 102 F lecture. This is a general education course for non-biology majors providing direct participation in experiments, demonstrations and discussions. Topics include: elements of human anatomy and physiology, fitness, nutrition, disease, elements of human heredity and environmental adaptations. (Degree Credit) (CSU) (UC; no UC credit if taken after a 200-level Biology course) CSU GE, IGETC

BIOL 104 F Biology of Insects and Spiders 3 Units

54 hours lecture per term. This course familiarizes students with basic biological principles as illustrated by insects and spiders. Special emphasis is placed on their relations to plants and animals including humans. Living and preserved insects and spiders and many other visual aids will be used to help describe in detail life cycles, evolution, adaptations to local environment and the major taxonomic groups. (Degree Credit) (CSU) (UC) AA GE, CSU GE

BIOL 108 F Plants and People**3 Units**

54 hours lecture per term. This course is the study of basic plant biology and the history and uses of plants and plant products by human societies. Plants that have played major roles in the molding of human society and civilization are studied. This course will also cover the changes made by human civilizations to plant morphology and physiology. Lectures are integrated with discussion, demonstration and hands-on learning activities. Specific topics include plant structure, function, origins of agriculture and domestication. Historical and contemporary uses of important plant products such as drugs, medicines, oils, resins, beverages, foods and industrial products are included. The nutritional values of major food plants are evaluated. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC

BIOL 109 F Genetics and Biotechnology in Society**3 Units**

54 hours lecture per term. This introductory survey course will cover the basic concepts and experiments of transmission genetics and molecular biology. The applications, social consequences and ethical implications of reproductive technology, genomics and biotechnology in medicine and agriculture are also addressed. (Degree Credit) (CSU) (UC; no UC credit if taken after BIOL 170 F or a 200-level Biology course) AA GE, CSU GE, IGETC

BIOL 109LF Biotechnology Lab Techniques**2 Units**

108 hours lab per term. In this course, students will learn skills and gain experience with tools of the molecular biology lab. Students will learn safety, sterile technique, solution preparation, record keeping, proper use of instruments, bacterial culture, recombinant DNA cloning, protein purification and applications on the computer. Class emphasizes practical hands-on experience and an understanding of the basic principles behind the technologies. (Note: BIOL 109 F is not required to take this course) (Degree Credit) (CSU)

BIOL 141 F Marine Mammal Biology and Conservation**3 Units**

54 hours lecture per term. This course will provide an overview of the diversity of marine mammal species, along with their natural history, behavior, physiology, and ecology. It will introduce students to the techniques used to study marine mammals, and their applications to conservation and management issues. Required field trips are included. (Degree Credit) (CSU) (UC) AA GE, CSU GE

BIOL 170 F Organismal Biology**5 Units**

Prerequisite(s): MATH 040 F with a grade of C or better or assessment through the college's multiple placement processes.

Advisory: BIOL 101 F or BIOL 190 F and BIOL 190LF or AP Biology with a grade of 3 or better on the placement exam.

72 hours lecture and 54 hours lab per term. This course is designed to familiarize students with the diversity and biology of living organisms. Integrated lab and lecture sessions emphasize the classification of organisms with respect to the evolution of anatomical and physiological adaptations. This class is designed for Biological Science majors in transfer programs. Field trips outside regularly-scheduled class times are required. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC (C-ID: BIOL 140)

BIOL 190 F Introduction to Biotechnology**3 Units**

54 hours lecture per term. This course will teach students about all aspects of the biotechnology field, with content appropriate for a wide range of students and professionals. Topics will include the biology, business and legal/ethical issues surrounding biotechnology, cells, genes, DNA, proteins, genetic engineering, drug development, biofuels, agriculture, bioremediation, biotechnology company structure, and the regulations affecting the field. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC

BIOL 190LF Introduction to Biotechnology Lab**1 Unit**

Corequisite(s): BIOL 190 F with a grade of C or better.

54 hours lab per term. This course prepares students for entry-level work in the biotechnology industry by emphasizing the basic concepts needed to work effectively in a bioscience laboratory. Topics include laboratory math, basic chemistry of buffers, health and safety, metrology, quality control, biological molecules, gene expression, cell structure and molecular biology techniques. This course introduces students to basic biotechnology laboratory skills including basic separation methods, aseptic technique and documentation. Good communication and work-readiness skills are emphasized. (Degree Credit) (CSU) (UC) IGETC

BIOL 191 F Biotechnology A - Basic Laboratory Skills**4 Units**

54 hours lecture and 54 hours lab per term. This course provides an introduction to the fundamental skills necessary for any biotechnology laboratory. Skills include maintenance of an industry standard notebook; preparation and sterilization of solutions, reagents, and media; utilization of good aseptic technique, proper use and maintenance of laboratory equipment, adherence to quality control protocols, and laboratory safety regulations. Compliance with industry standards and regulations will be incorporated into course procedures. (Degree Credit) (CSU)

BIOL 192 F Biotechnology B - Protein Biochemistry**4 Units**

Prerequisite(s): BIOL 191 F with a grade of C or better

54 hours lecture and 54 hours lab per term. This course covers fundamental skills in applied biotechnology necessary for any biotechnology laboratory but particularly focuses on downstream manufacturing processes in biomanufacturing. Skills include maintenance of an industry standard notebook, preparation and sterilization of solutions, reagents and media, utilization of good aseptic technique, proper use and maintenance of laboratory equipment, adherence to quality control protocols, lab safety regulations, in vitro translation, large scale expression, purification, modification, western blot analysis, ELISA, antibody tagging, and fluorescent microscopy. (Degree Credit) (CSU)

BIOL 193 F Biotechnology C - Molecular Biology**4 Units**

Prerequisite(s): BIOL 191 F with a grade of C or better

54 hours lecture and 54 hours lab per term. This course introduces the fundamental skills in any biotechnology laboratory focusing on the upstream research and development process. Skills include the maintenance of an industry standard notebook, preparation and sterilization of solutions, reagents, and media, utilization of good aseptic technique, proper use and maintenance of laboratory equipment, adherence to quality control protocols, lab safety regulations, DNA/RNA extraction and purification, bioinformatics, polymerase chain reaction, electrophoresis, DNA sequencing, recombinant DNA technology, DNA cloning, transformation, in vitro transcription, fluorescence in situ hybridization, and Southern blot analysis. Compliance with industry standards and regulations will be incorporated into course procedures. (Degree Credit) (CSU)

BIOL 194 F Quality and Regulatory Compliance in the Biosciences**2 Units**

36 hours lecture per term. This course will cover quality assurance and regulatory compliance for the bioscience industries. Topics will span quality control and Federal Drug Administration (FDA) regulations for the biotechnology, biopharmaceutical, biomedical device and food industries. Theories and application of quality assurance and quality control will be presented and several different quality systems will be discussed such as CGMP (Good Manufacturing Practices), ISO9000 (International Standards Organization), Six Sigma and Lean. (Degree Credit) (CSU)

BIOL 196 F Tissue Culture Methods**2 Units****Prerequisite(s):** BIOL 191 F with a grade of C or better

18 hours lecture and 54 hours lab per term. This course provides theoretical and practical knowledge and skills on how to culture eukaryotic cells. Students acquire practical and theoretical knowledge of the structure, equipment, and sterile techniques of the cell culture laboratory, the growth conditions of cells, and how scientists attempt to mimic this in cultures. Among the topics covered are the composition of cell culture media, establishment of primary cultures and cell lines from normal tissue and cancer tissue, routine cultivation of cells, long-term storage, contamination, various methods for characterization of cells, transfection, and the use of cells in culture to resolve various issues in basic and applied research. (Degree Credit) (CSU) (C-ID: BIOT 230BX)

BIOL 222 F Marine Biology**3 Units****Prerequisite(s):** A biological science laboratory course with a grade of C or better

36 hours lecture and 54 hours lab per term. This course presents an overview of life in the sea. Lectures, labs and fieldwork provide an introduction to the diversity of marine organisms and the physical and biological processes that influence their structure, life history, behavior, and distribution. An emphasis is placed on the interactions of these organisms and processes in a variety of marine habitats. Marine ecology and conservation are also discussed. Both lab and field exercises will be used to provide hands-on experience with marine organisms, habitats, and research techniques. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC

BIOL 272 F Cell and Molecular Biology**4 Units****Prerequisite(s):** BIOL 170 F and CHEM 111AF with a grade of C or better

54 hours lecture and 54 hours lab per term. This course is designed for Biological Sciences majors in transfer programs. Integrated lectures and labs cover the principles and applications of prokaryotic/eukaryotic cell structure and function, biological molecules, cell reproduction and controls, molecular genetics, classical/Mendelian genetics, cell transport, cell metabolism and cellular communication. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC (C-ID: BIOL 190)

BIOL 274 F General Ecology**4 Units****Prerequisite(s):** BIOL 170 F with a grade of C or better

54 hours lecture and 54 hours lab per term. This course is designed to familiarize students with basic principles governing interactions between organisms and the environment. Integrated lectures, field trips, and lab sessions emphasize basic ecological principles and relationships. These include identification of plants and animals, community analysis, environmental survey techniques, laws of thermodynamics, behavioral and physiological adaptations of organisms, and ecological models. Field trips, including an overnight trip, are required. (Degree Credit) (CSU) (UC) AA GE, CSU GE, IGETC

BIOL 276 F Genetics and Evolutionary Biology**4 Units****Prerequisite(s):** BIOL 272 F with a grade of C or better

54 hours lecture and 54 hours lab per term. This course is a comprehensive survey of the processes and products of genetics. Through a review of experimental evidence, students evaluate the basic tenets of molecular, transmission and population genetics, and use the science of genetics to appraise the relationship of genetics to the processes and products of microevolution and macroevolution. Lab topics include DNA replication/repair, transcription and translation and regulation of gene expression. The philosophy and methods of science, as well as the theory of evolutionary thought are integrated throughout. Field trips may be required outside regularly-scheduled class times. (Degree Credit) (CSU) (UC)

BIOL 297 F Biosciences Internship**2-4 Units**

18 hours lecture and 75-225 hours of supervised employment or 60-180 hours of unpaid internship per term. This course is designed to provide work experience directly related to the student's area of study in Biology or Biotechnology. This course offers career development opportunities for students and industry professionals who need to strengthen or broaden their skills to retain their current position or wish to advance in their current careers in the biosciences. Course awards 1 unit per 75 hours of paid internship or 1 unit per 60 hours of unpaid internships. (Degree Credit) (CSU)

BIOL 299 F Biological Science Independent Study**1 Unit****Prerequisite(s):** A 200-level course in the biological sciences with a grade of "B" or better

54 hours independent study per term. This course involves lab and/or field investigations under the guidance of members of the life sciences faculty. Hours to be arranged. Primarily for majors in life sciences who wish to increase their knowledge of the sciences through individual study and small group conferences. Independent research problems with staff supervision may be approved. Outside reading and written report required. Elective credit in the sciences area. (Degree Credit) (CSU) (UC review required)