BIOLOGICAL SCIENCE

The biology department offers courses in a variety of interconnected topics, including microbiology, molecular biology, cellular biology, genetics, anatomy, physiology, and ecology. Many of the topics address important social problems including public health, natural resource management, nutrition and the law.

Students and faculty collaborate on laboratory research, fieldwork, and publications with real-world application. The department provides students with a broad exposure to biological processes and systems and a deep understanding of biology at environmental, organismal, cellular, and molecular levels. Through these experiences our students will gain a conceptual and experiential understanding of the biological sciences spanning from molecules to ecosystems.

Career Opportunities

Environmental Analyst, Healthcare, Life Science Education, Forensic Science, Biological Research. May require advanced degree.

Faculty

Gibbs, David

Gibbs, Jessica

Harvey, Lisa

Howard, Kristy

Jalota, Naveen

Kaiser, Hinrich

Meyer, Archie

Sauer, Frank

Transfer

- California State University, San Bernardino: Biology major
- University of California, Riverside: Biology major

For the most up-to-date information on these programs and others, visit assist.org (http://www.assist.org). Please stop by the Transfer Center in Building 23 or make an appointment with a counselor if you have questions.

Biology, AS-T

State Control Number: 41089
Program Code: BIOLT.IGETC.AS
Approved for Federal Financial Aid: Yes

The Associate in Science in Biology for Transfer degree is appropriate for all students who want to pursue a career in the life sciences and allied health professions such as medicine, dentistry and pharmacy. In the 21st century, no field can compare to the biological sciences in terms of major discoveries that directly affect society and individuals. The disciplines are endless and new ones arise annually: genetic engineering, forensics, biochemistry, veterinary medicine, pathology, botany, zoology, marine biology, forestry, microbiology, conservation biology, ecology, environmental studies, and bioinformatics. The Associate in Science in Biology for Transfer is designed to provide students a clear transfer pathway to the CSU within the biological field major and the completion of baccalaureate degree, with guaranteed admission to a CSU to a similar major with junior standing, and the ability to complete their remaining requirements within 60 semester or 90 quarter units. Minimum overall grade point average of 2.0 Minimum grade of "C" (or "P") for each course in the major, and Completion of IGETC.

To earn this degree complete the major coursework listed here with "C" grades or better and the following graduation requirements: 60 CSU transferable units; the IGETC for STEM (https://www.vvc.edu/sites/default/files/2022-06/IGETCSTEM_2021-2022.pdf) pattern (see page 3); the Basic/Golden 4 requirements; and a 2.0 minimum overall CSU GPA. Courses used in the major may also be counted in the general education areas. Courses used for this major may also be used to earn other degrees at VVC.

Code	Title	Units
Required Courses		
BIOL 201	Biology of Cells	5.0
BIOL 202 & BIOL 200	Biology of Organisms and Botany: Plant Diversity and Ecology	9.0
List A		
Supporting Science and Math		22.0
CHEM 201 & CHEM 202	General Chemistry and General Chemistry	
MATH 226 or MATH 226H	Analytic Geometry and Calculus I Honors Analytic Geometry and Calculus I	
PHYS 221 & PHYS 222	General Physics I and General Physics II	
OR		
PHYS 202 & PHYS 203	Engineering Physics II - Fluids, Sound, and Thermodynamics and Engineering Physics III Electricity And Magnetism	
List B		
Additional Major Preparation		0-4.0
BIOL 203	Population and Environmental Biology	
Total Units		**36-40**

Biological Science Courses

BIOL 98A Research Experience in International Natural History (3-4 Units)
This study abroad course offers students the opportunity to travel, and to learn about and experience first-hand biological research. The experience is designed to extend beyond the natural environment and the local geography by including the history and the culture of the trip destination(s). Pre-trip preparation may include lectures as well as reading and/or writing assignments. Participation in the travel portion of the course is mandatory. No Trips vary in length from 9-13 days. Grade option.
Lecture Hours: 18.0; Lab Hours: 162.0
Transfer: Not transferable

BIOL 98B Reserch Concepts in International Natural History (4.0 Units)
This study abroad course offers students the opportunity to travel, and to learn about and conceptualize biological research first-hand. The experience is designed to extend beyond the natural environment and the local geography by including the history and the culture of the trip destination(s). Pre-trip preparation may include lectures as well as reading and/or writing assignments. Participation in the travel portion of the course is mandatory. No Trips vary in length from 14-18 days. Grade option.
Lecture Hours: 18.0; Lab Hours: 162.0
Transfer: Not transferable

BIOL 98C Research in International Natural History (5.0 Units)
This study abroad course offers students the opportunity to travel, and to learn about and conduct first-hand biological research. The experience is designed to extend beyond the natural environment and the local geography by including the history and the culture of the trip destination(s). Pre-trip preparation may include lectures as well as reading and/or writing assignments. Participation in the travel portion of the course is mandatory. No Trips vary in length from 19-25 days. Grade option.
Lecture Hours: 18.0; Lab Hours: 216.0
Transfer: Not transferable

BIOL 100 General Biology (4.0 Units)
This is an introductory course with emphasis on the scientific method, analysis of scientific data, metric system, current biological problems, cellular biology, genetics and heredity, classification and systematics, evolution, ecology, behavior, and environmental issues. The laboratory will include a survey of the morphological characteristics of various organisms on this planet. (UC credit limitation).
Lecture Hours: 54.0; Lab Hours: 54.0
Transfer: Transfers to both UC/CSU

BIOL 107 Introduction to Human Biology (4.0 Units)
An introduction to biological principles with a human perspective. Emphasis on cellular structure and function, organ systems, the concept of homeostasis, adaptation, cellular and population genetics, and the interaction of the human species with the ecosystem.
Lecture Hours: 54.0; Lab Hours: 54.0
Transfer: Transfers to CSU only

BIOL 110 Introduction to Human Nutrition (3.0 Units)
Introduction to the medical aspects of nutrition, intended for students pursuing a career in health care. Biological function and chemical classification of nutrients. Nutritional needs throughout the lifespan. Effects of nutritional deficiencies and excesses. Recommended nutrient intakes and the role of diet in the development of chronic disease.
Lecture Hours: 54.0
Transfer: Transfers to both UC/CSU

BIOL 118 Principles of Heredity (4.0 Units)
A survey of Mendelian inheritance, quantitative traits, and population genetics. Also includes sections on DNA technology, immune genetics, and genetics of cancer. This course places special emphasis on human inheritance and family pedigree analysis, and will stress development of critical thinking and problem-solving skills.
Lecture Hours: 54.0; Lab Hours: 54.0
Transfer: Transfers to both UC/CSU

BIOL 138 Cooperative Education Biology (1-8 Units)
This course is designed for students who are cross-training at their current worksite for upward mobility or possible career changes, as well as those looking for entry-level occupational training through work-based learning experiences. Students must have a co-op approved worksite to enroll in this class and establish new learning objectives.
Transfer: Transfers to CSU only

BIOL 145 Forensic Pathology (3.0 Units)
The scientific techniques used in forensic pathology investigations of regional injuries and death including firearm, transportation and physical injuries, trauma and disease, child abuse, sexual assaults, diagnosis of rape, pregnancy, abortion and delivery, infanticide, asphyxial and drug deaths. The course will cover forensic medical evidence and records for the court.
Lecture Hours: 54.0
Transfer: Transfers to CSU only

BIOL 149 Independent Study (1-4 Units)
Assigned projects involving research, laboratory work, or directed study for selected students who are interested in furthering their knowledge of anatomy and physiology on an independent study basis. For each unit earned, students are required to devote three hours per week throughout the semester. Enrollment limited to those who meet independent study criteria. Prior to registration, a contract must be prepared. See instructor for details.
Transfer: Transfers to CSU only

BIOL 190 Environmental Science (3.0 Units)
A study of humans in relation to the environment, that emphasizes population ecology, nutrient cycles and energy flow, pollution, food production and conservation of natural resources.
Lecture Hours: 54.0
Transfer: Transfers to CSU only

BIOL 200 Botany: Plant Diversity and Ecology (4.0 Units)
This course is intended for majors and covers comparative diversity, structure, and function of plant, fungal, and protistan phyla. Topics include development, morphology and physiology, taxonomy and systematics. Principles of population and community ecology and ecosystem interactions are emphasized. C-ID: BIOL 155.
Prerequisite(s): MATH 105, MATH 105H, MATH 120, MATH 120H, or MATH 120S, Minimum grade C
Recommended Preparation: BIOL 201 and ENGL 101.0
Lecture Hours: 54.0; Lab Hours: 54.0
Transfer: Transfers to CSU only

BIOL 201 Biology of Cells (5.0 Units)
This rigorous course will provide students with a comprehensive introduction to biological principles at the cellular and molecular level. Emphasis will be placed on the scientific method, molecular biology, biochemistry, structure and function of cells, cellular reproduction and Mendelian and molecular genetics. This course is designed for pre-professional and biology majors, but is open to all students. C-ID: BIOL 190.
Prerequisite(s): MATH 105 or higher Minimum grade C
Co-requisite(s): CHEM 201, Minimum grade C
Lecture Hours: 54.0; Lab Hours: 108.0
Transfer: Transfers to both UC/CSU

BIOL 202 Biology of Organisms (5.0 Units)
This course provides students with a comprehensive introduction to the diversity of biological organisms. Emphasis is placed on the origin of life, evolutionary relationships among groups of organisms and the basic anatomy and physiology of the major groups of living organisms and an introduction to the principles of ecology. Biology majors should also take Biology 201. C-ID: BIOL 150.
Prerequisite(s): MATH 90 or Higher, Minimum grade C
Lecture Hours: 54.0; Lab Hours: 108.0
Transfer: Transfers to both UC/CSU

BIOL 203 Population and Environmental Biology (4.0 Units)
An introduction to the structure and organization of populations, communities, and ecosystems. Emphasis will be on demography, population growth, life history traits, extinction, species interactions, ecosystem dynamics, and evolution, as well as selected current environmental issues. Students will participate in field laboratories, use simple statistics to analyze data, and compose scientific papers. This course is designed for biological science majors but is open to all students.
Prerequisite(s): MATH 90, Minimum grade C
Lecture Hours: 54.0; Lab Hours: 54.0
Transfer: Transfers to both UC/CSU

BIOL 211 Human Anatomy (5.0 Units)
An introduction to the gross and microscopic anatomy of the human body. Lab includes dissection of a cat, sheep eye, kidney, heart, and larynx with demonstrations on anatomical models and including demonstration on human cadavers when available. Lecture covers cells, tissues, organs, and the major human systems such as the integumentary, skeletal, muscular, nervous, endocrine, cardiovascular, respiratory, urinary, and reproductive. C-ID: BIOL 110 B.
Prerequisite(s): BIOL 107 or BIOL 201, Minimum grade C
Lecture Hours: 54.0; Lab Hours: 108.0
Transfer: Transfers to both UC/CSU

BIOL 213 Sexually Transmitted Diseases (3.0 Units)
The pathogenesis, treatment and diagnosis of the prominent sexually transmitted diseases. Impact of current biotechnology in relation to vaccine development, experimental treatments, and improved diagnostics and screening.
Lecture Hours: 54.0
Transfer: Transfers to both UC/CSU

BIOL 215 Human Gross Anatomy (4.0 Units)
An advanced anatomy class that utilizes a regional approach to the study of the thorax, abdomen, and pelvis. Lecture will include medical/clinical applications and case studies on these regions. Laboratory includes hands on group dissection of these regions on a whole cadaver; as well as work on high-level anatomy software.
Prerequisite(s): BIOL 211, Minimum grade C
Lecture Hours: 54.0; Lab Hours: 54.0
Transfer: Transfers to CSU only

BIOL 221 General Microbiology (5.0 Units)
Introduction to microbiology with emphasis on:
morphology, reproduction, growth, metabolishm, genetics and taxonomy of micro organisms; methods of biotechnology applicable to microbiology; and the role of micro organisms in infectious disease, methods of control of the disease, and the immune response of the host.
Prerequisite(s): (BIOL 100, BIOL 107, or BIOL 201) and (CHEM 100 or CHEM 201, Minimum grade C)
Lecture Hours: 54.0; Lab Hours: 108.0
Transfer: Transfers to both UC/CSU

BIOL 231 Human Physiology (5.0 Units)
Study of the physiological principles, function, integration and homeostasis of the human body at the cellular, tissue, organ, organ system and organism level: integumentary system, bone, skeletal, smooth and cardiac muscles, nervous system, sensory organs, cardiovascular system, lymphatic and immune systems, respiratory system, urinary system, digestive system, endocrine system, and reproductive system. This course is primarily intended for Nursing, Allied Health, Kinesiology, and other health related majors. C-ID: BIOL 120 B.
Prerequisite(s): (BIOL 100, BIOL 107 or BIOL 201) and (BIOL 211) and (CHEM 100 or CHEM 201, Minimum Grade C)
Lecture Hours: 54.0; Lab Hours: 108.0
Transfer: Transfers to both UC/CSU

BIOL 232 Human Physiology (4.0 Units)
Study of the physiological principles, function, integration and homeostasis of the human body at the cellular, tissue, organ, organ system and organism level: integumentary system, bone, skeletal, smooth and cardiac muscles, nervous system, sensory organs, cardiovascular system, lymphatic and immune systems, respiratory system, urinary system, digestive system, endocrine system, and reproductive system. This course is primarily intended for Nursing, Allied Health, Kinesiology and other health related major.
Prerequisite(s): (BIOL 100, BIOL 107, or BIOL 201; and) and (CHEM 100 or CHEM 201, Minimum Grade C)
Lecture Hours: 54.0; Lab Hours: 54.0
Transfer: Transfers to CSU only

BIOL 233 Pathophysiology (3.0 Units)
This introductory pathophysiology course uses a conceptual approach to introduce pathological mechanisms of altered human states of physiology. Topics include etiology, cellular metabolism, tissue perfusion, tissue alterations, functional changes and age-related differences when applicable. Specific disease processes are discussed to demonstrate application of the mechanisms.
Lecture Hours: 54.0
Transfer: Transfers to CSU only

BIOL 250A Ecosystem Field Biology (3.0 Units)
Students will learn research techniques hands-on, from basic specimen collecting, species identification, and data gathering in the field to data analysis and sicentific writing and will apply these in biodiversity surveys of terrestiral or aquatic habitats or both. This course is intended for biology majors but is open to all students. Non-majors who wish to participate with less rigorous course requirements may wish to enroll in BIOL 98A, BIOL 98B or BIOL 98C, which is offered concurrently.
Prerequisite(s): BIOL 100, Minimum grade C
Lecture Hours: 18.0; Lab Hours: 108.0
Transfer: Transfers to CSU only

BIOL 295AH Biological Research I (3.0 Units)
Students who would like to explore biological research for the first time will experience basic research techniques using the scientific method. During this course, the essential elements of research will be stressed, such as literature review, writing a research proposal and conducting an experiment. Undergraduate research helps students develop valuable skills, and provides an opportunity to apply scientific knowledge in the context of "real world" problems.
Prerequisite(s): BIOL 100, BIOL 107, or BIOL 201; and CHEM 100 or CHEM 201, Minimum grade C
Recommended Preparation: MATH 90 or higher
Lecture Hours: 54.0
Transfer: Transfers to CSU only

BIOL 295BH Biological Research II - Experimental Design (4.0 Units)
Students who would like to further explore biological research will use various research techniques following the scientific method. During this course, many essential elements of research will be stressed, such as literature review, writing a research proposal and conducting an experiment. Undergraduate research helps students develop valuable skills, and provides an opportunity to apply scientific knowledge in the context of "real world" problems.
Prerequisite(s): BIOL 100, BIOL 107, or BIOL 201, Minimum grade C
Lecture Hours: 54.0; Lab Hours: 54.0
Transfer: Transfers to both UC/CSU

BIOL 295CH Biological Research III - Research Design & Analysis (4.0 Units)
Construction of basic experimental designs based upon literature and data analyses. Students develop and participate in experimental designs of selected research projects including measurements, statistical analyses, and interpretation of data. Special emphasis will be placed on the development of laboratory skills.
Prerequisite(s): BIOL 100, BIOL 107, or BIOL 201, Minimum grade C
Recommended Preparation: MATH 90 or higher
Lecture Hours: 54.0; Lab Hours: 54.0
Transfer: Transfers to CSU only

Program Learning Outcomes

Program Learning Outcomes (PLOs) are statements of the kind of learning a program hopes a student will achieve. The PLOs describe the knowledge, skills, problem-solving, communication and values that apply to all certificates and/or degrees within that program.

Upon completion of this program, students should be able to:

1. Students will be able to use the scientific process to formulate questions, design experiments to test hypotheses, interpret experimental results to draw conclusions, communicate results both orally and in writing, and critically evaluate the use of the scientific method from published sources.
2. Students will be able to apply evolutionary theory at the molecular, cellular, organismal and population levels to explain the unity and diversity of living things.