

BIOLOGY (BIOL)

Using evolution as its paradigm, the Biology Department provides a supportive, challenging, and stimulating environment in which students are able to acquire a strong foundation in biology. This foundation includes instruction, development of critical thinking skills, and training on cutting-edge equipment to prepare students for transfer to 4-year institutions or provide access to fulfilling careers in medical, nursing, radiological sciences and other biology-related areas. We also wish to promote natural history both locally and internationally.

Merritt College offers the following certificate program in Biology:

NATURAL HISTORY

- CERTIFICATE OF PROFICIENCY



COURSES

NATURAL HISTORY CERTIFICATE OF PROFICIENCY

DESCRIPTION

The Natural History Certificate of Proficiency prepares students for entry-level jobs, provides for job-advancement and continuing education and professional development requirements, and supports docent training with both public and private agencies and companies. These include museums, nature centers, public schools and community colleges, ecotourism company guides, Nature Conservancy Preserves and the University of California Natural Reserve System, environmental consultants, and local, state and national park and national forest interpretive sites and visitor centers.

PROGRAM LEARNING OUTCOMES

Upon successful completion of this program, students will be able to:

1. Contrast and compare climates in local, regional and global settings and predict the characteristics of the ecosystems, both their physical and biotic components, which these climates produce.
2. Explain the origins of an extant landscape based on knowledge of the geology and geologic processes which exist and have been in effect in an ecosystem during geologic time, such as plate tectonics.
3. Elucidate ecological relationships between the various members of the biota of any ecosystem under consideration, both in food chains and webs and in biogeochemical cycles.
4. Evaluate conservation strategies in different regional and global ecosystems based on both the resources and the cultural characteristics of the people involved.
5. Program Requirements

PROGRAM REQUIREMENTS

Subject #	Title	Units
Major Courses		
Select a total of 10 units from the following:		
Group A: California Courses		
BIOL 62K	Natural History of the Ancient Bristlecone Pine Forest	1.5-2
BIOL 62R	Ecology of Yosemite Valley	1.5
BIOL 62S	Natural History of the Islands of California	2
BIOL 62T	Ecology of Mono Lake and the Mono Craters	1.5
BIOL 62U	Natural History of the Giant Sequoia in Yosemite and Sequoia/Kings Canyon National Parks	1.5
BIOL 62V	Ecology of the Mammoth Lakes Sierra and the Ritter Range	1.5
BIOL 62X	Natural History of Headwaters Forest	1.5
BIOL 80D	Ecology of the California Condor	1.5
Group B: Other State Courses		
BIOL 62W	Natural History of the Ice Age National Scenic Trail and Ice Age National Scientific Reserve, Wisconsin	1
BIOL 62Y	Natural History of Arches National Park	1
Group C: International Courses		
BIOL 65C	Natural History and Gaucho Culture of Uruguay	1
BIOL 65D	Natural History of New South Wales, Australia	1
BIOL 65F	Natural History of Tahiti (French Polynesia)	1
Group D: Indians and the Environment		
NATAM 76E	California Indian Ecology on the Central Coast	1.5
Total Units		10

COURSES

BIOLOGY

BIOL 1A

GENERAL BIOLOGY

5 units, 3 hours lecture, 6 hours laboratory (GR or P/ NP)

Prerequisite: CHEM 1A

Acceptable for credit: CSU, UC

Introduction to general biology: Cell structure and function, metabolism, molecular and organismal genetics, and animal physiology. 0401.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C

C-ID: BIOL 135S (with BIOL 1B), BIOL 190

BIOL 1B

GENERAL BIOLOGY

5 units, 3 hours lecture, 6 hours laboratory (GR or P/ NP)

Prerequisite: BIOL 1A

Acceptable for credit: CSU, UC

Continuation of BIOL 1A: Origin of life, evolution, classification, plant structure and function, and ecology. 0401.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C

C-ID: BIOL 135S (with BIOL 1A), BIOL 140

BIOL 2

HUMAN ANATOMY

5 units, 4 hours lecture, 3 hours laboratory (GR or P/ NP)

Prerequisite: BIOL 10 or BIOL 24

Acceptable for credit: CSU, UC

Detailed study of human body structure: Molecules, cells, tissues, organs and organ systems, basic physiology and cell division, selected human diseases. Laboratory work includes extensive use of microscopes, figures/charts, three-dimensional models, dissected human cadavers, and dissection of other mammalian organisms/organs. 0410.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C

C-ID: BIOL 110

BIOL 3

MICROBIOLOGY

5 units, 4 hours lecture, 3 hours laboratory (GR or P/ NP)

Prerequisite: CHEM 1A or CHEM 30A

Recommended preparation: BIOL 10

Acceptable for credit: CSU, UC

Survey of the various microscopic agents of particular importance to humans: Emphasis on microbes involved in infectious diseases, host defenses against diseases, elements of infectious chains and means utilized for breaking the chains. 0403.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C

BIOL 4

HUMAN PHYSIOLOGY

5 units, 4 hours lecture, 3 hours laboratory (GR or P/ NP)

Prerequisite: CHEM 1A or CHEM 30A

Recommended preparation: BIOL 2

Acceptable for credit: CSU, UC

Detailed study of human body function: Molecules, cells, tissues, organs and organ systems, basic anatomy essential to understanding function, physical and chemical factors and process, and selected human diseases. Laboratory work includes computer simulations and interactive programs, physiological experiments and demonstrations, and use of microscopes. 0410.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C

C-ID: BIOL 120

BIOL 5

BOTANY

4 units, 3 hours lecture, 3 hours laboratory (GR or P/ NP)

Also offered as LANHT 15. Not open for credit to students who have completed or are currently enrolled in LANHT 15.

Acceptable for credit: CSU, UC

Introductory study of botany: Structure, physiology, genetics, ecology, and uses of plants. Laboratory work emphasizes microscopy, physiology experiments, and field identification. 0402.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C

BIOL 9

MARINE BIOLOGY

4 units, 3 hours lecture, 3 hours laboratory (GR or P/ NP)

Acceptable for credit: CSU, UC

Introduction to the natural history of marine algae, invertebrates, fish and mammals, focusing on Northern California coast environments: Basic concepts of biology, oceanography, ecology, and current environmental issues. 0408.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C

BIOL 10

INTRODUCTION TO BIOLOGY

4 units, 3 hours lecture, 3 hours laboratory (GR or P/ NP)

Not open for credit to students who have completed or are currently enrolled in BIOL 1A or BIOL 1B or BIOL 25.

Students with previous credit in BIOL 11 receive only 1 unit of credit for BIOL 10.

Acceptable for credit: CSU, UC

Fundamentals of biology for the non-major: Scientific inquiry, biological chemistry, cell structure and function, DNA and genetics, evolution and ecology, and an overview of living organisms. Includes laboratory exercises designed to complement lectures. 0401.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C

COURSES

BIOL 13 PRINCIPLES OF ECOLOGY

3 units, 3 hours lecture (GR or P/NP)
Acceptable for credit: CSU, UC

Study of the interaction of humans with the living world around them: The nature of the biological world and how it works; and the problems of overpopulation, pollution, and environmental deterioration. 0408.00

AA/AS area 1; CSU area B2, B3 (with BIOL 13L or ENVMT 2L satisfies lab requirement; IGETC area 5B, 5C (with BIOL 13L or ENVMT 2L satisfies lab requirement)

BIOL 13L PRINCIPLES OF ECOLOGY AND SUSTAINABLE SYSTEMS LAB

1 unit, 3 hours laboratory (GR)
Prerequisite or Corequisite: BIOL 13 or ENVMT 2
Also offered as ENVMT 2L. Not open for credit to students who have completed or are currently enrolled in ENVMT 2L.
Acceptable for credit: CSU, UC

Field laboratory course which identifies, measures, and tests the sustainable environmental principles discussed in ENVMT 2 or BIOL 13: Qualitative and macro/micro quantitative methods, identifying and sustaining ecosystems, nutrient cycling, geographical and aquatic ecology, population dynamics, water and energy systems, air pollution and hazardous waste, and farming methods and use of pesticides. 0408.00

CSU area B3 (with BIOL 13 satisfies lab requirement); IGETC area 5C (with BIOL 13 satisfies lab requirement)

BIOL 15 ENVIRONMENTAL BIOLOGY

3 units, 3 hours lecture (GR or P/NP)
Acceptable for credit: CSU, UC

Study of the relationships between living things and their environment: Natural selection and speciation, the organism and the environment, population ecology, the ecosystem, and a survey of ecosystems. 0408.00

AA/AS area 1; CSU area B2; IGETC area 5B

BIOL 20A HUMAN ANATOMY AND PHYSIOLOGY

5 units, 4 hours lecture, 3 hours laboratory (GR or P/ NP)
Recommended preparation: BIOL 24 or CHEM 30A
Acceptable for credit: CSU, UC

Structure and function of the human body: Biological chemistry, cytology, tissues, and integumentary, skeletal, muscular and nervous systems; selected human diseases. Laboratory work: Dissection of mammalian organs, work with dissected human cadavers; use of microscopes, figures/ charts, three-dimensional models; physiological experiments and demonstrations, and computer simulations. 0410.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C
C-ID: BIOL 115S (with BIOL 20B)

BIOL 20B HUMAN ANATOMY AND PHYSIOLOGY

5 units, 4 hours lecture, 3 hours laboratory (GR or P/ NP)
Prerequisite: BIOL 20A
Acceptable for credit: CSU, UC

Structure and function of the human body: Special senses, endocrine, cardiovascular, immune, respiratory, digestive, urinary and reproductive systems; selected human diseases. Laboratory: Dissection of mammalian organs, work with dissected human cadavers; use of microscopes, figures/ charts, three-dimensional models; physiological experiments and demonstrations, and computer simulations. 0410.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C
C-ID: BIOL 115S (with BIOL 20A)

BIOL 23 INTRODUCTION TO THE HUMAN BODY

3 units, 3 hours lecture (GR or P/NP)
Course is equivalent to BIOL 24 without the lab; it does not meet Allied Health requirements for an anatomy and physiology course.
Acceptable for credit: CSU, UC

Fundamentals of structure and function of the human body: Emphasis on medical and health aspects. 0410.00
AA/AS area 1; CSU area B2; IGETC area 5B

BIOL 24 BASIC HUMAN ANATOMY AND PHYSIOLOGY

4 units, 3 hours lecture, 3 hours laboratory (GR or P/ NP)
Acceptable for credit: CSU, UC

Fundamentals of the structure and function of the human body from an organ system perspective: Key concepts and basic principles of the chemistry of life and organic compounds, cells and tissues, cell physiology, organ systems, selected human diseases. Laboratory work includes use of microscopes, figures/charts, three-dimensional models, dissection of mammalian organs and demonstration of human cadavers. 0410.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C

BIOL 25 HUMAN BIOLOGY

3 units, 3 hours lecture (GR or P/NP)
Not open for credit to students who have completed or are currently enrolled in BIOL 1A or BIOL 1B or BIOL 10.
Acceptable for credit: CSU, UC

Principles of life sciences through study of biological structures and functions of the human organism: Human genetics, evolution, ecology, sexual differences and comparisons, development and growth, and survey of body systems. 0401.00

AA/AS area 1; CSU area B2; IGETC area 5B

COURSES

BIOL 29

INTRODUCTION TO BIODIVERSITY

4 units, 3 hours lecture, 3 hours laboratory (GR or P/NP)
Acceptable for credit: CSU, UC

Introduction to biology emphasizing chiefly the evolution, adaptations, and classification of life forms from bacteria to animals: Identification of groups of organisms and the most common species; lesser emphasis on cellular and molecular biology and genetics. 0401.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C

BIOL 36

HUMAN GENETICS

4 units, 3 hours lecture, 3 hours laboratory (GR or P/ NP)
Recommended preparation: BIOL 1A or BIOL 10
Acceptable for credit: CSU, UC

Survey of basic Mendelian and modern genetics: Basic cell biology, cytogenetics, pedigree analysis, multi-factorial inheritance, development and sex determination, DNA structure and function, gene expression and regulation, mutation and epigenetics, evolution and population genetics, cancer genes, immune system, biotechnology, behavior genetics, genetic counseling. 0401.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C

BIOL 42

BASIC PATHOPHYSIOLOGY

3 units, 3 hours lecture (GR)
Prerequisites: BIOL 2 and BIOL 4, or BIOL 20A and BIOL 20B, and BIOL 3
Acceptable for credit: CSU

Introduction to the fundamentals of pathophysiology with a focus on physiologic changes and altered functions in the human body resulting from disease processes: Study of basic disease process concepts, body systems, etiology, and pathogenesis of various disorders based on foundation principles from anatomy, physiology and chemistry; exploration of diagnostic procedures, preventative measures, and current therapeutic regimens. 0410.00

AA/AS area 1

BIOL 47

STRATEGIES FOR THE BIOLOGY TEACHING ASSISTANT

.5-1.5 units, 1.5-4.5 hours laboratory (GR or P/NP)
Open-entry/open-exit course
Prerequisite or Corequisite: BIOL 2, BIOL 4, BIOL 20A, BIOL 20B, BIOL 35, or BIOL 48OF
Acceptable for credit: CSU

Laboratory preparation and design techniques: Anatomy and physiology laboratory procedures and dissection techniques, computer-based training and testing design and application, and pedagogy and student assistance. 0410.00

BIOL 49

INDEPENDENT STUDY IN BIOLOGICAL SCIENCES

.5-5 units (GR or P/NP)
Acceptable for credit: CSU

See section on Independent Study. 0401.00

BIOL 60A

NATURAL HISTORY OF THE BAY AREA: THE LOCAL PARKS

.5-4 units, .5-4 hours lecture (GR or P/NP)
Also offered as ENVST 60A. Not open for credit to students who have completed or are currently enrolled in ENVST 60A.
Acceptable for credit: CSU

Survey of the natural history of the Bay Area: Climate, geology, geologic history, geomorphology, flora and fauna of selected Bay Area parks. 0408.00

BIOL 60B

NATURAL HISTORY OF THE BAY AREA: MT. DIABLO STATE PARK

1-5 units, 1-5 hours lecture (GR or P/NP)
Also offered as ENVST 60B. Not open for credit to students who have completed or are currently enrolled in ENVST 60B.
Acceptable for credit: CSU

Survey of the natural history of Mt. Diablo State Park: Climate, geology, geologic history, geomorphology, flora and fauna; survey techniques for field studies and conservation strategies for the endangered species of the park; includes on-site field studies at Mt. Diablo State Park. 0408.00

BIOL 60C

NATURAL HISTORY OF THE BAY AREA: HERPETOLOGY

2 units, 2 hours lecture (GR or P/NP)
Also offered as ENVST 60C. Not open for credit to students who have completed or are currently enrolled in ENVST 60C.
Acceptable for credit: CSU

Survey of the natural history of reptiles and amphibians of the Bay Area; includes on-site field studies in various state and regional parks. 0408.00

BIOL 61E

NATURAL HISTORY: TIDE POOLS OF THE GREATER BAY AREA

.5 units, .5 hours lecture (GR or P/NP)
Acceptable for credit: CSU

Survey of tide-pool life of the Greater Bay Area: Invertebrates and vertebrates as well as tide-pool flora. 0408.00

COURSES

BIOL 61G
NATURAL HISTORY: MAMMALS OF THE GREATER BAY AREA

2 units, 2 hours lecture (GR or P/NP)
 Acceptable for credit: CSU

Survey of Bay Area Mammals: Marine as well as terrestrial mammals, endemic as well as introduced species and relatively recent extinctions. 0408.00

BIOL 61H
NATURAL HISTORY OF THE BAY AREA: BUTTERFLIES AND MOTHS

2 units, 2 hours lecture (GR or P/NP)
 Acceptable for credit: CSU

Butterflies and Moths of the Greater Bay Area: Life histories of common, rare and endangered species. 0408.00

BIOL 61I
NATURAL HISTORY OF THE BAY AREA: BRYOPHYTES

2 units, 2 hours lecture (GR or P/NP)
 Acceptable for credit: CSU

Identification of common mosses and liverworts of the greater San Francisco Bay Area: Slide preparation and microscopic examination including field identification. 0408.00

BIOL 61K
NATURAL HISTORY OF THE BAY AREA: LICHENS

2 units, 2 hours lecture (GR or P/NP)
 Acceptable for credit: CSU

Common Lichens of the Greater San Francisco Bay Area: Microscopic analysis and field study. 0408.00

BIOL 62K
NATURAL HISTORY OF THE ANCIENT BRISTLECONE PINE FOREST

1.5 units, 1.5 hours lecture (GR or P/NP)
 Acceptable for credit: CSU

Geography, climate, geology, plant and animal communities, and ecology of the Bristlecone Pine (*Pinus longaeva*) in the White Mountains of Eastern California. 0408.00

BIOL 62R
ECOLOGY OF YOSEMITE VALLEY

1.5 units, 1.5 hours lecture (GR or P/NP)
 Field sessions are at student expense.
 Acceptable for credit: CSU

Geologic origins and historic and present-day biota of Yosemite Valley: Rocks, glaciation, forests, rivers, meadows, native fauna, fire, succession and human impacts. 0408.00

BIOL 62S
NATURAL HISTORY OF THE ISLANDS OF CALIFORNIA

2 units, 2 hours lecture (GR or P/NP)
 Acceptable for Credit: CSU

Biogeography of California's islands: botany, zoology, and geology of the Channel Islands, Farallon Islands, and San Francisco Bay Islands. 0408.00

BIOL 62T
ECOLOGY OF MONO LAKE AND THE MONO CRATERS

1.5 units, 1.5 hours lecture (GR or P/NP)
 Acceptable for Credit: CSU

Pleistocene salt lake in the Great Basin Desert of Eastern California: Climate; geology; flora; fauna; history; controversies; and conservation. 0408.00

BIOL 62U
NATURAL HISTORY OF THE GIANT SEQUOIA IN YOSEMITE AND SEQUOIA/KINGS CANYON NATIONAL PARKS

1.5 units, 1.5 hours lecture (GR or P/NP)
 Acceptable for Credit: CSU

Iconic tree species, endemic to California: Classification; genetic relationships; anatomical and physiological characteristics; geologic history; environment; adaptations; community relationships; threats and exploitation; conservation. 0408.00

BIOL 62V
ECOLOGY OF THE MAMMOTH LAKES SIERRA AND THE RITTER RANGE

1.5 units, 1.5 hours lecture (GR or P/NP)
 Acceptable for Credit: CSU

Glaciers, volcanoes, alpine lakes, dense subalpine forests: High country geology, glacial landscapes, flora, fauna, ecology and conservation on and east of the Sierra crest. 0408.00

BIOL 62W
NATURAL HISTORY OF THE ICE AGE NATIONAL SCENIC TRAIL AND ICE AGE NATIONAL SCIENTIFIC RESERVE, WISCONSIN

1 unit, 1 hour lecture (GR or P/NP)
 Acceptable for Credit: CSU

Best and most accessible continental glacial landscape features in the world: Moraines; kettle lakes; kames; eskers; drumlins; glacial erratics; glacial outwash; and glacial lakes. 0408.00

BIOL 62X
NATURAL HISTORY OF HEADWATERS FOREST

1.5 units, 1.5 hours lecture (GR or P/NP)
 Acceptable for Credit: CSU

Pristine old-growth Coast Redwood forest near Arcata: Climate; geology; Redwood ecology; history; political struggle; conservation; and preservation. 0408.00

COURSES

BIOL 62Y**NATURAL HISTORY OF ARCHES NATIONAL PARK**

1 unit, 1 hour lecture (GR or P/NP)

Acceptable for Credit: CSU

Unparalleled landscape features in the canyonlands of Southeastern Utah: Natural arches; natural bridges; wild and scenic rivers; high desert wildlife; comparison of hot deserts with cold deserts. 0408.00

BIOL 64I**NATURAL HISTORY OF POINT REYES NATIONAL SEASHORE**

1 unit, 1 hour lecture (GR or P/NP)

Acceptable for credit: CSU

Survey of the flora, fauna, geology and ecosystems of Point Reyes National Seashore. 0408.00

BIOL 65C**NATURAL HISTORY AND GAUCHO CULTURE OF URUGUAY**

1 unit, 1 hour lecture (GR or P/NP)

Acceptable for credit: CSU

Wild nature in outback Uruguay: Quebrada ecosystems and the local people in the forefront of protecting and interpreting them. 0408.00

BIOL 65D**NATURAL HISTORY OF NEW SOUTH WALES, AUSTRALIA**

1 unit, 1 hour lecture (GR or P/NP)

Acceptable for credit: CSU

Remnants of the great southern continent: Plants, animals and geology of UNESCO World Heritage Gondwana Rainforest Reserves and the Great Dividing Range in eastern Australia. 0408.00

BIOL 65F**NATURAL HISTORY OF TAHITI (FRENCH POLYNESIA)**

1 unit, 1 hour lecture (GR or P/NP)

Acceptable for Credit: CSU

Overview of geology, flora, and fauna of Tahiti: French Polynesia; botany; zoology; biogeography. 0408.00

BIOL 80A**RAPTORS OF CENTRAL CALIFORNIA AND THE BAY AREA**

.5-2.5 units, .5-2.5 hours lecture (GR or P/NP)

Also offered as ENVST 80A. Not open for credit to students who have completed or are currently enrolled in ENVST 80A.

Attendance in on-campus classroom lectures required in order to participate in field lectures for additional units.

Acceptable for credit: CSU

Introduction to the basic biology of birds with an emphasis on hawks, eagles, falcons, kites, owls, vultures and other raptors of Central California and the Bay Area: Identification, classification, evolution, migration and ecology of the raptors; field sessions in outstanding fall migration and overwintering areas presenting these birds in their natural habitats. 0408.00

BIOL 80B**BIRD SONGING: THE ECOLOGY OF BIRD SONGS AND IDENTIFICATION BY EAR**

.5-2.5 units, .5-2.5 hours lecture (GR or P/NP)

Also offered as ENVST 80B. Not open for credit to students who have completed or are currently enrolled in ENVST 80B.

Attendance in on-campus classroom lectures required in order to participate in field lectures for additional units.

Acceptable for credit: CSU

Introduction to the identification, classification, and ecology of birds in terms of how they communicate and use their songs: Emphasis on Central California and Bay Area birds, with special attention paid to birds such as passerines, hummingbirds, and parrots that memorize and learn their songs; concepts relating to how birds sing, learn their songs, mimic one another, and play duets together. 0408.00

BIOL 80C**FUNDAMENTALS OF ORNITHOLOGY AND BIRDING IN CENTRAL CALIFORNIA AND THE BAY AREA**

.5-7 units, .5-7 hours lecture (GR or P/NP)

Also offered as ENVST 80C. Not open for credit to students who have completed or are currently enrolled in ENVST 80C.

Attendance in on-campus classroom lectures required in order to participate in field lectures for additional units.

Acceptable for credit: CSU

Fundamentals of ornithology: Emphasis on habitats from the pelagic to the High Sierra and the birds found there. 0408.00

BIOL 80D**ECOLOGY OF THE CALIFORNIA CONDOR**

1.5 units, 1.5 hours lecture (GR or P/NP)

Acceptable for credit: CSU

Introduction to the California Condor, *Gymnogyps californianus*: Characteristics, life history, habitat and niche, past and present ranges and conservation challenges. 0408.00

BIOL 260**BIOLOGY SUCCESS SKILLS**

Variable 0.5 to 1 unit, 0.5 to 1 hour lecture (GR or P/NP)

Study of topics basic to biology: Biological chemistry, cell structure and function, genetics, and use of the microscope. 4930.14