

Biology

Overview

The Folsom Lake College biology curriculum offers courses that satisfy general education requirements in life sciences. Some courses are prerequisites for a degree in the environmental sciences or health professions. In addition, the curriculum helps prepare students for transfer opportunities to four-year programs in biological sciences, nursing, and physical therapy, and programs leading to careers in teaching, medicine, dentistry, and veterinary medicine. All courses seek to develop critical thinking skills while fostering a lasting appreciation of biology. Students planning to continue for a four-year degree should consult the lower division requirements of the transfer program of the university to which they plan to attend.



Career Options

- Dentistry
- Marine Biology
- Medicine
- Microbiology
- Nursing
- Nutrition
- Optometry
- Pharmacy
- Physical Therapy
- Physician's Assistant
- Research
- Teaching
- Veterinary Medicine
- Wildlife Biology

Some career options may require more than two years of college study. Classes beyond the associate degree may be required to fulfill some career options or for preparation for transfer to a university program.

Program Maps

[Public Service, Health, and Education Undecided Major \(/flc/main/doc/instruction/program-maps/Public-service-undecided-major.pdf\)](/flc/main/doc/instruction/program-maps/Public-service-undecided-major.pdf)

[Science, Technology, Engineering, and Mathematics Undecided Major \(/flc/main/doc/instruction/program-maps/STEM-Undecided-major.pdf\)](/flc/main/doc/instruction/program-maps/STEM-Undecided-major.pdf)

[Biology, A.S.-T Degree \(/flc/main/doc/instruction/program-maps/Biological-Science-AST.pdf\)](/flc/main/doc/instruction/program-maps/Biological-Science-AST.pdf)

[Biological Sciences, A.S. Degree \(/flc/main/doc/instruction/program-maps/Biological-Science-AS-degree.pdf\)](/flc/main/doc/instruction/program-maps/Biological-Science-AS-degree.pdf)

[Interdisciplinary Studies: Math and Science, A.A Degree \(/flc/main/doc/instruction/program-maps/IS-Math-Science.pdf\)](/flc/main/doc/instruction/program-maps/IS-Math-Science.pdf)

[Heritage Interpretation, Certificate of Achievement \(/flc/main/doc/instruction/program-maps/Heritage-Interpretation-Certificate.pdf\)](/flc/main/doc/instruction/program-maps/Heritage-Interpretation-Certificate.pdf)

Dean [Greg McCormac \(/about-us/contact-us/faculty-and-staff-directory/greg-mccormac\)](/about-us/contact-us/faculty-and-staff-directory/greg-mccormac)

Department Chair [Sherry Rogers \(/about-us/contact-us/faculty-and-staff-directory/sherry-rogers\)](/about-us/contact-us/faculty-and-staff-directory/sherry-rogers)

Meta-Majors [Science, Technology, Engineering, and Mathematics \(/academics/meta-majors/science-technology-engineering-and-mathematics\)](/academics/meta-majors/science-technology-engineering-and-mathematics)
[Public Service, Health, and Education \(/academics/meta-majors/public-service-health-and-education\)](/academics/meta-majors/public-service-health-and-education)

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Associate Degrees for Transfer

A.S.-T. in Biology

The Associate in Science in Biology for Transfer Degree program provides students with a major that fulfills the general requirements for transfer to the California State University (CSU). Students with this degree will receive priority admission with junior status to the California State University system. Students should work closely with their Folsom Lake College counselor to ensure that they are taking the appropriate coursework to prepare for majoring in Biology at the institution they wish to transfer to because major and general education requirements may vary for each CSU, and the degree does not guarantee admission to a specific CSU campus.

This program has the following completion requirements:

- (1) Completion of 60 semester units that are eligible for transfer to the California State University, including both of the following:
 - (A) CSU IGETC for STEM Breadth Requirements.
 - (B) The required number of units in the major or area of emphasis, as determined by the community college district.
- (2) Obtainment of a minimum grade point average of 2.0. Associate Degrees for Transfer also require that students must earn a C or better in all courses required for the major or area of emphasis.

Catalog Date: June 1, 2020

Degree Requirements

COURSE CODE	COURSE TITLE	UNITS
BIOL 400	Principles of Biology	5
BIOL 410	Principles of Botany	5
BIOL 420	Principles of Zoology	5
CHEM 400	General Chemistry I	5
CHEM 401	General Chemistry II	5
MATH 400	Calculus I	5
[PHYS 350	General Physics (4)	8
and PHYS 360]	General Physics (4)	
or [PHYS 411	Mechanics of Solids and Fluids (4)	
and PHYS 421]	Electricity and Magnetism (4)	
Total Units:		38

The Associate in Science in Biology for Transfer (AS-T) degree may be obtained by completion of 60 transferable, semester units with a minimum 2.0 GPA, including (a) the major or area of emphasis described in the Required Program, and (b) the Intersegmental General Education Transfer Curriculum for Science, Technology, Engineering, and Mathematics (IGETC for STEM).

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- apply acquired knowledge, skills, and abilities toward successful completion of coursework at transfer institutions.
- demonstrate knowledge of the language, facts, and concepts that serve as the foundation for working independently on more complex problems.
- employ appropriate information-gathering tools to investigate scientific matters.
- clearly communicate scientific information, both orally and in written form, to diverse audiences.
- demonstrate laboratory and field habits consistent with accepted practices for safety, documentation, and core techniques.
- analyze data sets, recognize the implications of disturbances to biological systems, and synthesize information to draw conclusions.
- differentiate between scientifically-derived knowledge, myth, and conjecture in professional or everyday encounters with information.
- recognize and discuss ethical implications of biological research when encountered in personal, community, and scientific issues.
- engage in free exchange of ideas to support creative problem solving.
- evaluate former and proposed human activities, and, if necessary, recommend alternative actions that are environmentally sustainable.

Associate Degrees

A.S. in Biological Sciences

Biology programs at FLC seek to prepare lower division students for transfer to higher education institutions, entry into vocational programs, or science-related employment. All programs seek to develop critical thinking skills while fostering a lasting appreciation of biology.

Catalog Date: June 1, 2020

Degree Requirements

COURSE CODE	COURSE TITLE	UNITS
CHEM 400	General Chemistry I	5
CHEM 401	General Chemistry II	5
BIOL 400	Principles of Biology	5
BIOL 410	Principles of Botany	5
BIOL 420	Principles of Zoology	5
A minimum of 8 units from the following:		8
BIOL 323	Plants and People (4)	
BIOL 350	Environmental Biology (3)	
BIOL 380	Natural History Field Studies: Coastal Ecosystems (1)	
BIOL 382	Natural History Field Studies: Desert Ecosystems (1)	
BIOL 384	Natural History Field Study of Forest Ecosystems (1 - 4)	
BIOL 386	Natural History Field Studies: Marine Ecosystems (1)	
BIOL 388	Natural History Field Studies: River Ecosystems (1)	
BIOL 389	Natural History Field Studies: Wetland Ecosystems (1)	
BIOL 390	Natural History Field Study (0.5 - 4)	
CHEM 420	Organic Chemistry I (5)	
CHEM 421	Organic Chemistry II (5)	
INDIS 360	Sustainability: Your Future on Planet Earth (3)	
MATH 400	Calculus I (5)	
MATH 401	Calculus II (5)	
PHYS 350	General Physics (4)	
PHYS 360	General Physics (4)	
PHYS 411	Mechanics of Solids and Fluids (4)	
PHYS 421	Electricity and Magnetism (4)	
PHYS 431	Heat, Waves, Light and Modern Physics (4)	
STAT 300	Introduction to Probability and Statistics (4)	
Total Units:		33

The Biological Sciences Associate in Science (A.S.) degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See FLC graduation requirements.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- apply acquired knowledge, skills, and abilities toward successful completion of coursework at transfer institutions.
- demonstrate knowledge of the language, facts, and concepts that serve as the foundation for working independently on more complex problems.
- employ appropriate information-gathering tools to investigate scientific matters.
- clearly communicate scientific information, both orally and in written form, to diverse audiences.
- demonstrate laboratory and field habits consistent with accepted practices for safety, documentation, and core techniques.
- analyze data sets, recognize the implications of disturbances to biological systems, and synthesize information to draw conclusions.
- differentiate between scientifically-derived knowledge, myth, and conjecture in professional or everyday encounters with information.
- recognize and discuss ethical implications of biological research when encountered in personal, community, and scientific issues.
- engage in free exchange of ideas to support creative problem solving.
- evaluate former and proposed human activities, and, if necessary, recommend alternative actions that are environmentally sustainable.

A.S. in Environmental Science

Environmental Science prepares students to address the effects of climate change on our planet and on human interactions with our environment and each other. Students completing the Associate in Science degree will be prepared to transfer to a four-year college to major in Environmental Science, Environmental Policy, or related fields. Students are encouraged to meet with a counselor to determine the appropriate course work necessary to meet transfer admission requirements.

Catalog Date: June 1, 2020

Degree Requirements

COURSE CODE	COURSE TITLE	UNITS
BIOL 400	Principles of Biology	5
BIOL 410	Principles of Botany	5
BIOL 420	Principles of Zoology	5
CHEM 400	General Chemistry I	5
CHEM 401	General Chemistry II	5
A minimum of 30 units from the following:		30
BIOL 350	Environmental Biology (3)	
CHEM 420	Organic Chemistry I (5)	
CHEM 421	Organic Chemistry II (5)	
ECON 302	Principles of Macroeconomics (3)	
ECON 304	Principles of Microeconomics (3)	
GEOG 300	Physical Geography: Exploring Earth's Environmental Systems (3)	
GEOG 301	Physical Geography Laboratory (1)	
GEOL 300	Physical Geology (3)	
GEOL 301	Physical Geology Laboratory (1)	
MATH 355	Calculus for Biology and Medicine I (4)	
MATH 356	Calculus for Biology and Medicine II (4)	
MATH 370	Pre-Calculus Mathematics (5)	
MATH 400	Calculus I (5)	
MATH 401	Calculus II (5)	
MATH 402	Calculus III (5)	
PHYS 350	General Physics (4)	
PHYS 360	General Physics (4)	
PHYS 411	Mechanics of Solids and Fluids (4)	
PHYS 421	Electricity and Magnetism (4)	
PHYS 431	Heat, Waves, Light and Modern Physics (4)	
PSYC 330	Introductory Statistics for the Behavioral Sciences (3)	
STAT 300	Introduction to Probability and Statistics (4)	
Total Units:		55

The Environmental Science Associate in Science (A.S.) degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See FLC graduation requirements.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- apply acquired knowledge, skills, and abilities toward successful completion of coursework at transfer institutions.
- demonstrate knowledge of the language, facts, and concepts that serve as the foundation for working independently on more complex problems.
- employ appropriate information-gathering tools to investigate scientific matters.
- clearly communicate scientific information, both orally and in written form, to diverse audiences.
- demonstrate laboratory and field habits consistent with accepted practices for safety, documentation, and core techniques.
- analyze data sets, recognize the implications of disturbances to biological systems, and synthesize information to draw conclusions.
- differentiate between scientifically-derived knowledge, myth, and conjecture in professional or everyday encounters with information.
- recognize and discuss ethical implications of environmental science research when encountered in personal, community, and scientific issues.
- engage in free exchange of ideas to support creative problem solving.
- evaluate former and proposed human activities, and, if necessary, recommend alternative actions that are environmentally sustainable.

A.A. in Interdisciplinary Studies: Math and Science

The Interdisciplinary Studies degree is designed for students who wish to obtain a broad knowledge of arts and sciences plus additional coursework in a prescribed "Area of Emphasis". This program is a good choice for students planning on transferring to the California State University or University of California. The student will be able to satisfy general education requirements, plus focus on transferable course work that relates to a specific major and/or individual interest. This degree will have an "Area of Emphasis" in Math and Science. These courses emphasize the natural sciences which examine the physical universe, its life forms and its natural phenomena. Courses in math emphasize the development of mathematical and quantitative reasoning skills beyond the level of intermediate algebra. Students will be able to demonstrate an understanding of the methodologies of science as investigative tools. Students will also examine the influence that the acquisition of scientific knowledge has on the development of the world's civilizations. Possible majors at a four-year institution include, but are not limited to: mathematics, biology, chemistry, and physical science.

It is highly recommended that students consult a counselor to determine the classes within each area that will best prepare them for their intended transfer major.

Catalog Date: June 1, 2020

Degree Requirements

COURSE CODE	COURSE TITLE	UNITS
A minimum of 18 units from the following:		18
You must select courses from at least three different disciplines and complete courses from both math and science. If a course is cross-listed with another on the list, only one may apply to the degree.		
ANTH 300	Biological Anthropology (3)	
ANTH 301	Biological Anthropology Laboratory (1)	
ANTH 303	Introduction to Forensic Anthropology (3)	
ASTR 300	Introduction to Astronomy (3)	
ASTR 400	Astronomy Laboratory (1)	
BIOL 300	The Foundations of Biology (3)	
BIOL 307	Biology of Organisms (4)	
BIOL 310	General Biology (4)	
BIOL 323	Plants and People (4)	
BIOL 350	Environmental Biology (3)	
BIOL 400	Principles of Biology (5)	
BIOL 410	Principles of Botany (5)	
BIOL 420	Principles of Zoology (5)	
BIOL 430	Anatomy and Physiology (5)	
BIOL 431	Anatomy and Physiology (5)	
BIOL 440	General Microbiology (4)	
BIOL 442	General Microbiology and Public Health (5)	
CHEM 305	Introduction to Chemistry (5)	
CHEM 306	Introduction to Organic and Biological Chemistry (5)	
CHEM 400	General Chemistry I (5)	
CHEM 401	General Chemistry II (5)	
CHEM 410	Quantitative Analysis (5)	
CHEM 420	Organic Chemistry I (5)	
CHEM 421	Organic Chemistry II (5)	
GEOG 300	Physical Geography: Exploring Earth's Environmental Systems (3)	
GEOG 301	Physical Geography Laboratory (1)	
GEOG 306	Weather and Climate (3)	
GEO 300	Physical Geology (3)	
GEO 301	Physical Geology Laboratory (1)	
GEO 305	Earth Science (3)	
GEO 306	Earth Science Laboratory (1)	
GEO 310	Historical Geology (3)	
GEO 311	Historical Geology Laboratory (1)	
GEO 330	Introduction to Oceanography (3)	
GEO 345	Geology of California (3)	
MATH 300	Introduction to Mathematical Ideas (3)	
MATH 310	Mathematical Discovery (3)	
MATH 335	Trigonometry with College Algebra (5)	
MATH 341	Calculus for Business and Economics (4)	
MATH 343	Modern Business Mathematics (4)	
MATH 355	Calculus for Biology and Medicine I (4)	
MATH 356	Calculus for Biology and Medicine II (4)	
MATH 370	Pre-Calculus Mathematics (5)	
MATH 400	Calculus I (5)	
MATH 401	Calculus II (5)	
MATH 402	Calculus III (5)	
MATH 410	Introduction to Linear Algebra (3)	
MATH 420	Differential Equations (4)	
NUTRI 300	Nutrition (3)	
NUTRI 340	Nutrition and Metabolism (3)	
PHYS 310	Conceptual Physics (3)	
PHYS 311	Basic Physics (3)	
PHYS 350	General Physics (4)	
PHYS 360	General Physics (4)	
PHYS 411	Mechanics of Solids and Fluids (4)	
PHYS 421	Electricity and Magnetism (4)	
PHYS 431	Heat, Waves, Light and Modern Physics (4)	
PS 302	Introduction to Physical Science (4)	
PSYC 312	Biological Psychology (4)	
PSYC 330	Introductory Statistics for the Behavioral Sciences (3)	
STAT 300	Introduction to Probability and Statistics (4)	

Total Units:

18

The Interdisciplinary Studies: Math and Science Associate in Arts (A.A.) degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See FLC graduation requirements.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- reason quantitatively and empirically (Math and Science).

Certificate of Achievement

Heritage Interpretation Certificate

Heritage Interpretation involves conveying meaningful information about historical, cultural, and natural events or sites to a broad audience. One may have encountered interpretive prose in historical site markers, displays at parks or museums, and written park visitor guides. Park rangers, docents, and tour guides use oral and written interpretation skills. More recently, interpretive skills have been expanding into social media. Students completing this proposed certificate of recognition will be prepared to take an exam to be a Certified Interpretive Guide (C.I.G) from the National Association for Interpretation. Courses in this certificate may also be applied towards associate degree and/or transfer requirements.

Catalog Date: June 1, 2020

Certificate Requirements

COURSE CODE	COURSE TITLE	UNITS
ANTH 300	Biological Anthropology (3)	3
or ANTH 310	Cultural Anthropology (3)	
or ANTH 320	Introduction to Archaeology and World Prehistory (3)	
BIOL 307	Biology of Organisms (4)	3 - 4
or BIOL 323	Plants and People (4)	
or BIOL 350	Environmental Biology (3)	
HIST 319	American Environmental History (3)	3
or HIST 344	Survey of California History: A Multicultural Perspective (3)	
ANTH 392	Principles of Heritage Interpretation (3)	3
or HIST 392	Principles of Heritage Interpretation (3)	
A minimum of 2 units from the following:		2
ANTH 498	Work Experience in Anthropology (1 - 4)	
BIOL 380	Natural History Field Studies: Coastal Ecosystems (1)	
BIOL 382	Natural History Field Studies: Desert Ecosystems (1)	
BIOL 384	Natural History Field Study of Forest Ecosystems (1 - 4)	
BIOL 386	Natural History Field Studies: Marine Ecosystems (1)	
BIOL 388	Natural History Field Studies: River Ecosystems (1)	
BIOL 389	Natural History Field Studies: Wetland Ecosystems (1)	
BIOL 390	Natural History Field Study (0.5 - 4)	
HIST 498	Work Experience in History (1 - 4)	
WEXP 498	Work Experience in (Subject) (1 - 4)	
Total Units:		14 - 15

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- pass the Certified Interpretive Guide exam offered by the National Association for Interpretation.
- interpret information about a historical, cultural, or natural event or site to a diverse audience.
- justify the importance of preserving historical, cultural, and natural resources.

Career Information

Students completing this certificate along with additional coursework may be prepared to seek jobs as an interpretive guide or Interpretive Specialist at parks, museums, historical sites, and cultural centers; K-12 educator; river guide; or in the hospitality industry. This certificate may also fulfill some of the transfer requirements for a bachelor's degree in Public History, Cultural Resources Management, or Natural Resources Management.

Certificates

Biology UC Preparation Certificate

This certificate aligns with the UC Transfer Pathway in Biology, which provides students with roadmaps to Biology (or related) majors at any University of California (UC) campus. This certificate will be especially helpful to students who know (or have a general idea) that they are interested in majoring in Biology (or a related discipline), but have not decided which UC campuses they would like to apply to.

This certificate outlines the set of courses students should take to be competitive for admission to a Biology major in the UC system. Campuses may have grade requirements for particular courses. Students are encouraged to meet with a counselor to determine other campus-specific requirements such as determining which Math sequence to complete.

Catalog Date: June 1, 2020

Certificate Requirements

COURSE CODE	COURSE TITLE	UNITS
BIOL 400	Principles of Biology	5
BIOL 410	Principles of Botany	5
BIOL 420	Principles of Zoology	5
CHEM 400	General Chemistry I	5
CHEM 401	General Chemistry II	5
CHEM 420	Organic Chemistry I	5
CHEM 421	Organic Chemistry II	5
[MATH 355 and MATH 356]	Calculus for Biology and Medicine I (4) Calculus for Biology and Medicine II (4)	8 - 10
or [MATH 400 and MATH 401]	Calculus I (5) Calculus II (5)	
Total Units:		43 - 45

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- apply acquired knowledge, skills, and abilities toward successful completion of coursework at transfer institutions.
- demonstrate knowledge of the language, facts, and concepts that serve as the foundation for working independently on more complex problems.
- employ appropriate information-gathering tools to investigate scientific matters.
- clearly communicate scientific information, both orally and in written form, to diverse audiences.
- demonstrate laboratory and field habits consistent with accepted practices for safety, documentation, and core techniques.
- analyze data sets, recognize the implications of disturbances to biological systems, and synthesize information to draw conclusions.
- differentiate between scientifically-derived knowledge, myth, and conjecture in professional or everyday encounters with information.
- recognize and discuss ethical implications of biological research when encountered in personal, community, and scientific issues.
- engage in free exchange of ideas to support creative problem solving.
- evaluate former and proposed human activities, and, if necessary, recommend alternative actions that are environmentally sustainable.

Environmental Science Certificate

Environmental Science prepares students to address the effects of climate change on our planet and on human interactions with our environment and each other. Students completing the Certificate of Achievement in Environmental Science will be prepared to transfer to a four-year college where completing general education prior to admission to a major in Environmental Science or similar field is neither required nor expected. Students are encouraged to meet with a counselor to determine the appropriate course work necessary to meet transfer admission requirements.

Catalog Date: June 1, 2020

Certificate Requirements

COURSE CODE	COURSE TITLE	UNITS
BIOL 400	Principles of Biology	5
BIOL 410	Principles of Botany	5
BIOL 420	Principles of Zoology	5
CHEM 400	General Chemistry I	5
CHEM 401	General Chemistry II	5
A minimum of 30 units from the following:		30
BIOL 350	Environmental Biology (3)	
CHEM 420	Organic Chemistry I (5)	
CHEM 421	Organic Chemistry II (5)	
ECON 302	Principles of Macroeconomics (3)	
ECON 304	Principles of Microeconomics (3)	
GEOG 300	Physical Geography: Exploring Earth's Environmental Systems (3)	
GEOG 301	Physical Geography Laboratory (1)	
GEOL 300	Physical Geology (3)	
GEOL 301	Physical Geology Laboratory (1)	
MATH 355	Calculus for Biology and Medicine I (4)	
MATH 356	Calculus for Biology and Medicine II (4)	
MATH 370	Pre-Calculus Mathematics (5)	
MATH 400	Calculus I (5)	
MATH 401	Calculus II (5)	
MATH 402	Calculus III (5)	

COURSE CODE	COURSE TITLE	UNITS
PHYS 350	General Physics (4)	
PHYS 360	General Physics (4)	
PHYS 411	Mechanics of Solids and Fluids (4)	
PHYS 421	Electricity and Magnetism (4)	
PHYS 431	Heat, Waves, Light and Modern Physics (4)	
PSYC 330	Introductory Statistics for the Behavioral Sciences (3)	
STAT 300	Introduction to Probability and Statistics (4)	
Total Units:		55

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- apply acquired knowledge, skills, and abilities toward successful completion of coursework at transfer institutions.
- demonstrate knowledge of the language, facts, and concepts that serve as the foundation for working independently on more complex problems.
- employ appropriate information-gathering tools to investigate scientific matters.
- clearly communicate scientific information, both orally and in written form, to diverse audiences.
- demonstrate laboratory and field habits consistent with accepted practices for safety, documentation, and core techniques.
- analyze data sets, recognize the implications of disturbances to biological systems, and synthesize information to draw conclusions.
- differentiate between scientifically-derived knowledge, myth, and conjecture in professional or everyday encounters with information.
- recognize and discuss ethical implications of environmental science research when encountered in personal, community, and scientific issues.
- engage in free exchange of ideas to support creative problem solving.
- evaluate former and proposed human activities, and, if necessary, recommend alternative actions that are environmentally sustainable.

Biology (BIOL) Courses

BIOL 100 Introduction to Concepts of Human Anatomy and Physiology

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
General Education:	AA/AS Area IV (effective Summer 2020)
Catalog Date:	June 1, 2020

This course provides an overview of the basic concepts of anatomy and physiology, with coverage of all body systems. It is a non-transferable course designed for students requiring a one semester prerequisite for certain allied health programs, for students wanting to improve critical thinking, learning skills, and college-level vocabulary in preparation for more rigorous courses, and for any students with a desire to explore and to improve their understanding of the human body.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- apply basic skills to generate and interpret oral and written communication about the human body.
- apply basic critical thinking to analyze structure and function of the human body.
- evaluate the roles of each body system in promoting necessary life functions and maintaining homeostasis.
- assess how lifestyle choices, environmental conditions, and genetics impact each body system.
- apply varied learning strategies to master basic human anatomy & physiology.

BIOL 300 The Foundations of Biology

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Advisory:	ENGWR 101 and MATH 100 with grades of "C" or better
Transferable:	CSU; UC (UC credit limitation: Biology 300, 307 and 310 combined: maximum credit, one course)
General Education:	AA/AS Area IV; CSU Area B2; IGETC Area 5B
Catalog Date:	June 1, 2020

This course is a survey of major topics in the biological sciences for the non-science major with an emphasis on human biology. Units covered include the origin of life, cell structure and chemistry, metabolism, Mendelian and molecular genetics, genetic engineering, evolution, anatomy and physiology of humans, animal behavior and ecology.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- explain the basic cellular, anatomical and physiological mechanisms by which organisms, including humans, maintain homeostasis using correct biological vocabulary.

- describe the basic processes of cellular reproduction and genetics and analyze the implications of related modern biotechnologies.
- explain the basic principles of evolution and biodiversity.
- evaluate the impacts of humans on biodiversity and ecosystem function.
- apply the scientific method to biological problems and data, and evaluate the validity of biological information as applied to personal and community issues.

BIOL 307 Biology of Organisms

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	None.
Advisory:	ENGWR 101 and MATH 100 with grades of "C" or better
Transferable:	CSU; UC (UC credit limitation: Biology 300, 307 and 310 combined: maximum credit, one course)
General Education:	AA/AS Area IV; CSU Area B2; CSU Area B3; IGETC Area 5B; IGETC Area 5C
Catalog Date:	June 1, 2020

This is a general biology course focusing on a survey of the plant and animal kingdoms. The course covers the general principles of biology including: methods of science, cell organization, genetics, evolution, ecology, biodiversity, and anatomy. These principles are explored in more depth through the examination of additional topics which may include: disease and epidemiology, physiological ecology, animal behavior, biotechnology, population growth and regulation, ecosystem ecology, and conservation biology. Evolution and biodiversity are continuing themes included in each major topic. The course is designed for non-science majors and is especially useful for liberal studies, elementary education, environmental studies, recreation, and similar majors. Field trips scheduled outside of class time (including day-length weekend field trips) may be required. Students may be required to purchase eye protection and disposable gloves.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- compare and contrast the various metabolic, cellular, anatomical, morphological, physiological, and behavioral mechanisms evolved by organisms to acclimate or adapt to their environments.
- apply the scientific method to simple experiments designed and conducted by students.
- assemble the emergent properties of life, and describe each as they relate to different organisms.
- explain the importance of ecology and evolution to organismal diversity.
- evaluate the use of biotechnology in current fields (e.g. agriculture, medicine, and criminal investigations) based on a student's understanding of DNA and heredity.
- research human interactions with the environment, and recommend sustainable practices that could be practically implemented.

BIOL 310 General Biology

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	None.
Advisory:	ENGWR 101 and MATH 100 with grades of "C" or better
Transferable:	CSU; UC (UC credit limitation: Biology 300, 307 and 310 combined: maximum credit, one course)
General Education:	AA/AS Area IV; CSU Area B2; CSU Area B3; IGETC Area 5B; IGETC Area 5C
Catalog Date:	June 1, 2020

This course introduces the major concepts of biological science with an emphasis on human biology. It is intended for non-science majors and disciplines requiring a broad overview of Biology (e.g. some Allied Health programs). Topics covered include: cell biology, metabolism, Mendelian and molecular genetics, evolution, anatomy and physiology, animal behavior, and ecology. The laboratory activities are designed to further investigate and illuminate each topic area. Students may be required to purchase eye protection and disposable gloves. Field trips outside of class time may be required. Additionally, students may be required to provide their own transportation to field trip sites.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- explain how human bodies function and maintain homeostasis at the cellular, anatomical, and physiological levels using correct biological vocabulary.
- describe the processes of heredity, reproduction, and development, and discuss how the three are applied in modern biotechnologies.
- explain the principles of evolution, ecology, and biodiversity, and apply an understanding of each concept to how humans interact with our environment.
- apply the scientific method to biological problems, and interpret scientific data in a reasonable manner.
- critically evaluate the validity of scientific information from a variety of sources.

BIOL 323 Plants and People

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	None.
Advisory:	ENGWR 101 and MATH 100; with a grade of "C" or better.
Transferable:	CSU; UC
General Education:	AA/AS Area IV; CSU Area B2; CSU Area B3; IGETC Area 5B; IGETC Area 5C
Catalog Date:	June 1, 2020

This introductory course focuses on the scientific study of the interactions between plants and humans. Students will use the scientific method to investigate the ecological and biological traits of plants, how these traits have shaped multicultural human use, and how plants have been affected by humans. Topics include plant anatomy, structure, and reproduction; the role of biodiversity in natural and cultivated

systems; plant evolution under domestication; sustainable use of resources; ethical issues surrounding plant use; and comparison of plant use by various cultures for food, medicine, shelter, and dyes. Laboratory topics may include plant identification, experimental investigation of medicinal and food value of selected plants, traditional preparation of selected plants, plant structure and anatomy, and analysis of plant fibers and dyes. Field trips may be required.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- apply the scientific method to test the medicinal and food value of selected plant parts or plant extracts, and assess the scientific support for specific plant supplements.
- describe the anatomy, morphology, and function of the vegetative and reproductive plant organs, and identify vegetative modifications, flower parts, and fruit types of flowering plants.
- explain how plants have evolved under domestication, and interpret and evaluate multiple lines of evidence connecting domesticated plants to their wild relatives.
- compare and contrast uses of plants from many cultures (including, but not necessarily limited to modern and indigenous African, Eurasian, and North and South American societies) and relate the uses to the ecological constraints on the environment.
- use dichotomous keys to identify native plants, describe the ethnobotanical significance of native plants, and prepare herbarium specimens to document specimens.
- research human interactions with the environment, and recommend sustainable practices that could be practically implemented.

BIOL 350 Environmental Biology

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Transferable:	CSU; UC
General Education:	AA/AS Area IV; CSU Area B2; IGETC Area 5B
Catalog Date:	June 1, 2020

This course provides an overview of ecosystems and natural resources. Major topics covered include scientific methods, data interpretation, ecological principles, ecosystem functioning, conservation biology, resource use (including historical and cultural values) and management, and human-caused environmental impacts (e.g. pollution). This course provides the background needed to understand major global and regional issues such as acid rain, global warming, hazardous waste disposal, deforestation, ecological sustainability, and endangered species recovery. BIOL 350 is a general education course that is especially useful for Environmental Technology, Environmental Sciences, Ecology, Recreation, Education, and Political Science majors. You cannot enroll in this course if you have passed ENVT 304. One off-campus field trip is required. Students may be required to drive themselves and there may be entrance fees to certain field trip locations. Attendance at public meetings, and/or a semester project may be required.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- apply the principles of ecology and conservation to the analysis of natural resource management and use.
- evaluate how the current and past world views impact local, regional, and global environmental issues.
- use the scientific method to pose questions and interpret data relevant to conservation issues.
- predict effects of consumer actions, government policies, and worldwide practices on the future sustainability and needs of society.

BIOL 380 Natural History Field Studies: Coastal Ecosystems

Units:	1
Hours:	12 hours LEC; 18 hours LAB
Prerequisite:	None.
Transferable:	CSU
Catalog Date:	June 1, 2020

This course will study the ecology and natural history of coastal ecosystems covered in the field. Animals, plants, geology, and environmental impacts unique to coastal areas will be studied and their interrelationships investigated. Assignments, field notes and appropriate exams will be an integral part of the course. Students will be responsible for providing their own lodging or camping equipment and meals. Campsites will be available. This course is ideal for anyone interested in nature, environmental topics, and the biological sciences. Teachers and resource managers seeking professional growth, and students from all academic disciplines are encouraged to take this course.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- analyze a proposed development plan and determine the potential impacts to the environment that may occur if the plan is approved.
- explore career options as a professional naturalist, park ranger, or biological technician.
- engage in a professional or non-professional teaching capacity by writing lesson plans, designing field trips, and preparing lecture presentations to teach about the significance of delicate ecosystems to human life.
- describe the economic value of the development and maintenance of refuges, preserves, and sanctuaries, and in turn make informed decisions about the importance of their existence.

BIOL 382 Natural History Field Studies: Desert Ecosystems

Units:	1
Hours:	12 hours LEC; 18 hours LAB
Prerequisite:	None.
Transferable:	CSU

Catalog Date: June 1, 2020

This course will study the ecology and natural history of desert and arid ecosystems covered in the field. Animals, plants, geology, and environmental impacts unique to desert-related areas will be studied and their interrelationships investigated. Assignments, field notes and appropriate exams will be an integral part of the course. Students will be responsible for providing their own lodging or camping equipment and meals. Campsites will be available. This course is ideal for anyone interested in nature, environmental topics, and the biological sciences. Teachers and resource managers seeking professional growth, and students from all academic disciplines are encouraged to take this course.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- analyze a proposed development plan and determine the potential impacts to the environment that may occur if the plan is approved.
- explore career options as a professional naturalist, park ranger, or biological technician.
- engage in a professional or non-professional teaching capacity by writing lesson plans, designing field trips, and preparing lecture presentations to teach about the significance of delicate ecosystems to human life.
- describe the economic value of the development and maintenance of refuges, preserves, and sanctuaries, and in turn make informed decisions about the importance of their existence.

BIOL 384 Natural History Field Study of Forest Ecosystems

Units: 1 - 4
Hours: 12 hours LEC; 18 hours LAB
Prerequisite: None.
Transferable: CSU
Catalog Date: June 1, 2020

This course will cover the ecology and natural history of forest ecosystems covered in the field. Animals, plants, geology, and environmental impacts unique to forest and mountain areas will be studied and their interrelationship investigated. Assignments, field notes and appropriate exams/quizzes will be an integral part of the course. Students will be responsible for providing their own lodging or camping equipment and meals. Campsites will be available. Additional fees for tours or transportation may also be required. This course is ideal for anyone interested in nature, environmental topics, and the biological sciences. Teachers and resource managers seeking professional growth, and students from all academic disciplines are encouraged to take this course.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- analyze a proposed development plan and determine the potential impacts to the environment that may occur if the plan is approved.
- explore career options as a professional naturalist, park ranger, or biological technician.
- engage in a professional or non-professional teaching capacity by writing lesson plans, designing field trips, and preparing lecture presentations to teach about the significance of delicate ecosystems to human life.
- describe the economic value of the development and maintenance of refuges, preserves, and sanctuaries, and in turn make informed decisions about the importance of their existence.

BIOL 386 Natural History Field Studies: Marine Ecosystems

Units: 1
Hours: 12 hours LEC; 18 hours LAB
Prerequisite: None.
Transferable: CSU
Catalog Date: June 1, 2020

This course will cover the ecology and natural history of marine ecosystems in the field. Animals, plants, geology, and environmental impacts unique to ocean areas will be studied and their interrelationships investigated. Assignments, field notes and appropriate exams/quizzes will be an integral part of the course. Students will be responsible for providing their own lodging or camping equipment and meals. Campsites will be available. This course is ideal for anyone interested in nature, environmental topics, and the biological sciences. Teachers and resource managers seeking professional growth, and students from all academic disciplines are encouraged to take this course.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- analyze a proposed development plan and determine the potential impacts to the environment that may occur if the plan is approved.
- explore career options as a professional naturalist, park ranger, or biological technician.
- engage in a professional or non-professional teaching capacity by writing lesson plans, designing field trips, and preparing lecture presentations to teach about the significance of delicate ecosystems to human life.
- describe the economic value of the development and maintenance of refuges, preserves, and sanctuaries, and in turn make informed decisions about the importance of their existence.

BIOL 388 Natural History Field Studies: River Ecosystems

Units: 1
Hours: 12 hours LEC; 18 hours LAB
Prerequisite: None.
Transferable: CSU
Catalog Date: June 1, 2020

This course will study the ecology and natural history of river ecosystems covered in the field. Animals, plants, geology, and environmental impacts unique to rivers and riparian areas will be studied and their interrelationships investigated. Assignments, field notes, and appropriate exams/quizzes will be an integral part of the course. Students will be responsible for providing their own lodging or camping equipment and meals. Campsites will be available. This course is ideal for anyone interested in nature, environmental topics, and the biological sciences. Teachers and resource managers seeking professional growth, and students from all academic disciplines are encouraged to take this course.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- analyze a proposed development plan and determine the potential impacts to the environment that may occur if the plan is approved.
- explore career options as a professional naturalist, park ranger, or biological technician.
- engage in a professional or non-professional teaching capacity by writing lesson plans, designing field trips, and preparing lecture presentations to teach about the significance of delicate ecosystems to human life.
- describe the economic value of the development and maintenance of refuges, preserves, and sanctuaries, and in turn make informed decisions about the importance of their existence.

BIOL 389 Natural History Field Studies: Wetland Ecosystems

Units:	1
Hours:	12 hours LEC; 18 hours LAB
Prerequisite:	None.
Transferable:	CSU
Catalog Date:	June 1, 2020

This course will study the ecology and natural history of wetland ecosystems covered in the field. Animals, plants, geology, and environmental impacts unique to wetland areas will be studied and their interrelationships investigated. Assignments, field notes and appropriate exams/quizzes will be an integral part of the course. Students will be responsible for providing their own lodging or camping equipment and meals. Campsites will be available. This course is ideal for anyone interested in nature, environmental topics, and the biological sciences. Teachers and resource managers seeking professional growth, and students from all academic disciplines are encouraged to take this course.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- analyze a proposed development plan and determine the potential impacts to the environment that may occur if the plan is approved.
- explore career options as a professional naturalist, park ranger, or biological technician.
- engage in a professional or non-professional teaching capacity by writing lesson plans, designing field trips, and preparing lecture presentations to teach about the significance of delicate ecosystems to human life.
- describe the economic value of the development and maintenance of refuges, preserves, and sanctuaries, and in turn make informed decisions about the importance of their existence.

BIOL 390 Natural History Field Study

Units:	0.5 - 4
Hours:	6 - 48 hours LEC; 9 - 72 hours LAB
Prerequisite:	None.
Transferable:	CSU
Catalog Date:	June 1, 2020

This course will study ecology and natural history covered in the field. Animals, plants, and geology will be studied and their interrelationships investigated. The course may be offered in the mountains, desert, or seashore and ocean. Assignments, field notes, and appropriate exams/quizzes will be an integral part of the course. Students will be responsible for providing their own lodging or camping equipment and meals. Campsites will be available. Additional fees for tours or transportation may also be required. This course is ideal for anyone interested in nature, environmental topics, and the biological sciences. Teachers and resource managers seeking professional growth, and students from all academic disciplines are encouraged to take this course.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- analyze a proposed development plan and determine the potential impacts to the environment that may occur if the plan is approved.
- explore career options as a professional naturalist, park ranger, or biological technician.
- engage in a professional or non-professional teaching capacity by writing lesson plans, designing field trips, and preparing lecture presentations to teach about the significance of delicate ecosystems to human life.
- describe the economic value of the development and maintenance of refuges, preserves, and sanctuaries, and in turn make informed decisions about the importance of their existence.

BIOL 392 Principles of Heritage Interpretation

Same As:	ANTH 392 and HIST 392
Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Transferable:	CSU
Catalog Date:	June 1, 2020

This interdisciplinary course covers the basics of interpreting historical, cultural, and natural resources to the general public. Interpretation is a communication process that forges emotional and intellectual

connections between the interests of the audience and the inherent meanings of the resource. Topics include developing an interpretive program using a thematic approach and learning program delivery techniques. Completion of this course will qualify students to apply for professional certification through the National Association for Interpretation as a Certified Interpretive Guide (CIG). This course is recommended for students interested in history, biology, anthropology, recreation, education, and communication. Not open to students who have received credit for Anthropology 392 or History 392. This course requires field trips.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- define heritage interpretation.
- demonstrate knowledge of the history, principles, and philosophy of interpretation as it is practiced in natural resource settings (parks and forests) and a variety of other settings (museums, nature centers, zoos, arboretums, planetariums, aquariums, botanical gardens, historic sites, etc...).
- compose interpretive themes, goals, and objectives.
- research, outline, and develop an interpretive presentation.

BIOL 400 Principles of Biology

Units:	5
Hours:	54 hours LEC; 108 hours LAB
Prerequisite:	CHEM 400 with a grade of "C" or better; AND Intermediate Algebra (Math 120 or the equivalent)
Advisory:	CHEM 401; AND: ENGWR 101 AND ENGRD 110 with a grade of "C" or better.
Transferable:	CSU; UC
General Education:	AA/AS Area IV; CSU Area B2; CSU Area B3; IGETC Area 5B; IGETC Area 5C
C-ID:	C-ID BIOL 190; Part of C-ID BIOL 135S
Catalog Date:	June 1, 2020

This course introduces universal biological principles, including biological molecules, enzymes, cell structure and function, biochemistry, Mendelian and molecular genetics, ecology and evolution. BIOL 400 is recommended for science majors and students in pre-professional programs. Goggles and a scientific or 4 function calculator are required (programmable or cell phone calculators are NOT allowed).

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- formulate hypotheses, propose and conduct scientific tests of these hypotheses utilizing basic biological laboratory skills, and organize, evaluate and interpret biological data.
- identify the structural characteristics of biological molecules and cellular organelles and relate these features to their functions in cells and organisms.
- explain how cells obtain and use energy, how metabolism and movement are conducted and regulated, and how prokaryotic and eukaryotic cells differ in structure.
- explain the underlying mechanisms of heredity and genetic change, how these mechanisms allow for evolution, natural selection and adaptation, and how biological evolution explains the adaptation, diversity, unity and history of life.
- identify the abiotic and biotic factors, including human activities, that influence the abundance and distribution of organisms, the structure of biological communities, and the functioning of ecosystems.

BIOL 410 Principles of Botany

Units:	5
Hours:	54 hours LEC; 108 hours LAB
Prerequisite:	BIOL 400 with a grade of "C" or better
Advisory:	ENGWR 101 and MATH 120 with grades of "C" or better
Transferable:	CSU; UC
General Education:	AA/AS Area IV; CSU Area B2; CSU Area B3; IGETC Area 5B; IGETC Area 5C
C-ID:	C-ID BIOL 155; Part of C-ID BIOL 135S
Catalog Date:	June 1, 2020

This course introduces the biology of plants, fungi, cyanobacteria, and algae. Topics covered include the morphology, anatomy, physiology, development, classification, evolution, and ecology of botanical organisms and other non-botanical organisms traditionally included in an introductory botany course for biology majors. Students may be required to purchase eye protection and disposable gloves. Additionally, students may be required to provide their own transportation to field trip sites.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate knowledge of the morphology, anatomy, physiology, development, classification, ecology, and evolution of non-metazoan organisms.
- apply laboratory skills to solve biological problems of a botanical, ecological, or evolutionary nature.
- integrate botanical knowledge with knowledge gained from previous biology courses.
- evaluate the design of laboratory experiments performed in class, and those published in peer-reviewed literature; and suggest reasonable improvements or modifications.

BIOL 420 Principles of Zoology

Units:	5
Hours:	54 hours LEC; 108 hours LAB
Prerequisite:	BIOL 400 with a grade of "C" or better

Advisory:	ENGWR 101 with a grade of "C" or better
Transferable:	CSU; UC
General Education:	AA/AS Area IV; CSU Area B2; CSU Area B3; IGETC Area 5B; IGETC Area 5C
C-ID:	C-ID BIOL 150; Part of C-ID BIOL 135S
Catalog Date:	June 1, 2020

This course is part of a three-semester sequence in general biology for biology majors. Topics include zoology with particular emphasis on comparative anatomy and physiology of vertebrates and invertebrates. The basic principles of evolution, taxonomy, embryology, morphology, physiology, behavior and ecology will be covered. Students may be required to purchase eye protection and disposable gloves. Field trips scheduled outside of class time may be required. Additionally, students may be required to provide their own transportation to field trip sites.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- analyze adaptations to environmental pressures and the evolutionary causes of the diversity and unity of animal life.
- synthesize and analyze major patterns of animal classification and taxonomy and describe the features of major animal phyla.
- differentiate anatomical structures and describe their physiological functions.
- formulate hypotheses, design investigation methods, collect and analyze data, and evaluate these elements of others' work, using appropriate scientific methodology.

BIOL 430 Anatomy and Physiology

Units:	5
Hours:	54 hours LEC; 108 hours LAB
Prerequisite:	CHEM 305 with a grade of "C" or better
Advisory:	BIOL 310 and ENGWR 101, or placement through the assessment process.
Transferable:	CSU; UC
General Education:	AA/AS Area IV; CSU Area B2; CSU Area B3; IGETC Area 5B; IGETC Area 5C
C-ID:	Part of C-ID BIOL 115S
Catalog Date:	June 1, 2020

This is an introductory course in which the basic principles of human anatomy and physiology are presented in an integrated fashion. This course covers anatomical terminology, basic organic chemistry, histology, and the integumentary, skeletal, muscular, and nervous systems. Both BIOL 430 and BIOL 431 must be taken to study all of the major body systems. Purchase of personal protective equipment including lab coats, safety glasses, and disposable gloves is required.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- evaluate the unique and overlapping roles of each body system in promoting necessary life functions and maintaining homeostasis, and assess how lifestyle choices, environmental conditions, and genetics impact role performance.
- generate and interpret oral and written communication about the human body using knowledge of anatomy and physiology terminology and graphics.
- analyze novel or complex scenarios and collaborate in creative problem solving using knowledge of the concept of complementarity of form and function and of how the body operates and is regulated from the cellular to the organismal level.
- evaluate anatomy and physiology related information from various sources and apply findings to decision making.
- differentiate structural elements, including natural anatomic variations and patterns of organization, and analyze physiologic conditions, using appropriate laboratory methods.

BIOL 431 Anatomy and Physiology

Units:	5
Hours:	54 hours LEC; 108 hours LAB
Prerequisite:	BIOL 430 with a grade of "C" or better
Advisory:	ENGWR 101, or placement through the assessment process.
Transferable:	CSU; UC
General Education:	CSU Area B2; CSU Area B3; IGETC Area 5B; IGETC Area 5C
C-ID:	Part of C-ID BIOL 115S
Catalog Date:	June 1, 2020

This is an introductory course in which the basic principles of human anatomy and physiology are presented in an integrated fashion. This course covers the circulatory, respiratory, urinary, immune, digestive, endocrine, and reproductive systems. Both BIOL 430 and BIOL 431 must be taken to study all of the major body systems. Purchase of personal protective equipment including lab coats, safety glasses, and disposable gloves is required.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate higher levels of mastery of the following student learning outcomes begun in BIOL 430.
- generate and interpret oral and written communication about the human body using knowledge of anatomy and physiology terminology and graphics.
- analyze novel or complex scenarios and collaborate in creative problem solving using knowledge of the concept of complementarity of form and function and of how the body operates and is regulated from the cellular to the organismal level.
- evaluate anatomy and physiology related information from various sources and apply findings to decision making.
- differentiate structural elements, including natural anatomic variations and patterns of organization, and analyze physiologic conditions, using appropriate laboratory methods.
- evaluate the unique and overlapping roles of each body system in promoting necessary life functions and maintaining homeostasis, and assess how lifestyle choices, environmental conditions, and

BIOL 439 Human Cadaver Dissection

Units:	1
Hours:	12 hours LEC; 18 hours LAB
Prerequisite:	BIOL 430 and 431 with grades of "C" or better
Transferable:	CSU
Catalog Date:	June 1, 2020

The Human Cadaver Dissection course is a one-unit, intensive course for nursing, medical, chiropractic, physical therapy, sonography, or other health-related majors. Using a regional approach, students will study the structure of the human body through the dissection of cadavers. Students will gain experience in dissection techniques, more fully understand relationships between organs, and discuss physiological concepts as they pertain to anatomy. Maintaining a detailed lab notebook is an integral part of the course. A lab coat and safety glasses with side splash protection will be required.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- develop dissection techniques. Identify and utilize appropriate dissection technique and tools. Perform advanced dissections to prepare the specimens for study in other Biology courses.
- identify anatomical structures and explore relationships between structure and function. Investigate human anatomy from superficial to deep structures. Discuss physiological concepts based on anatomical relationships.

BIOL 440 General Microbiology

Units:	4
Hours:	54 hours LEC; 72 hours LAB
Prerequisite:	CHEM 305 or CHEM 400 with a grade of "C" or better, or equivalent high school chemistry.
Advisory:	BIOL 307, BIOL 310, and ENGWR 101
Transferable:	CSU; UC
General Education:	AA/AS Area IV; CSU Area B2; CSU Area B3; IGETC Area 5B; IGETC Area 5C
Catalog Date:	June 1, 2020

This course introduces the concepts of microbiology with an emphasis on forms, modes of growth, cell specialization, mutual, commensal and parasitic relationships of bacteria, fungi, molds, protozoa and viruses. Topics will be correlated with medical and health applications to animals and human beings. Students are required to purchase a laboratory coat, microscope slides, safety glasses, disposable gloves and a laboratory notebook. Field trips and/or a semester project may be required.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- apply microbiological concepts to current issues in human health, biotechnology, and infectious diseases.
- analyze how the human body interacts with various microorganisms through symbiotic relationships and defense mechanisms.
- evaluate the role various microbes play in epidemiology and analyze methods used to control the spread of such disease.
- employ appropriate lab techniques to aseptically culture, transfer, observe, identify and manipulate microorganisms.

BIOL 442 General Microbiology and Public Health

Units:	5
Hours:	54 hours LEC; 108 hours LAB
Prerequisite:	CHEM 305, 306, or 400 with a grade of "C" or better; Or one year high school chemistry with a laboratory with a grade "C" or better.
Advisory:	BIOL 307, BIOL 310, or ENGWR 101, or placement through the assessment process.
Transferable:	CSU; UC
General Education:	AA/AS Area IV; CSU Area B2; CSU Area B3; IGETC Area 5B; IGETC Area 5C
Catalog Date:	June 1, 2020

This course provides a survey of bacteria, viruses, fungi, protozoa, and helminths that are associated with human infectious diseases. It examines their cellular and molecular structure, physiology, metabolism, and genetics. Laboratory work introduces methods for cultivating and characterizing microorganisms. Topics will be related to global public health issues both past and present. Students are required to purchase a laboratory coat, microscope slides, safety glasses, disposable gloves and a laboratory notebook. Field trips and/or a semester project may be required.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- apply microbiological concepts to current issues in human health, biotechnology, and infectious diseases.
- analyze how the human body interacts with various microorganisms through symbiotic relationships and defense mechanisms.
- evaluate how physical and chemical methods can be used to control microbial growth.
- conduct experiments involving culture and transfer of microbes, microscopy, biochemical tests, DNA techniques, and diagnostic media.
- evaluate the impact of various infectious diseases, including descriptions of the causative agent(s), signs and symptoms, pathogenesis, virulence factors, epidemiology, diagnosis, treatment, and prevention.

BIOL 495 Independent Studies in Biology

Units:	1 - 3
Hours:	54 - 162 hours LAB
Prerequisite:	None.
Transferable:	CSU
Catalog Date:	June 1, 2020

BIOL 498 Work Experience in Biology

Units:	1 - 4
Hours:	60 - 300 hours LAB
Prerequisite:	None.
Enrollment Limitation:	Student must be in a paid or non-paid internship, volunteer opportunity, or job related to career interests.
Advisory:	ENGWR 101 or ESLW 320
Transferable:	CSU
General Education:	AA/AS Area III(b)
Catalog Date:	June 1, 2020

This course provides students with opportunities to develop marketable skills in preparation for employment or advancement within the field of Biology. Course content will include understanding the application of education to the workforce; completing required forms which document the student's progress and hours spent at the work site; and developing workplace skills and competencies. During the semester, the student is required to attend orientation. Students must complete 75 hours of related paid work experience, or 60 hours of related unpaid work experience, for one unit. An additional 75 hours of related paid work experience or 60 hours of related unpaid work experience is required for each additional unit. The course may be taken for a maximum of 16 units. Students should have access to a computer, the Internet, and some computer media such as a USB drive to store data files. Online students must have an email account. Only one Work Experience course may be taken per semester.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- apply industry knowledge and theoretical concepts in a field of study or career as written in the minimum 3 learning objectives created by the student and his/her employer or work site supervisor at the start of the course.
- manage personal career plans and decision making using industry & workforce information and online resources.
- behave professionally and ethically, exhibit adaptability, initiative, self-awareness and self-management as needed.
- exhibit effective communication, collaboration, and leadership skills at work with consideration to workplace dynamics and social and diversity awareness.
- demonstrate critical and creative thinking skills as they apply to the workplace.

BIOL 499 Experimental Offering in Biology

Units:	0.5 - 4
Prerequisite:	None.
Transferable:	CSU
Catalog Date:	June 1, 2020

Biology - Field Studies (BIOLFS) Courses

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