BIO 2.2 Course Outline as of Fall 2024

CATALOG INFORMATION

Dept and Nbr: BIO 2.2 Title: FUND BIO:EVO, GENET, ZOO
Full Title: Fundamentals of Biology (Evolution, Genetics, and Zoology)
Last Reviewed: 8/14/2023

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	5.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	5.00	Lab Scheduled	6.00	8	Lab Scheduled	105.00
		Contact DHR	0		Contact DHR	0
		Contact Total	9.00		Contact Total	157.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00 Total Student Learning Hours: 262.50

Title 5 Category:	AA Degree Applicable
Grading:	Grade Only
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	BIO 2A

Catalog Description:
Students will be introduced to evolution, genetics, and the phylogeny of animals with emphasis on development, morphology, physiology, and behavior. Field trips taken. Intended for students majoring in biological sciences, pre-medical, or related pre-professional programs.

Prerequisites/Corequisites:
Course Completion of BIO 2.1

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: Students will be introduced to evolution, genetics, and the phylogeny of animals with emphasis on development, morphology, physiology, and behavior. Field trips taken. Intended for students majoring in biological sciences, pre-medical, or related pre-professional programs. (Grade Only)
Prerequisites/Corequisites: Course Completion of BIO 2.1
Recommended:

Limits on Enrollment:
Transfer Credit: CSU;UC.
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**		Effective:	Inactive:
	C	Natural Sciences	Fall 2025	
	L5	Physical and Biological Sciences		
	C	Natural Sciences	Spring 1982	Fall 2025
CSU GE:	**Transfer Area**		Effective:	Inactive:
	B2	Life Science	Fall 1981	
	B3	Laboratory Activity		
IGETC:	**Transfer Area**		Effective:	Inactive:
	5B	Biological Sciences	Fall 1981	
	5C	Fulfills Lab Requirement		

CSU Transfer:	Transferable	Effective:	Spring 1982	Inactive:
UC Transfer:	Transferable	Effective:	Spring 1982	Inactive:

CID:
CID Descriptor: BIOL 150 Zoology / Animal Diversity and Evolution
SRJC Equivalent Course(s): BIO2.2

Certificate/Major Applicable:
Major Applicable Course

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Independently apply the scientific method, biological knowledge, and critical thinking skills to the investigation and evaluation of natural phenomena, and summarize results in written scientific format.
2. Perform laboratory techniques, including dissection and microscopy, with a high level of expertise without assistance or instruction.
3. Describe underlying mechanisms of evolution leading to adaptations and patterns in animal diversity.
4. Explain the mechanisms of animal physiological systems (nervous, muscular, digestive, and circulatory).

Objectives:
At the conclusion of this course, the student should be able to:
1. Explain the principles of heredity, including post-Mendelian genetics and the chromosomal basis of inheritance.
2. Define the basic principles of evolutionary theory and be able to apply them to diversity and evolution of all life forms.
3. Integrate the concepts of genetics with the processes of evolution and phylogeny.
4. Evaluate phylogenetics using cladistics as hypotheses for evolutionary relationships.

5. Describe processes of population evolution.
6. Describe the system of classification for major groups of animals and be able to classify a selected number of animals.
7. Describe the basic anatomical systems of animals and explain the relationship between their structure and their physiological and behavioral functions.
8. Explain basic physiological processes of animals such as thermoregulation, circulation, gas exchange, movement, nutrient processing, osmoregulation, chemical communication, and nervous integration.
9. Relate animal behavior to evolution and ecology.
10. Define the basic steps of the scientific method and apply these methods in experimental laboratory exercises, generating lab reports in scientific paper format.

Topics and Scope:

I. Introduction
- A. Levels of biological organization
- B. Scientific method
- C. The use of biostatistics in analysis of data

II. Post-Mendelian Genetics
- A. Relationship of genotype and phenotype
- B. Effects of environment on genetic expression

III. Evolution
- A. Population evolution
- B. Evidence
- C. Mechanisms
- D. Biological and other species concepts
- E. Macroevolution
  1. Speciation
  2. Reproductive isolating mechanisms
  3. Adaptive radiation

IV. Animal Diversity
- A. Phylogeny and adaptation
- B. Systematics and cladistics
- C. Protozoa and the origin of animals

V. Animal Anatomy and Physiology
- A. Animal architecture and design
- B. Membranes and their physiological roles
- C. Anatomy and physiology
  1. Circulation, respiration, excretion, and digestion
  2. Metabolism, thermoregulation, and energetics
  3. Locomotion, protection, and support
  4. Neural and endocrine systems
  5. Reproduction and development of animals

VI. Animal Behavior

VII. Laboratory Exercises
- A. Animal taxonomy and cladistics
- B. Diversity and phylogeny of major animal phyla
- C. Reproduction and development
- D. Functional morphology and locomotion
- E. Field biology

Assignment:

Lecture-Related Assignments:
1. Exams (3-4)
2. Quiz(zes) (0-10)

Lab-Related Assignments:
1. Scientific writing (2-4), may include:
   A. Calculation
   B. Graphing
   C. Data analysis
   D. Literature review
2. Lab practical exams (3-4)
3. Quiz(zes) (0-20)
4. Lab skill demonstrations (1-4), such as:
   A. Dissections
   B. Microscopy
   C. Insect collection

Lecture- and Lab-Related Assignments:
1. Weekly reading in text and other sources (40-80 pages/week)
2. Oral presentations relating to course topic(s) (0-3)
3. Field journaling
4. Exercise(s) in cladistics and/or genetic analysis (0-5)

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Scientific writing; field journaling	Writing 10 - 30%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Exercise(s) in cladistics and/or genetic analysis	Problem solving 5 - 20%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Lab skill demonstrations	Skill Demonstrations 5 - 20%

Exams: All forms of formal testing, other than skill performance exams.

Lecture and lab exams and quizzes	Exams 50 - 80%

Other: Includes any assessment tools that do not logically fit into the above categories.

Oral presentation; active participation in class, including field trips	Other Category 0 - 15%

Representative Textbooks and Materials:
Campbell Biology. 12th ed. Urry, Lisa and Cain, Michael and Wasserman, Steven and Minorsky, Peter and Orr, Rebecca. Pearson. 2021.
Animal Diversity. 9th ed. Hickman, Cleveland and Keen, Susan and Larsan, Allan and Eisenhour, David. MCG. 2021.
Integrative Principles of Zoology. 18th ed. Hickman, Cleveland and Keen, Susan and Eisenhour, David and Larson, Allan and l'Anson, Helen. MCG. 2020.
Instructor prepared materials and lab manual