BIOL 0033 - INTRODUCTION TO ZOOLOGY

Catalog Description

Advisory: Eligibility for ENGL 1A
Hours: 108 (54 lecture, 54 laboratory)
Description: A survey of the animal kingdom emphasizing the evolution, structure, function, ecology, and natural history of major groups of animals. Designed for nonscience majors. (CSU, UC-with unit limitation)

Course Student Learning Outcomes

- CSLO #1: Evaluate the similarities and differences between single- and multi-cellular organisms.
- CSLO #2: Compare and contrast the basic protostome, deuterostome, coelomate, pseudocoelomate, and acoelomate animal body plans.
- CSLO #3: Evaluate the key evolutionary adaptations exhibited by the major animal phyla.
- CSLO #4: Analyze the ways in which humans and other animals interact with each other and their environment.

Effective Term

Fall 2022

Course Type

Credit - Degree-applicable

Contact Hours

108

Outside of Class Hours

108

Total Student Learning Hours

216

Course Objectives

Course objectives for lecture and lab are linked to items listed in the lecture and lab course content outline, respectively (in parentheses).
Lecture Objectives
1. Outline general steps of scientific discovery; distinguish between hypothesis, prediction, and theory. (#1)
2. Identify the general properties of living organisms, such as reproduction, evolution, etc. (#1, #2, #3)
3. Identify and describe the major developmental patterns of animals, such as protostomes vs. deuterostomes, diploblasty vs. triploblasty, and acoelomate vs. pseudocoelomate vs. coelomate body plans. (#3, #4, #5)
4. Explain that the classification of organisms is based on shared features, including developmental, genetic, physiological, and structural features. (#1, #3, #4, #5)
5. List and/or describe the key characteristics of the major taxa of animals. (#7 - #18)
6. Formulate hypotheses that explain the conditions that likely led to major evolutionary adaptations, such as multicellularity, segmentation, jaws, terrestriality, and flight. (#6, #7, #11, #15-#18)

7. Describe the impacts that animals have on humans, distinguishing between positive, neutral, and detrimental interactions such as parasitism, pollination, diseases vectors, etc. (#7-#20)
8. Investigate the impacts that humans have on other animal species, such as predation, habitat loss, climate change, domestication, etc. (#7-#20)
9. Evaluate the content of textbook chapters and/or articles about a zoological topic, synthesize and/or critique that information in a short paper, essay, or exam question. (#1-#20)
Laboratory Objectives
1. Use basic laboratory techniques to investigate the response of animals to various environmental stimuli and to dissect specimens to better understand their physiological and structural adaptations. (#1, #8-#12, #22)
2. Identify and/or diagram the major reproductive and developmental patterns of animals, such as acoelomate vs. pseudocoelomate vs. coelomate body plans, etc. (#4, #9)
3. Compare/contrast the general features of the major animal phyla. (#5-#16)
4. Evaluate the impact of microevolutionary processes on populations. (#3)
5. Investigate the adaptations that animals have to aquatic environments. (#6-#8, #13-#17)
6. Investigate the adaptations that animals have to terrestrial (and aerial) environments. (#11-#14, #16, #18-#21)
7. Analyze the biodiversity of an ecosystem, describe the interactions that occur in ecosystems and evaluate the stability of different systems. (#1-#2, #22)

General Education Information

- Approved College Associate Degree GE Applicability
  - AA/AS - Life Sciences
  - AS - Life Science Lab
- CSU GE Applicability (Recommended-requires CSU approval)
  - CSUGE - B2 Life Science
  - CSUGE - B3 Lab Activity
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)
  - IGETC - 5B Biological Science
  - IGETC - 5C Laboratory Science

Articulation Information

- CSU Transferable
- UC Transferable

Methods of Evaluation

- Classroom Discussions
  - Example: To assess lecture course objective #6, "Formulate hypotheses that explain the conditions that likely led to major evolutionary adaptations, such as multicellularity, segmentation, jaws, terrestriality, and flight", students might participate in a classroom discussion about the two major hypotheses explaining the evolution of multicelled animals. Students could be evaluated based on participation, accuracy of information, and completeness of information.
- Essay Examinations
  - Example: To assess lecture course objective #6, "Formulate hypotheses that explain the conditions that likely led to major evolutionary adaptations, such as multicellularity, segmentation,

jaws, terrestriality, and flight", students might answer an essay exam question that asks them to differentiate between the two major hypotheses explaining the evolution of multicelled animals. Students could be evaluated based on accuracy and completeness of their answer.

- Objective Examinations
  - Example: To assess lab course objective #3, "Identify and describe the general features of the major animal phyla", students might answer an objective quiz or exam question asking them to identify the correct phylum of a specimen given the presence of a particular set of diagnostic features. Students could be evaluated based on accuracy of answer.
- Problem Solving Examinations
  - Example: To assess lab course objective #3, "Compare/contrast the general features of the major animal phyla", students might be given an unknown specimen and asked to identify the correct phylum of that specimen and to describe (either verbally or in writing) the diagnostic features that warrant that taxonomic designation. Students could be evaluated based on their accuracy and completeness in identifying the diagnostic characteristics and their accuracy in using those characteristics to correctly identify the taxon.
- Projects
  - Example: To assess lab course objective #4, "Evaluate the impact of microevolutionary processes on populations," students might complete a project, either individually or in groups, that includes the collection and analysis of data from an activity that simulates the impacts of natural selection, genetic drift, and mutation, the compilation of this information in written or graphical form that documents that data and evaluates the relative contributions of these various microevolutionary mechanisms, and the sharing of this information in an oral classroom presentation. Students could be evaluated based on the completeness of the project, participation in all aspects of the project, accuracy of information presented, and overall quality of the project.
- Reports
  - Example: To assess lab course objective #4, "Evaluate the impact of microevolutionary processes on populations," students might collect and analyze data in an activity that simulates the impacts of natural selection, genetic drift, and mutation and document this information in a written report that evaluates relative contributions of these various microevolutionary mechanisms. Students could be evaluated based on quality of writing, accuracy and completeness of information.

Repeatable

No

Methods of Instruction

- Laboratory
- Lecture/Discussion
- Distance Learning

Lab:

1. To address the lab course objective #3, "Compare/contrast the general features of the major animal phyla", the instructor might explain the process needed to dissect roundworm and annelid specimens to compare their internal and external anatomy. Students will then be able to successfully dissect laboratory specimens enabling them to compare and contrast anatomical structures.

2. To address lab course objective #1, "Use basic laboratory techniques to investigate the response of animals to various environmental stimuli and to dissect specimens to better understand their physiological and structural adaptations", the instructor ask students to develop, either individually or in groups, a zoology experiment based in the hypothetico-deductive scientific method.

Lecture:

1. To address the lecture course objective #3, "Identify and describe the major developmental patterns of animals, such as protostomes vs. deuterostomes, diploblasty vs. triploblasty, and acoelomate vs. pseudocoelomate vs. coelomate body plans", the instructor might prepare a lecture that explains the process of embryonic development and how it follows one of several basic developmental pathways; the lecture could include examples of animals with these various body plans, supplemented by images and/or videos where appropriate. Students would then be able to successfully answer a homework or exam question about the similarities and differences between the various animal developmental pathways.

2. To address lecture course objective #8, "Investigate the impacts that humans have on other animal species, such as predation, habitat loss, climate change, domestication, etc.", the instructor might lead an in-class discussion about these impacts.

Distance Learning

1. To address lecture course objective #4, "Explain that the classification of organisms is based on shared features, including developmental, genetic, physiological, and structural features.", the instructor might prepare a lecture to post online that explains the tenets of the taxonomic classification system, providing examples. This online lecture might include text, audio (with transcript), and/or captioned video presentation of information. The students will be listening and/or watching this lecture, taking notes, asking clarifying questions (via chat, video conferencing, email, etc.), making connections to previous lecture topics and/or material learned in previous classes, and applying this information to answer questions in homework assignments and/or lab activities that ask them to think critically about analogous and homologous features and their impact on classification. A student can demonstrate mastery of this objective in multiple ways. One example is to successfully answer an online multiple choice or essay exam question that asks the student to identify the various types of features that can be used in organismal classification. Another example is to provide students with images of a group of hypothetical organisms, such as Caminalcules, and ask students to correctly classify them into genera based on homologous features. Students could use the LMS collaboration or discussion board features to work together to describe the homologous features found in various organisms and determine how they would be classified.

2. To address lecture course objective #7, "Describe the impacts that animals have on humans, distinguishing between positive, neutral, and detrimental interactions such as parasitism, pollination, diseases vectors, etc.", the instructor might guide students in an online discussion of the various forms of symbiotic interactions and disease transmissions, asking students to consider specific examples of species and their adaptations.

Typical Out of Class Assignments
Reading Assignments

1. Read the section on cnidarians in the textbook and compare their general body plan with that of poriferans. 2. Read a published scientific paper or article about a zoological topic, such as function of the echinoderm water vascular system, and be prepared to discuss the topic in class.

Writing, Problem Solving or Performance

1. Write a 2-4 page paper about a zoological topic, such as the similarities and differences between Mullerian and Batesian mimicry. 2. Answer an essay question on an exam about a topic covered in class, such as distinguishing between the various reproductive strategies exhibited by mammals and the advantages and disadvantages of each.

Other (Term projects, research papers, portfolios, etc.)
Required Materials

- Zoology
  - Author: Miller and Tupper
  - Publisher: McGraw-Hill
  - Publication Date: 2019
  - Text Edition: 11th
  - Classic Textbook?:
  - OER Link:
  - OER:
- Animal Diversity
  - Author: Hickman, Keen, Larson, Eisenhour
  - Publisher: McGraw-Hill
  - Publication Date: 2018
  - Text Edition: 8th
  - Classic Textbook?:
  - OER Link:
  - OER:
- Biology 33 Lab Manual
  - Author: Carroll and Skillen
  - Publisher: Sierra Publishing
  - Publication Date: 2019
  - Text Edition: 8th
  - Classic Textbook?:
  - OER Link:
  - OER:
- Laboratory Studies for Animal Diversity
  - Author: Hickman and Kats
  - Publisher: McGraw-Hill
  - Publication Date: 2018
  - Text Edition: 8th
  - Classic Textbook?:
  - OER Link:
  - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.