

# BIOL 0035 - INTRODUCTION TO ENTOMOLOGY

## Catalog Description

Advisory: Eligibility for ENGL 1A

Hours: 54 lecture

Description: Introduction to the general ecology, evolution, and physiology of insects, with examples from the insect fauna of northern California. Describes the key relationships (medical, agricultural, etc.) insects have with humans. Recommended for general education students or other majors interested in entomology. (CSU, UC)

## Course Student Learning Outcomes

- CSLO #1: Outline the key characteristics and evolutionary adaptations found in insects.
- CSLO #2: Identify and describe examples from the major orders of insects.
- CSLO #3: Investigate the interactions and ecological relationships between humans and insects.

## Effective Term

Fall 2022

## Course Type

Credit - Degree-applicable

## Contact Hours

54

## Outside of Class Hours

108

## Total Student Learning Hours

162

## Course Objectives

Course objectives are linked to items listed in the course content outline (in parentheses)

1. Outline the general scope of entomology, distinguishing it from other biological disciplines (#1)
2. Describe the evolution of insects; outline the major drivers of natural selection in insects (#2)
3. List the basic characteristics of insects, outline their general adaptations and list the major taxonomic groups (#1, #3, #4)
4. Identify commonly found representatives of major taxonomic groups of insects that can be found in northern California (#4, #11)
5. Analyze the unique aspects of insect anatomy and physiology, including the adaptive value of metamorphosis (#2, #3, #4, #5)
6. Synthesize the current understanding of the evolution of social insects; outline the advantages and disadvantages of this behavior (#6)
7. Investigate how modern agricultural practices are affecting insect-plant interactions (#7, #8, #10)

8. Evaluate the current human health risks posed by insects and how effectively we are responding to those risks (#9, #10)

## General Education Information

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

## Articulation Information

- CSU Transferable
- UC Transferable

## Methods of Evaluation

- Classroom Discussions
  - Example: To assess course objective #2, "Describe the evolution of insects; outline the major drivers of natural selection in insects", students might participate in a classroom discussion about the ecological pressures that led to the evolution and radiation of terrestrial insects. Students could be evaluated based on participation, accuracy of information, and completeness of information.
- Essay Examinations
  - Example: To assess course objective #2, "Describe the evolution of insects; outline the major drivers of natural selection in insects", students might answer an essay exam question that asks them to describe the major factors affecting natural selection among insects. Students could be evaluated based on accuracy and completeness of their answer.
- Objective Examinations
  - Example: To assess course objective #5, "Analyze the unique aspects of insect anatomy and physiology, including the adaptive value of metamorphosis", students might answer an objective quiz or exam question asking them to identify the various forms of insect metamorphosis that can occur and the conditions under which each form is most adaptive. Students could be evaluated based on accuracy of answer.
- Projects
  - Example: To assess course objective #5, "Analyze the unique aspects of insect anatomy and physiology, including the adaptive value of metamorphosis", students might complete a project, either individually or in groups, that includes the compilation of information about a unique aspect of insect anatomy or physiology, a visual presentation this information 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 course objective #2, "Describe the evolution of insects; outline the major drivers of natural selection in insects", students might research information about the differentiation of insects from other arthropods and the ecological pressures that led to the evolution and radiation of terrestrial insects and document this information in a written

report. Students could be evaluated based on quality of writing, accuracy and completeness of information.

## Repeatable

No

## Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. To address course objective #7, "Investigate how modern agricultural practices are affecting insect-plant interactions", the instructor might prepare a lecture (supplemented by images and/or video) that explains how insects interact with plants, how modern agriculture has changed the plant communities that occur across landscapes, and how insect populations are responding to these changes. Students will then be able to successfully complete a homework assignment about the various types of insect-plant interactions and their impacts on agriculture.
2. To address course objective #8, "Evaluate the current human health risks posed by insects and how effectively we are responding to those risks", the instructor might lead an in-class discussion about the various diseases transmitted through insect vectors, the control methods available, and the rates of occurrence and transmission of these diseases.

Distance Learning

1. To address lecture course objective #2, "Describe the evolution of insects; outline the major drivers of natural selection in insects", the instructor might prepare a lecture to post online that explains the evolutionary pathway and major selective forces that led to modern insects, providing examples of particular groups and/or species. This online lecture might include text, audio (with transcript), and/or captioned video presentation of information. After reviewing this lecture, students will be able to successfully answer quiz or exam questions about the types of selective forces that led to the evolution of modern insect biodiversity.
2. To address lecture course objective #6, "Synthesize the current understanding of the evolution of social insects; outline the advantages and disadvantages of this behavior", the instructor might guide students in an online discussion of various examples of social insects, asking students to consider specific examples of species that illustrate this behavior and the costs and benefits accrued to these species.

## Typical Out of Class Assignments Reading Assignments

1. Read the chapter in the textbook about the medical impact of insects as vectors of disease and be prepared to discuss in class.
2. Read a published scientific paper about a topic, such as the evolutionary origins of social insects, and be prepared to discuss the topic in class.

## Writing, Problem Solving or Performance

1. Write a 2-4 page paper about an entomological topic, such as the reproductive adaptations exhibited by a group of insects or a life history account for a local insect species.
2. Answer an essay question on an exam about a topic covered in class, for example, distinguishing between

the various sensory systems found in insects and how these systems contribute to the adaptation and survival of the organisms.

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

- The Insects: An Outline of Entomology
  - Author: Gullan & Cranston
  - Publisher: Wiley
  - Publication Date: 2014
  - Text Edition: 5th
  - Classic Textbook?:
  - OER Link:
  - OER:
- How to Know the Insects
  - Author: Bland & Jaques
  - Publisher: Waveland
  - Publication Date: 2010
  - Text Edition: 3rd
  - Classic Textbook?:
  - OER Link:
  - OER:
- Insights from Insects: What Bad Bugs Can Teach Us
  - Author: Waldbauer
  - Publisher: Prometheus
  - Publication Date: 2005
  - Text Edition: 1st
  - Classic Textbook?:
  - OER Link:
  - OER:
- Bugs Rule
  - Author: Crenshaw & Redak
  - Publisher: Princeton University Press
  - Publication Date: 2014
  - Text Edition: 1st
  - Classic Textbook?:
  - OER Link:
  - OER:
- California Insects
  - Author: Powell and Hogue
  - Publisher: UC Press
  - Publication Date: 1980
  - Text Edition: 1st
  - Classic Textbook?:
  - OER Link:
  - OER:

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