

BIO 44300: INSECT ECOLOGY
FALL TERM 2010

Designation: Elective

Lectures: Tuesday, Thursday 1:00-2:30 p.m.

Laboratory: Thursday, 2:45–5:45 p.m.

Location: American Museum of Natural History Invertebrate Zoology Classroom

Hours/Credits

6 hours per week, 4 credits; 3 hours lecture, 3 hours lab

Course Coordinators

DR. AMY BERKOV

Marshak 811 Office hours TBA (Berkov@sci.ccny.cuny.edu)

DR. DAVID LOHMAN

Marshak 730 Office hours TBA (dlohman@ccny.cuny.edu)

Catalog Description

Introduction to the diversity and biology of major insect groups, focusing on the role of insects and other arthropods in natural ecosystems and their role in human affairs.

Prerequisite: Bio 22800 (Ecology and Evolution) or permission of instructor

Course objectives

In terms of number of individuals, species richness, and sheer biomass, insects are the dominant multicellular animals on land. More than 60% of all described species on earth are insects, and they play a multitude of important roles in terrestrial and freshwater ecosystems as pollinators, consumers, decomposers, predators, parasites, and prey. In addition, insects are both helpful (as crop pollinators, for example) and harmful (*e.g.*, as vectors of disease) to human endeavors. This course will introduce students to the extraordinary diversity of insects and their importance in natural and anthropogenically altered landscapes.

Learning Objectives
1. Identify the major orders and families of insects and their relationships to one another
2. Describe the many roles of insects in natural ecosystems
3. Describe beneficial and detrimental roles of insects in human agriculture and medicine
4. Understand first-hand the scientific process from hypothesis generation to final written presentation of results
5. Observe organisms in nature, identify different taxa, and recognize patterns of abundance and distribution

Required text

Gullan, P.J. and P.S. Cranston. 2010. *The Insects: An Outline of Entomology*. Wiley-Blackwell. 565 pp.

Handouts

Handouts for lab exercises and class discussions will be provided or available to download via Blackboard. Please keep a folder or three ring binder for these handouts.

Support Facilities: The Departmental Resource Center is in Room J-502.

Course format

Required readings should be completed before each lecture, as they will form the basis of the lectures. Some lecture topics are not covered in the textbook. Select papers from the primary literature must be read before these lectures; these readings will be distributed shortly after the course begins. Laboratories will immediately follow Thursday lectures, and the two course field trips held during the week will consume the entire ~five hour block of time. Initial laboratories will familiarize students with handling and identifying specimens, and subsequent laboratories will focus on small group projects.

Field trips

Field trips are mandatory. Dress appropriately, including sturdy walking or hiking footwear and a raincoat or poncho (if needed). Bring a bottle of drinking water. Since there will be no make-up opportunities for these field trips, a student who misses a field trip will be given a zero if they do not have an official excuse, such as a letter from a doctor.

Grammar, spelling, and composition: Because scientists express themselves in written prose, students must use proper spelling, grammar (including punctuation), and composition. Illegible answers will be given no credit. Unintelligible sentences will be given no credit. Minor spelling and grammatical errors will result in reduced credit. Paragraphs must be composed of organized, coherent sentences. The research report must be typed.

Attendance Policy: Attendance is required. If you miss more than two lectures, laboratory periods, or field trips, you will be dropped from the course for excessive absences (WU). Lectures and laboratories begin promptly, and you must be on time. Please finish any assigned readings before class.

Grading for undergraduates	
Mid-term Exam	25 %
Final Exam	25 %
Lab Practical 1	5 %
Lab Practical 2	5 %
Field Trip Report 1	5 %
Field Trip Report 2	5 %
Research Report (3 page minimum)	20 %
Participation	10 %

WEEK 1

Thurs, 26 Aug	Lecture 1: What are arthropods and insects?
READING	Chapter 1
LAB	Introduction to laboratory techniques

WEEK 2

Tues, 31 Aug	Lecture 2: Diversity and phylogeny I
READING	Taxoboxes 1-29 (see Table of Contents)

Thurs, 2 Sept	FIELD TRIP I – Receive Field Trip Assignment 1 1 – 5:45 pm
----------------------	--

WEEK 3

Tues, 7 Sept	Lecture 3: Diversity and phylogeny II
READING	Chapter 7

Thurs, 9 Sept	No classes
----------------------	------------

Sat, 11 Sept	FIELD TRIP to Black Rock Forest
---------------------	--

WEEK 4

Tues, 14 Sept	No class (Friday schedule)
----------------------	----------------------------

Thurs, 16 Sept	Lecture 4: Evolution and biogeography
READING	Chapter 8
LAB	Recognizing major insect orders
LAB PRACTICAL	Identification of major insect orders

WEEK 5

Tues, 21 Sept	Lecture 5: Insect feeding and nutrition
READING	Chapter 3

Thurs, 23 Sept	FIELD TRIP II – Receive Field Trip Assignment 2 1 – 5:45 pm
ASSIGNMENT DUE	Exercise from Field Trip I due at 1pm

WEEK 6

Tues, 28 Sept	Lecture 6: Herbivory
READING	Chapter 11

Thurs, 30 Sept	Lecture 7: Seed predation & seed dispersal
READING	Selected readings

LAB Recognizing major insect families
LAB PRACTICAL Identification of major insect families

WEEK 7

Tues, 5 Oct **Lecture 8:** Pollination

READING Selected readings

Thurs, 7 Oct **Lecture 9:** Microbial symbionts of insects

READING Selected readings

ASSIGNMENT DUE Exercise from Field Trip II due at 1pm

LAB Introduction to group research projects

WEEK 8

Tues, 12 Oct **MIDTERM EXAM**

Thurs, 14 Oct **Lecture 10:** Spider ecology

READING Selected readings

LAB Data collection for group projects

WEEK 9

Tues, 19 Oct **Lecture 11:** Physiological adaptations to the environment

READING Chapter 2

Thurs, 21 Oct **Lecture 12:** Sensory systems and behavior

READING Chapter 4

LAB Data collection for group projects

WEEK 10

Tues, 26 Oct **Lecture 13:** Reproductive ecology

READING Chapter 5

Thurs, 28 Oct **Lecture 14:** Development and life histories

READING Chapter 6

LAB Data collection for group projects

WEEK 11

Tues, 2 Nov **No classes (that end before 4:00 pm)**

Thurs, 4 Nov **Lecture 15:** Community ecology

READING Chapter 9

LAB Analytical techniques

WEEK 12

Tues, 9 Nov **Lecture 16:** Ecosystem functioning
READING Selected Readings

Thurs, 11 Nov **Lecture 17:** Aquatic insect ecology
READING Chapter 10
LAB Writing suggestions, Data collection for group projects

WEEK 13

Tues, 16 Nov **Lecture 18:** Forest insects, succession
READING Selected Readings

Thurs, 18 Nov **Lecture 19:** Insects & human agriculture
READING Chapter 16
LAB Guided tour of the AMNH insect collection
LAB ASSIGNMENT DUE First draft of project reports due at 1pm

WEEK 14

Tues, 23 Nov **No class (To make up for Saturday field trip)**
READING Selected Readings

Thurs, 25 Nov **No class (Thanksgiving)**

WEEK 15

Tues, 30 Nov **Lecture 20:** Medical & forensic entomology
READING Chapter 15

Thurs, 2 Dec **Lecture 21:** Insect defenses
READING Chapter 14
LAB Open lab to collect additional data or discuss paper with course coordinators

WEEK 16

Mon **Lecture 22:** Insect societies
READING Chapter 12

Wed **Lecture 23:** Insect conservation
READING Selected Readings
LAB No lab
LAB ASSIGNMENT DUE Final project report due at 1pm

This schedule is subject to change at the instructors' discretion.

Relationship of course to program outcomes

The outcomes of this course reinforce these important scientific skills:

- Use spreadsheets for data analysis
- Use maps or data arrays to reveal patterns
- Use web-based search engines for literature search
- Formulate research question and testable hypothesis
- Design an experiment to test a hypothesis
- Write a lab report in the format of a scientific paper
- Display data graphically in the best format

Academic Integrity

The CUNY Policy on plagiarism says the following about plagiarism (the CUNY Policy can be found in Appendix B.3 of the CCNY Undergraduate Bulletin 2007 -2009):

“Plagiarism is the act of presenting another person’s ideas, research or writings as your own.

The following are some examples of plagiarism, but by no means is it an exhaustive list:

1. Copying another person’s actual words without the use of quotation marks and footnotes attributing the words to their source.
2. Presenting another person’s ideas or theories in your own words without acknowledging the source.
3. Using information that is not common knowledge without acknowledging the source.
4. Failing to acknowledge collaborators on homework and laboratory assignments.
5. Internet plagiarism includes submitting downloaded term papers or parts of term papers, paraphrasing or copying information from the internet without citing the source, and “cutting and pasting” from various sources without proper attribution.

The City College Faculty Senate has approved a procedure for addressing violations of academic integrity, which can also be found in Appendix B.3 of the CCNY Undergraduate Bulletin.”

Be aware that if we suspect plagiarism we will report your conduct to the Academic Integrity Official. Disciplinary sanctions range from failing the class to expulsion from the college.

Date Prepared

11 November 2009