Insect Biology
Spring 2018
ENTO 115

Instructor:

Erin Bauer
Lecturer
Department of Entomology
103 Entomology Hall
University of Nebraska--Lincoln
Lincoln, NE 68583-0816
Phone: 402-472-9548
E-mail: ebauer2@unl.edu

Teaching Assistants:

Rebekah Rogers (bekahr826@comcast.net)
Kelsey Larsen (kelseylarsen21@gmail.com)
Dan Murphy (dmurph9113@gmail.com)

Important Websites:
Entomology Department Web Site: http://entomology.unl.edu
Canvas: https://canvas.unl.edu/

Technical Requirements

In order to take this course, you must have:

- E-mail
- Click here to check your browser
- Microsoft Word
- PowerPoint
- Adobe Acrobat Reader
- RealPlayer
- The technology skills you will need to succeed in this course are a basic familiarity with your Web browser, e-mail, word processing, and the ability to locate specific information on the Internet. You must also know or learn how to use the Canvas courseware.

Note: When you click on the link above a new browser window will open. Be sure to close the window when you are done.

What You Will Learn

This course offers a general introduction to insects. Topics covered include insect diversity, insect morphology and physiology, insect ecology and behavior, and considerations of the economic and medical importance of insects. By the end of this course you should be able to recognize common insects that occur in Nebraska and understand their biology and unique adaptations.

Why Take This Course?

- Insects have an enormous impact on humans.
- Insects outnumber all other organisms.
- Insects are amazingly diverse.

Textbooks

There are **no required textbooks**. References that you may find useful throughout the semester include the following introductory entomology textbooks:

O'Toole, C. 2002. Firefly Encyclopedia of Insects and Spiders. Firefly Books Inc.
Turpin, F.T. 2000. Insect Appreciation, 2nd edition. Kendall/Hunt Publishing Company.

Office Hours

We have "Virtual Office Hours" and will be available for interaction via phone and e-mail (UNL and Canvas). Feel free to contact us at your convenience. Our goal is to respond to your questions in a timely manner. At a minimum, e-mail will be checked once a day on weekdays. Response time for questions will typically be within 24 hours on weekdays and 48 hours on weekends.

Grades for assignments and tests will be posted on the Canvas site within one week of the due date. Grades for scientific reports will be posted within two weeks of the due date.

Course Information

Insect Biology is likely to be very different from other university and high school courses that you have taken in the past. This course is an on-line course offered by the Department of Entomology, University of Nebraska-Lincoln. Since this is an on-line course and we do not meet on a regular basis, you will have to be willing to take control of your learning in this class. We have set deadlines for turning in assignments, taking exams, and viewing the lectures to help you stay on track.

Lectures can be accessed through Canvas: (https://canvas.unl.edu/). Canvas also includes information on deadlines, assignments, and exams, as well as other important information pertaining to this course. Your first assignment is to view the course syllabus through Canvas to learn more about how the course

works and to provide you with an overview of the material we will be covering during the semester. After reviewing the syllabus, continue as outlined in the course syllabus lecture schedule.

Assignments

- **Introductory Assignments**– Purpose is to familiarize you with Canvas and its features, the library services, and how to send e-mail messages and attachment files. Each of these assignments is worth 5 points.
    - Six Noun Assignment
        - Post your nouns to Discussion Board
        - Respond to 10 of your classmates
- **Insect Pets** - Each of you will have two insect house-guests for the semester. You will be responsible for rearing these insects and writing 2 short scientific reports on your experience. Each report will include hypotheses tested, appropriate observations and data collection on the development, behavior, and physiology of your insects, and your conclusions.
        - Hissing Cockroach
        - Tobacco Hornworm
- **Website Assignments -**Throughout the semester you will be assigned several website assignments. These assignments are designed to provide you an opportunity to learn more about entomology and to reinforce concepts presented in class.
    a. Classification Exercise (15 pts)
    b. Insects in the Sea (15 pts)
    c. Designer Insect (15 pts)
    d. How Does the Digestive System Work? (15 pts)
    e. Comparison of Human & Insect Physiological Systems (15 pts)
    f. Termite Activity (15 pts)
    g. Genetically Modified Mosquitoes (15 pts)
    h. Bt Corn and Monarch Butterflies (15 pts)

Information Regarding Assignments:

All assignments will be submitted either with the Canvas Assignment tool or through the "Discussion Board" unless otherwise instructed. Website assignments will normally be due one week after they are assigned. Assignments are due on time. Late assignments will be downgraded (2 points per day), and assignments more than a week late will not be graded. If circumstances arise that do not allow you to complete your assignments by the specified dates, please let us know.

Exams

There will be four hourly exams during the semester and one take home final. Exams may be a combination of short essay, matching, and multiple-choice questions. Students who take all four hourly

tests can drop their lowest score. Students who miss an exam will be graded on the three they have taken. Everyone is required to take the final.

- Exam 1: February 5-9
- Exam 2: March 5-9
- Exam 3: April 2-6
- Exam 4: April 20-26
- Take Home Final Exam: April 27-May 2

Cheating:

The University of Nebraska-Lincoln has a policy about academic dishonesty, as indicated in the Student Code of Conduct (http://stuafs.unl.edu/ja/code). As a student at UNL, you enjoy rights and protections under the code and are obligated to conduct yourself in compliance with the code. One area where students occasionally have some confusion regards plagiarism. The key concept here is misrepresenting the work of another as one's own.

As the Student Code of Conduct indicates, academic sanctions for misconduct subject to appeal are at the discretion of the instructor, and may include giving the student a failing grade for the course. In this course, the least penalty I will impose for misconduct is a one letter grade reduction in the course grade, but in most instances the penalty for cheating will be a failing grade in the course.

Course Evaluation

Exams	400 points
Six Noun Assignment	10 points
Insect Pets (2 pets @ 50 points)	100 points
Website Assignments (8 @15 points)	120 points
Total	**630 points**

Scale				
100 - 97 A+ 96 - 93 A 92 - 90 A –	89 - 87 B+ 86 - 83 B 82 - 80 B –	79 - 77 C + 76 - 73 C 72 - 70 C –	69 - 67 D + 66 - 63 D 62 - 60 D –	59 - 0 F

General Education Program (ACE)

Entomology 115 is a certified approved ACE outcome 4 course.

ACE outcome 4: Use scientific methods and knowledge of the natural and physical world to address problems through inquiry, interpretation, analysis, and the making of inferences from data, to determine whether conclusions or solutions are reasonable.

The learning outcome is embedded in the course through lectures, inquiry investigations, and insect pet projects. Lecture topics focus on conveying the content knowledge that is essential for student synthesis and application of insect biology to problem solving. The inquiry investigations and insect pet projects support problem-based learning and inquiry. Students enrolled in Insect Biology conduct at minimum three inquiry investigations related to insect biology. The inquiry investigations require students to draw on their specific content knowledge, develop testable hypotheses, test their hypotheses, analyze and interpret their data, and identify appropriate conclusions and implications. The two insect pet projects reinforce the inquiry approach by requiring students to review existing literature to learn about their specific insect pet, develop a set of hypotheses related to habitat selection, food preference, and development of their pet; test their hypotheses through observations and designing experiments to gather appropriate data; interpret their data sets; and ultimately make inferences from the data to determine whether their original hypotheses were accepted. At the end of each project, students prepare a scientific report that includes their hypotheses, methods, data sets (graphs and tables) and summaries, and conclusions.

Student understanding and application of content knowledge is assessed through three hourly exams and a final exam. Exams consist of short essays and multiple choice questions. Graded assignments used to assess the student's achievement of the scientific method component include scientific reports on their insect pets. The scientific reports gauge the student's ability to develop a testable hypothesis; collect data; present (graphs and tables), assess and analyze their data sets; identify appropriate conclusions; and effectively communicate their findings.

Student Disabilities

Students with disabilities are encouraged to contact me for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office, 132 Canfield Administration, 472-3787 voice or TTY.

Course Etiquette

Be courteous to others when submitting assignments and participating in discussions. Offensive materials will be removed from the course web site. Students will be contacted if material is deemed inappropriate by any of the instructors.

Tentative Schedule

Date (2018)	**Lecture Topic**	**Assignment Given**	**Assignment Due**
Module 1: Introduction			
Jan 8	Review Course Syllabus	**Six Noun Assignment: Post your nouns**	

Jan 10	Lesson 1: Introduction to Insects • Topic 1 – Why Study Insects? • Topic 2 – Reasons Why Insects are so Successful		
Module 2: Classification of Insects and Other Arthropods			
Jan 16	Lesson 1: Classification of Insects and Other Arthropods • Topic 1 – What is an Arthropod? • Topic 2 – Classification System	Classification Exercise	**Six Noun Assignment: Post Your Nouns (Jan 16)**
Jan 18	Lesson 1: Classification of Insects and Other Arthropods • Topic 3 – Types of Arthropods • Topic 4 – Arachnids of Medical Importance		
Module 3: Putting Order into the Insect World			
Jan 23	Lesson 1: Putting Order into the Insect World • Topic 1 – Apterygotes • Topic 2 – Crickets and Grasshoppers (Orthoptera) • Topic 3 – Roaches (Blattodea)	Cockroach Pet	• **Six Noun Assignment: Respond to 10 of your classmates (Jan 23)** • **Classification Exercise (Jan 23)**
Jan 25	Lesson 1: Putting Order into the Insect World • Topic 4 – Mantids (Mantodea) • Topic 5 – Walkingsticks (Phasmatodea) • Topic 6 – Hemiptera		
Jan 30	Lesson 1: Putting Order into the Insect World		

	• Topic 7 – Termites (Isoptera) • Topic 8 – Lice and Fleas (Phthiraptera and Siphonaptera) • Topic 9 – Neuropterans		
Feb 1	Lesson 2: Aquatic Insects • Topic 1 – Types of Aquatic Insects • Topic 2 – Advantages & Disadvantages	Insects in the Sea	
Feb 5-9: Exam 1			**Insects in the Sea—3 Explanations to the Discussion Board (Feb 5)**
Feb 8	Lesson 3: Putting Order into the Insect World • Topic 1 – Beetles (Coleoptera) • Topic 2 – Butterflies and Moths (Lepidoptera) • Topic 3 – Insect Conservation		
Feb 13	Lesson 4: Putting Order into the Insect World • Topic 1 – Biology of Flies and Mosquitoes (Diptera) • Topic 2 – Maggot Therapy • Topic 3 – Internal Parasites		**Insects in the Sea - one page summary (Feb 13)**
Feb 15	Lesson 5: Putting Order into the Insect World • Topic 1 – Biology of Bees, Ants, & Wasps (Hymenoptera) • Topic 2 – Bee Venom Therapy • Topic 3 – Killer Bees		
Module 4: Insect Development, Morphology, and Physiology			

Feb 20	Lesson 1: Insect Development • Topic 1 – Growth and Development • Topic 2 – Tobacco Hornworm Overview	Hornworm Pet	**Hissing Cockroach Scientific Report (Feb 20)**
Feb 22	Lesson 2: Metamorphosis • Topic 1 – Complete Metamorphosis • Topic 2 – No Metamorphosis • Topic 3 – Gradual & Incomplete Metamorphosis • Topic 4 – Other Types of Metamorphosis		
Feb 27	Lesson 3: Insect Structure and Function • Topic 1 – The Exoskeleton • Topic 2 – Molting Process		
Mar 1	Lesson 3: Insect Structure and Function • Topic 3 – Insect Head • Topic 4 – Insect Thorax • Topic 5 – Insect Abdomen	Designer Insect	
Mar 5-9: Exam 2			
Mar 8	Lesson 4: Internal Workings of Insects • Topic 1 – Digestive System • Topic 2 – Excretory System • Topic 3 – Circulatory System	How Do These Systems Work?	**Designer Insect (March 8)**
Mar 13	Lesson 4: Internal Workings of Insects • Topic 4 – Respiratory System	Comparison of Human & Insect Physiological Systems	

	• Topic 5 – Nervous System (animation)		
Module 5: Insect Behavior			
Mar 15	Lesson 1: Insect Mating and Reproduction • Topic 1 – Insect Reproductive Systems • Topic 2 – How to Find a Mate? • Topic 3 – Mating Behaviors • Topic 4 – Sperm Competition		**How Do These Systems Work? (March 27)**
Spring Break: March 19-23, 2018			
Mar 27	Lesson 2: Social Insects • Topic 1 – Solitary to Social • Topic 2 – Components of Eusocial Insects	Termite Activity	**Comparison of Human & Insect Physiological Systems (March 27)**
Module 6: Insects and Humans			
Mar 29	Lesson 1: Forensic Entomology • Topic 1 – What is Forensic Science? • Topic 2 – Insects and Forensics • Topic 3 – Waves of Arthropods • Topic 4 – Analyzing a Crime Scene		
April 2-6: Exam 3			**Termite Activity (April 2)**
Apr 10	Lesson 2: Insects of Medical Importance • Topic 1 – Broad Categories • Topic 2 – Introduction to Disease • Topic 3 - Malaria	Genetically Modified Mosquitoes	
Apr 12	Lesson 3: West Nile Virus		

	• Topic 1 – Overview of Disease • Topic 2 – Current Status and New Updates		
Apr 17	Lesson 4: Managing Insect Pests • Topic 1 – What is a Pest? • Topic 2 – IPM Steps • Topic 3 – IPM Tactics	Bt Corn and Monarch Butterflies	**Genetically Modified Mosquitoes (April 17)**
Apr 19	Lesson 5: Biotechnology • Topic 1– What is Biotechnology • Topic 2 – Controversy over Biotechnology		• **Tobacco Hornworm Scientific Report (April 19)** • **Bt Corn and Monarch Butterflies (April 19)**
April 20-26 Exam 4			
April 27-May 2 Take Home Comprehensive Exam			

Classroom Emergency Preparedness and Response Information

Fire Alarm (or other evacuation):

In the event of a fire alarm: Gather belongings (Purse, keys, cellphone, N-Card, etc.) and use the nearest exit to leave the building. Do not use the elevators. After exiting notify emergency personnel of the location of persons unable to exit the building. Do not return to building unless told to do so by emergency personnel.

Tornado Warning:

When sirens sound, move to the lowest interior area of building or designated shelter. Stay away from windows and stay near an inside wall when possible.

Active Shooter:

Evacuate: if there is a safe escape path, leave belongings behind, keep hands visible and follow police officer instructions. Hide out: If evacuation is impossible secure yourself in your space by turning out lights, closing blinds and barricading doors if possible. Take action: As a last resort, and only when your life is in imminent danger, attempt to disrupt and/or incapacitate the active shooter.

UNL Alert:

Notifications about serious incidents on campus are sent via text message, email, unl.edu website, and social media. For more information go to: http://unlalert.unl.edu.

Additional Emergency Procedures can be found here: http://emergency.unl.edu/doc/Emergency_Procedures_Quicklist.pdf

HELP!!

Library Services

UNL distance students have access to a tremendous resource-UNL's Library Services. Their web site can be accessed directly at: http://iris.unl.edu/ Here, you can search for general library information.

For specific entomological resources, see http://unl.libguides.com/entomology . Dr. Leslie Delserone is our entomology librarian and has compiled this guide. She provides reference assistance for students in Entomology. She can be reached at (402) 472-6297 or via email (ldelserone2@unl.edu).

For information about other services check out:

http://www.unl.edu/libr/dept/subjname.html

This page has information about the web request form, information about liaison librarian services, various delivery options (including web delivery), and much more.