

## BIOLOGY 3430/3435 – Entomology & Entomology Lab

**Instructor:**

Dr. Mark Grover  
SCI 113  
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**Text book:**

Johnson, N.F. and C.A. Triplehorn. 2005. An introduction to the study of insects. 7<sup>th</sup> edition. Brooks/Cole.

**Lecture:** MWF 11:00-11:50 A.M. SC 128

**Lab:** Wednesday 12:00-2:50 P.M. SC 125

**Office hours:** Wednesday 8:00-8:50, Thursday 9:00-10:50, 1:00-3:00, Friday 12:00-1:00

**Course Description:** An introduction to the biology of insects, including insect evolution, diversity, morphological and anatomical adaptations, physiology, behavior, ecology, and management. The laboratory portion of this course will focus on the taxonomy of insect orders and major families.

<u>Date</u>	<u>Lecture Topic</u>	<u>Reading</u>
Aug 29	Arthropod evolution and the origin of insects	Ch. 5
Aug 31	Overview of insect characteristics and insect diversity	Ch. 1
Sept 2	Morphological traits and external anatomy	Ch. 2
Sept 5	<b>Labor Day</b>	
Sept 7	Insect biomechanics – walking, jumping, swimming, & flight	
Sept 9	Origins of flight	
Sept 12	Insect evolution and systematics	Ch. 3
Sept 14	Major adaptive radiations and phylogeny	Ch. 6-8
Sept 16	Respiration and circulation	Ch. 2
Sept 19	Size, flight energetics, and thermoregulation	
Sept 21	Extreme biology – surviving excessive cold, heat, and aridity	
Sept 23	Water balance – excretion, acquiring water, and osmoregulation	
Sept 26	Feeding and digestion	
Sept 28	Nervous system and sensory perception	
Sept 30	<i>Catch-up and review</i>	
Oct 3	<b>Exam 1</b>	
Oct 5	Courtship and reproductive behavior	Ch. 4
Oct 7	Growth, development, and metamorphosis	
Oct 10	Reproductive and life-history strategies	
Oct 12	Ecology of aquatic insects I – adaptations to life in water	
Oct 14	Ecology of aquatic insects II – food webs & functional groups	
Oct 17	Soil, wood-eating, & litter insects – living in dirt and organic debris	
Oct 19	<b>Harvest break</b>	
Oct 21	Insect-plant interactions I – adaptations & influences of herbivorous insects	
Oct 24	Insect-plant interactions II – pollination & other mutualistic interactions	
Oct 26	Adaptations and influences of insect predators	
Oct 28	Parasites and parasitoids – reality stranger than fiction	
Oct 31	Strategic defense systems of insects	
Nov 2	Complex behavior – fungus farming, aphid ranching, & eusociality	
Nov 4	Insect communication – pheromones, flashing, & waggle dancing	

Nov 7	<i>Catch-up and review</i>
Nov 9	<b>Exam 2</b>
Nov 11	Population dynamics – population growth, outbreaks, & regulation
Nov 14	Population dynamics continued – metapopulation biology of insects
Nov 16	Insects and the structure and function of ecosystems
Nov 18	Human uses of insects
Nov 21	Forensic entomology
Nov 23-25	Holiday – Thanksgiving
Nov 28	Insects as vectors for disease & agents of destruction
Nov 30	Pest management I – physical & chemical controls
Dec 2	Pest management II – biological controls & genetic engineering
Dec 5	Insect biogeography
Dec 7	Insect conservation
Dec 9	<i>Catch-up and review</i>
<b>Dec 13</b>	<b>Final Exam —Monday 11:00 AM -12:50 PM</b>

**Lecture Exams:** Exams will consist of a mix of multiple-choice questions, short answers, matching, definitions, true or false questions, and one or more essay questions. The essay questions will be designed to test your ability to creatively apply your knowledge and abilities to interpret information and solve problems. Exams 1 & 2 will be worth 100 points each. The final exam will be comprehensive and will be worth 150 points.

**Assignments:**

1. A field research project and paper dealing with insects. Your project should involve a simple lab experiment or collection of field data to test a hypothesis. I will give you a list of potential study ideas, but you are welcome and encouraged to come up with your own idea for a research project. The data that you collect must be formally analyzed and reported in the form of a scientific paper. The format of your paper should follow the general format of journal articles (There should be Introduction, Methods, Results, Discussion, and Literature Cited sections). You may work in groups of 2-3 for this assignment. More details will be provided in class.
2. You will be required to complete an insect collection. You may work alone or with another person in the class to complete this assignment. The collection should include specimens from at least 8 orders and 25 or more families if you work alone, and 10 orders and 40 families if you work with a partner. You will be allotted time during lab to work on your collection. Specimens must be correctly mounted or preserved, labeled, and catalogued. Details will be provided in lab.

**Grades:** Your work in lecture and lab will be reflected in a single grade. The breakdown is as follows:

<u>Grading Criteria</u>	<u>Points</u>	<u>Approximate grade distribution</u>
Lecture exams --- 100 points each, 2 exams	200	90-100% (672-750 points) ≈ A
Final exam	150	80-89% (597-671 points) ≈ B
Research project & paper	100	70-79% (522-596 points) ≈ C
Collection	100	60-69% (447-521 points) ≈ D
Lab quizzes & assignments	150	< 60% (0-446 points) ≈ F
Lab practical	50	
<b>Total Points</b>	<b>750</b>	

The lab will focus on collection, identification, and basic biology of the various insect taxa. You will be expected to recognize representatives of all of the insect orders and several major families. You will also be expected to use dichotomous keys to identify insects to the family level. There will be three mandatory field trips during the regularly scheduled lab time. I am willing to arrange additional collecting trips if there is interest. There will be a minimum of five lab quizzes and three lab assignments. Quizzes will be unannounced and will be given at the beginning of the lab period. There will be a 50-point lab practical given during the last lab period.

### BIOL 3430 – Lab Schedule & Useful Material in Johnson and Triplehorn (2005)

<b>Date</b>	<b><u>Activity</u></b>	<b><u>Reading</u></b>
Aug 31	Insect morphology & external anatomy; Insect collection & preservation	Ch. 2. Ch. 35
Sept 7	<b>Field trip</b> – collecting (aquatic sampling)	
Sept 14	Wingless hexapods; Orders Ephemeroptera & Odonata	Ch. 7-10
Sept 21	<b>Field trip</b> – collecting (terrestrial sampling methods)	
Sept 28	Work on collection/additional field trip (local) if needed	
Oct 5	<b>Field trip</b> – insect ecology	Handout
Oct 12	Orthoptera, Phasmatodea, Grylloblattodea, Mantophasmatodea, Dermaptera, Plecoptera, Embiidina, Zoraptera, and Isoptera	Ch 11-19
Oct 19	Mantodea, Blattodea & Hemiptera	Ch. 20-22
Oct 26	Thysanoptera, Psocoptera, Phthiraptera, and Coleoptera	Ch. 23-26
Nov 2	Coleoptera (continued) & Neuroptera	Ch. 26-27
Nov 9	Hymenoptera, Trichoptera, & Lepidoptera	Ch. 28-30
Nov 16	Lepidoptera (continued) & Siphonaptera	Ch. 30-32
Nov 23	<i>Thanksgiving Holiday</i>	
Nov 30	Mecoptera, Strepsiptera, and Diptera	Ch. 33-34
Dec 7	<b>Lab practical</b>	

**Services for Students with Disabilities:** Students with medical, psychological, learning or other disabilities desiring academic adjustments, accommodations, or auxiliary aids must contact the Disability Support Center, Room 205D, Sharwan Smith Center, phone (435) 865-8022. The Disability Support Center determines eligibility for and authorizes the provision of these services and aids.