

Fall 2015

BIOS 5974

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Recommended Citation

DeVries, Philip, "BIOS 5974" (2015). *University of New Orleans Syllabi*. Paper 127.
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BIOS 5974 (Entomology) Fall, 2015

Lectures: Tu-Th 12:30-1:45, Biology room 216; Lab: Tuesday: 2:00-4:45

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Office Hours: Mon 830-1030 am, Wed 830-1030 am, Thur 830-1030 am, anytime by appointment.

There are more species of insects than any terrestrial group of macro-organisms. This course covers major groups of arthropods, with emphasis on the most successful group of organisms in the world -- the insects. Insects are crucial to the functioning of a major portion of the biological world. Consider the roles insects play in the pollination and evolution of flowering plants, or their role as food for many vertebrate groups (birds, lizards, mammals, fish). Human dependence upon plants and other vertebrates as food suggests that human evolution was shaped by insects.

Learning objectives: Graduate students in this course be exposed to an in depth survey of topics related to understanding insect biology and their ecological and evolutionary success. Lecture, discussions and laboratory topics will include: 1) Learning the major orders plus many of the families of insects that you are likely to encounter during your research career. 2) Participants are required to make an insect collection, and identify many of the local insect families. 3) The relationships of insect morphological structure and function. 4) Physiology of insect flight, reproduction, respiration, digestion and excretion. 5) Comparative life histories and behaviors of select groups of insects and other arthropod groups. 6) Ecology, evolution, and plant-insect interactions. 7) The importance of insects to agriculture, science, and human culture. 8) Integration of entomological knowledge attained in this course with the graduate student's own research program.

Required Textbook: *An Introduction to the study of Insects* 2005. By C.A. Triplehorn & N.F. Johnson. Thompson, Brooks/Cole. ISBN 0-03-096835-6

Additional readings will be provided from Evans as handouts or PDF files. You may want to buy your own copy. It's a good book. *Insect Biology* 1984. by H.E. Evans Addison-Wesley publishing company. ISBN 0-201- 11981-1

Grading: There are 3 written exams based on materials covered in lecture & laboratory, and the readings and handouts. Each exam will account for 20% of the final grade. Each exam will have a written component derived from lectures and handouts, and a laboratory practical component focusing on the identification of pinned insect material. *Graduate students are required to answer all questions on the exams.* **Collections:** Field trips (possibly) may be offered, but it depends on the semester scheduling – the course was recently changed by the administration, so it may not be possible to have field trips. Students are strongly encouraged to start collecting early for their collections. **Note:** students are required to make, and correctly identify an insect collection that will comprise

40% of their final grade. **Grade point standards:** A= 100-90, B= 89-80, C= 79-70, D= 69-60, F= 59 and below.

Make-up exams will be given ONLY by prior arrangement. **To be excused from any exam, the professor must be contacted in writing prior to the exam via email.** If you are absent from an exam without being excused you will receive a 0 for that exam grade. **Cheating on any exam will result in a zero for that exam.**

THE INSECT COLLECTION (40 grade points total)

Below is a list of the minimum required specimens for graduate student collections. **Points will be given for properly pinned, identified, labeled and preserved specimens. Labels should be legible with complete data.** The collection should be organized in a systematic fashion, not thrown together. Extra points will be given for specimens of additional, correctly identified families not listed below.

Dry, pinned specimens:

Representatives of the following Orders classified to family, 42 families (42 points):
Odonata (2 families) Orthoptera (2 families) Mantodea (1 family) Blattodea (3 families) Dermaptera (1 family) Hemiptera (6 families) Homoptera (2 families) Neuroptera (2 families) Coleoptera (8 families) Siphonaptera (1 family) Diptera (6 families) Trichoptera (1 family) Lepidoptera (3 families) Hymenoptera (6 families)

Alcohol preserved collections (8 points): Adults: One representative of each of the following Orders classified to family, 3 families (3 points): Isoptera (now Blattodea) (1 family) Thysanoptera (1 family) Immatures: One representative of each of the following Orders, 5 Orders (5 points): Lepidoptera (larvae) Coleoptera (larvae) Diptera (larvae) Hymenoptera (larvae) Odonata (nymphs)

Other invertebrates: (4 points).

Five non-insect invertebrates. See beginning TJ chapters for examples: Crustacea (Isopoda, Amphipoda) Arachnida Araneae, Acarina, Opiliones, Scorpiones etc. Diplopoda, Chilopoda

Organization and neatness (5 points) will be given if the collection is well organized, labeled to family, and with complete locality and date labels for each specimen in the collection.

Accommodations: It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities should contact the Office of Disability Services as well as their instructors to discuss their individual needs for accommodations. For more information, please go to <http://www.ods.uno.edu>.

Academic Integrity: Academic integrity is fundamental to the process of learning and evaluating academic performance. Academic dishonesty will not be tolerated. Academic dishonesty includes, but is not limited to, the following: cheating, plagiarism, tampering with academic records and examinations, falsifying identity, and being an accessory to acts of academic dishonesty. Refer to the Student Code of Conduct for further information. The Code is available online at <http://www.studentaffairs.uno.edu>.

Schedule --Bios- 4974- Entomology 2015 -- LECTURE/LAB TOPICS & REQUIRED READINGS, EXAMS, etc

Thurs, Aug 20 Lecture/Lab: Introduction to course. Arthropod diversity, especially the insects. General natural history (aquatic, terrestrial, parasites).

Tue, Aug 25 Lecture: Collecting, preparation, handling and pinning insects (TJ Chapter 35). Development and reproduction in hemimetabolous & holometabolous insects (growth, molting, metamorphosis) & their importance to insect diversification (TJ pg. 60-71; IB Chapter 2). See also insect diversity handout.

Thurs, Aug 27 Lecture/Lab: External morphology & dissection of the grasshopper (TJ pg. 5-23; IB pg. 4-15). Internal anatomy (TJ Chapter 2; IB pg. 24-29).

Tues, Sep 1 Lecture: Evolution of flight and insect diversification (TJ Chapter 5 and 7; IB pp. 16-20, Chapter 2) See insect diversity handout

Thurs, Sep 3 Lecture & Lab: Comparative morphology of insects: mouth parts, wings, legs & antennae (IB pg. 10-11, TJ Chapter 2).

Tues, Sep 8 Lecture: Reproduction, evolution and behavior (IB Chapters 4, 7, 8).

Thurs, Sep 10 Lecture & Lab: The Insect Orders: features important for identification to order (TJ Chapter 3), using dichotomous keys, “insect rodeo” exercise.

Tues, Sep 15 Lecture: Environmental escape: migration and diapause (IB Chapter 16). Review of insect orders (TJ various chapters)

Thurs, Sep 17 . Lec & Lab: Identification of families in Odonata, Orthoptera, Blattodea & other ancient insect orders. Review of insect orders.

Tues, Sep 22 Lecture: Behavior - communication (IB Chapters 7, 8, 12, 13, 14)

Thurs, Sep 24 ---- **EXAM 1**

Tues, Sept 29 – Lecture: Tropical insect ecology (selected readings)

Thur, Oct 1 Lecture/Lab: Identification of Hemiptera, Homoptera & Neuroptera families (TJ various chapters).

Tue, Oct 6 Lecture: Agricultural entomology (TJ Chapter 2; IB Chapters 17-18)

Thu, Oct 8 Lecture/Lab: Identification of selected families of Coleoptera (TJ various appropriate chapters).

Tue, Oct 13 – TBA – Student study lab will be open

Thu, Oct 15 - FALL BREAK

Tue, Oct 20 Lecture: Continued identification of selected families of Hemiptera, Homoptera & Neuroptera & Coleoptera for Exam 2 (TJ various chapters).

Thu, Oct 22 EXAM 2

Tues, Oct 27 Lecture: Herbivory

Thurs, Oct 29 Lecture/Lab: Identification of selected families of Diptera (TJ various appropriate chapters).

Tue, Nov 3 Lecture: Insect pollination (IB Chapter 9, 10, 11)

Thurs, Nov 5 Lecture/Lab: Identification of Hymenoptera families 1 -Review of previous families

Tues, Nov 10 Lecture: Insect pollination continued (IB Chapter 9, 10, 11)

Thu, Nov 12 Lecture/Lab: Identification of Hymenoptera families 2 and selected groups of Lepidoptera (TJ appropriate chapters). Review previous families

Tue, Nov 17 Insect symbioses

Thurs, Nov 19 Review identification of insect families.

Tue, Nov 24 Lecture: Medical entomology

Thurs, Nov 26 -- no class THANKSGIVING HOLIDAY

Tues, Dec 1 Review identification of insect families. **Collections are due.**

Thurs, Dec 3 Last day of class – **EXAM 3**