Insect Biodiversity and Evolution (ENT 432)

Department of Entomology, Pennsylvania State University

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Lecture:	T Th 12:05–1:20 PM	110 ASI Building
Lab:	T Th 1:30–3:20 PM	131 Headhouse III

This course is designed to teach students about insect taxonomy, evolutionary relationships, collection and preservation techniques, morphology, and natural history. We'll focus mostly on adult forms and emphasize insects found in Pennsylvania. In the lab, students will learn how to handle specimens, use diagnostic keys, and identify insects by sight. Collection techniques will be honed during field trips.

Learning Outcomes

Upon completion of this course students should be able to:

- Label a generalized hexapod diagram with external anatomy terms
- Name and sight-identify all local hexapod orders and several common local families
- Solve taxonomic problems and describe how species and other taxa are named and described, *i.e.*, understand the fundamentals of taxonomic practice
- Draw a phylogenetic tree of relationships between hexapod orders
- Teach others how to read a phylogenetic tree and know what kinds of data are used to estimate trees, how those data are analyzed, and what it means to be monophyletic
- Describe key innovations and life history strategies of major hexapod lineages
- Teach others how to collect, preserve, and transport hexapod specimens and describe why this process is important
- Teach others about the natural history of insects more generally

To realize these educational outcomes students are expected to:

- Attend every lecture and lab
- Participate in discussions
- Ask questions

Logistics

Office Hours: By appointment.

Course Website: http://deanslab.org/ent432/ Note that source files for teaching materials are available through our GitHub repo - https://github.com/OpenEntomology/InsectBiodiversityEvolution - which also provides a mechanism for submitting issues: https://github.com/OpenEntomology/InsectBiodiversityEvolution/issues

Textbook There is no required textbook. Instructors will discuss and make available resources that facilitate specimen diagnosis and learning about the evolution of these organisms.

Organization The course content is partitioned across 15 units, each of which has its own (more or less) structured curriculum, including lecture/discussion components and lab exercises:

1. What are arthropods? What is systematics?
2. Understanding arthropod phenotypes
3. Systematics and Evolution, past and present
4. Early arthropods, fossils, terrestrialization
5. Non-hexapod Arthropoda
6. Non-pterygote Hexapoda
7. Paleoptera, Plecoptera, origin of wings
8. Polyneoptera
9. Acercaria
10. Holometabolous development, Hymenoptera
11. Neuropterida
12. Coleoptera, Strepsiptera
13. Antliophora
14. Amphiesmenoptera
15. Natural History Collections

Dispersed across these units are topics ("phenomena") that transcend taxa—*i.e.*, they will be discussed at multiple points during the semester, as appropriate. Examples include leaf mining and other herbivory strategies, galls, mimicry/aposematism, sound production, weapons, and parasitism.

Grading Policy Letter grades follow the usual scale: A = 93–100%, A- = 90–92.9%, B+ = 87–89.9%, B = 83–86.9%, B- = 80–82.9%, C+ = 76–79.9%, C = 70–75.9%, D = 60–69.9%, F <60%.

Graded Components

Discover your inner Darwin	350 pts.
Lab practicals (n=3)	150 pts.
Lab notebook	100 pts.
Final exam	100 pts.
Participation[a]	100 pts.
Total	**800 pts.**

[a] Based on attendance (35%) and participation in lecture discussions and quizzes (65%)

≫≫≫≫≫ Note that fabricated specimen data and natural history observations will result in a *ZERO* (0) for the Discover your inner Darwin exercise. There are *NO EXCEPTIONS* to this rule. ≪≪≪≪≪

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Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts. Academic integrity includes a commitment not to engage in or tolerate acts of falsification, plagiarism, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others. See Faculty Senate Policy 49â€20 (http://www.psu.edu/ufs/policies/47-00.html#49-20) and Gâ€9 Procedures (http://www.psu.edu/dept/oue/aappm/G-9.html) and the PSU Code of Conduct (http://studentaffairs.psu.edu/conduct/codeofconduct).

Academic Integrity Guidelines for the College of Agricultural Sciences can be found at: http://agsci.psu.edu/students/resources/academic-integrity

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