IB 468: Insect Classification and Evolution

Instructors:

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Teaching Assistant: to be determined each semester when the course is offered; typically an entomology graduate student in systematics.

Course description:

Analytical survey of the classification and evolution of the orders and principal families of insects, with practical experience in the identification of insects at these taxonomic levels; field trips required. Lecture and laboratory. 4 undergraduate hours. 4 graduate hours. Offered in alternate (odd) years in the Fall. Prerequisite: IB 401 or consent of instructor.

Lecture: MW 9:00 -9:50 am, NHB 4072
Laboratory: MW 10 - 11:50 am, NHB 4072

Student outcomes:

Primarily:

The student should learn the most important features of insect natural history and taxonomy.
The student should learn major diagnostic features for sight recognition of the most common and important insect families (roughly 300).
The student should learn the newest concepts of the phylogenetic relationships and evolutionary history of major insect and arthropod groups.

Secondarily:

The student should learn insect collecting, sampling and preservation techniques.

Lecture Schedule

UNIT I. The basics of insect biology (class periods 1-6)

Topics

The general subject matter, conduct and content of the course, grading. Insect anatomy, internal and external, used in classification.
Insect development and classification.
Insect field natural history.

Readings

Textbook chapters 1-14 (most of this should be review).
Handout material

Class Period(s)  Topics covered
1   Introduction to course
2   The insect body
3   The integument
4   Development
5   Insect natural history/lifestyles
6   Exam on Unit 1

UNIT 2. Insect phylogeny, evolution and classification   (class periods 7-12)

Topics

Insights from comparative morphology into phylogeny and classification.
Fossil history and early evolution of insects
Insights from molecular genetics into phylogeny and classification
Approaches to insect phylogenetics and classification
Nomenclature

Readings

Textbook, chapters 15-16.
Handouts from the literature.

Class Period(s)  Topics covered
7   Nomenclature & Classification
8   Systematic approaches
9   Fossil history
10  Molecular phylogeny
11  Comparative morphology
12  Exam on Unit 2

(in lab, we will have started a survey of non-insect arthropods and the orders of insects)
UNIT 3. Introduction to the orders and common families of insects. (lab periods)

Topics

A group-by-group survey of the orders and common families of insects, plus a brief discussion of non-insect arthropods. Each lecture will focus on the basic biology and some diagnostic features of each group, while each lab will focus on diagnostic features and learning to sight-identify the insect groups. In each case, the start of a new order will be accompanied by an updated review of the phylogeny and classification of that order. The pace of coverage in this section is driven mainly by the amount of material to be absorbed in the lab.

Readings

Textbook, chapters 17-46.

Topics covered in lab * (unit 3)

Non-insect arthropods
Entognatha, Apterygota, Ephemeroptera, Odonata 18-21

Phasmatodea, Blattodea (Including Isoptera), Mantodea, Orthoptera,
Grylloblattodea, Mantophasmatodea 22-25, 29
Dermaptera, Embiidina 26, 28
Plecoptera, Zoraptera, Phthiraptera 27, 31-33
Hemiptera, Thysanoptera 34, 35
Neuroptera, Megaloptera, Raphidioptera 36-38
Coleoptera 39
Strepsiptera, Siphonaptera, Mecoptera, begin Diptera 40,42,44
Diptera 43
Trichoptera 46
Lepidoptera 45
Hymenoptera 41
Collection and Preservation 47

*See the lab web page for handouts and potential lab practical dates.
**GRADING SYSTEM**

Lecture exam on Unit I  
100 pts.

Lecture exam on Unit II  
100 pts.

Laboratory practical quizzes (6 @ 75 pts.)  
450 pts.

Final lecture exam  
100 pts.

Insect collection  
250 pts.

**TOTAL:**  
1000 pts.

**GRADING SCALE**

- 900-1000 A
- 800-899 B
- 700-799 C
- 600-699 D
- below 600 F

Attendance to all lectures and lab sessions is important, not only to enhance learning, but because schedules are liable to change and exams may change dates if necessary.

**Academic integrity**

According to the Student Code, ‘It is the responsibility of each student to refrain from infractions of academic integrity, from conduct that may lead to suspicion of such infractions, and from conduct that aids others in such infractions.’ Please know that it is the responsibility of an instructor to uphold the academic integrity policy of the University, which can be found here: [http://studentcode.illinois.edu/article1_part4_1-401.html](http://studentcode.illinois.edu/article1_part4_1-401.html).

**Disability accommodations**

To ensure that disability-related concerns are properly addressed from the beginning, students with disabilities who require assistance to participate in this class are asked to see the instructors as soon as possible. In particular, alternatives to the field collecting component will be considered.