The learning objective of this course is to gain a sound understanding of insect diversity, and the practice of classifying and identifying organisms. The lectures will present the general principles of insect classification, construction and use of identification tools, nomenclature, morphology, and biology of insects. We will also cover the means of recognition of the major groups of insects (to order and family). A collection is required that will further develop your ability to identify insects to the level of order and family. Accumulating the required numbers of taxa will be possible only by employing a variety of collecting techniques. Building an insect collection, with correctly identified specimens, is an excellent way to learn about insect ecology and well as to introduce you to the immense biodiversity of insects. Once you can attach a name to an insect, in most cases you have immediate access to a large amount of information about that insect.

After completing this course you will be able to:
- Collect insects in many habitats using a variety of different methods, and be aware of the strengths and weaknesses of each technique
- Preserve insects by pinning, and know proper curation techniques.
- Describe the taxonomic process: how species are described, named and classified
- Sight identify insects to order, and the majority of common insects to family
- Describe key innovations in life history, growth, development and behavior for each insect order.
- Draw a phylogenetic tree depicting the relationships among hexapod orders

“Lecture” sequence

Unit 1. Introduction to insect classification
   Length of narration: approx. 22 minutes for 14 slides
   PowerPoint notes, B&W
   PowerPoint notes, color

Unit 2. Collecting and curating insects
   Length of narration: approx. 88 minutes for 26 slides
   PowerPoint notes, B&W
   PowerPoint notes, color

Unit 3. Insect morphology
   Length of narration: approx. 70 minutes for 28 slides
   PowerPoint notes, B&W
   PowerPoint notes, color

Unit 4. Insect morphology exercises
   Length of narration: not narrated, self-paced exercises; 29 slides
   PowerPoint notes, B&W
   PowerPoint notes, color

Unit 5. Insect identification, classification, and systematics
   Length of narration: approx. 118 minutes for 70 slides
   PowerPoint notes, B&W
   PowerPoint notes, color

Unit 6. Insect order overview
   Length of narration: approx. 124 minutes for 43 slides
   PowerPoint notes, B&W
   PowerPoint notes, color
Unit 7. Primitive insects, inc. Paleoptera: Thysanoptera, Microcoryphia, Ephemeroptera, Odonata
   Length of narration: approx. 37 minutes for 29 slides
   PowerPoint notes, B&W
   PowerPoint notes, color

Unit 8. More advanced insects (exopterygotes), part 1: Plecoptera, Embiidina, Orthoptera, Phasmatodea,
   Grylloblattodea, Mantophasmatodea, Dermaptera, Zoraptera, Isoptera, Mantodea, Blattodea
   Length of narration: approx. 102 minutes for 66 slides
   PowerPoint notes, B&W
   PowerPoint notes, color

Unit 9. More advanced insects (exopterygotes), part 2: Hemiptera, Thysanoptera, Psocoptera, Phthiraptera
   Length of narration, approx. 137 minutes for 88 slides
   PowerPoint notes, B&W
   PowerPoint notes, color

Unit 10. Most advanced insects (endopterygotes), part 1: Coleoptera
   Length of narration: approx. 87 minutes for 67 slides
   PowerPoint notes, B&W
   PowerPoint notes, color

Unit 11. Most advanced insects (endopterygotes), part 2: Neuroptera
   Length of narration: approx. 20 minutes for 17 slides
   PowerPoint notes, B&W
   PowerPoint notes, color

Unit 12. Most advanced insects (endopterygotes), part 3: Hymenoptera
   Length of narration: approx. 90 minutes for 65 slides
   PowerPoint notes, B&W
   PowerPoint notes, color

Unit 13. Most advanced insects (endopterygotes), part 4: Trichoptera, Lepidoptera
   Length of narration; approx. 99 minutes for 67 slides
   PowerPoint notes, B&W
   PowerPoint notes, color

Unit 14. Most advanced insects (endopterygotes), part 5: Siphonaptera, Mecoptera, Strepsiptera, Diptera
   Length of narration; approx. 100 minutes for 80 slides
   PowerPoint notes, B&W
   PowerPoint notes, color

Please note: The amount of time that you should plan to spend on each lecture is likely twice what is shown above under ‘length of narration’ because you may want to read the information carefully, study the images, and take notes.

Also, it will be a good idea to listen to all the ‘lectures’ in the first few weeks of the course. The characters used in identification, as well as the ecology of the insects, can be useful as you work on your collection, both acquisition and identification of specimens.

Course Prerequisites:
ENY 3005, Principles of Entomology, or a similar introductory course in entomology.

REQUIRED Text:

This book is pretty expensive, so it is tempting to purchase a used, earlier edition. Be advised that some name changes are always occurring in taxonomy, so if you acquire the earlier (6th) edition you will find that some order names have changed: Phasmatodea was formerly called Phasmida, Grylloblattodea was formerly called Grylloblattaria, Blattodea was called Blattaria, and what was formerly called Homoptera is now part of Hemiptera. There are family name changes as well. You can get by with the earlier version, but let me know if you did so when you submit your collection, so I can grade it appropriately.
Additional Recommended Resources:
Field guides such as:


In addition to these general field guides, there are many specialty guides that treat moths, butterflies, beetles, grasshoppers and kin, or pest species. They can be very useful for gaining some idea what insect group you are dealing with, but NEVER depend solely on pictures for identification. You should always attempt to confirm your tentative (picture-based) identification using a key. Likewise, you should confirm your key-based determinations with a collection or pictures.

WWW resources can be useful, particularly BugGuide (http://bugguide.net), but sometimes errors appear in WWW databases (especially Google images), so consider the quality of the source, and do not depend on them solely for identification.

Grading
Your grade will be based, in part, on 2 tests, the first of which will be open-book style, and the second of which will be photo-based insect recognition. You will be allowed to use any written materials to answer the questions in the tests, but are not allowed to consult any person about the questions or answers. The insect recognition test will be time limited, preventing you from looking up very many unknowns, so you will have to study for this in advance. You also will have several morphology activities to complete; these emphasize the differences in insect morphology among the various taxa, and how keys function. Although these are scored, this information is for your use only and does not enter into the course grade. Finally, a collection must be submitted. Your grade is comprised of the following elements:

- Test 1 covers the introductory material such as morphology, principles of classification and systematics, collection techniques, and the characteristics of the insect orders. Most of this is covered in the first few chapters of your text, but the order characteristics are found in the first few pages of each chapter, so you will need to use the entire book to complete this exam. Again, this is an open book test. Test 1 will be scheduled in week 6 of the course. Test 1 comprises 25% of your grade.
- Test 2 is insect recognition, based on photographs. You will be asked to identify orders and families. You can use images to help you recognize the insects, but because it is time limited you will not have time to do more that confirm a few; you will need a pretty good idea of what the important orders and families look like in advance of the test. Test 2 will be scheduled in the last week of classes. Test 2 comprises 25% of your grade.
- The insect collection comprises 50% of your grade. The collection is due (received) 2 weeks before the end of the semester.
- Exact dates will be announced by email.

The final grade will be assigned as:

A=>93  
A-=90-92.9  
B+=87-89.9  
B=83-86.9  
B-=80-82.9  
C+=77-79.9  
C=73-76.9  
C-=70-72.9  
D+=67-69.9  
D=63-66.9  
D-=60-62.9  
E=<60
Insect Collection Requirements

An insect collection is due 2 weeks before the end of the semester. The collection comprises a substantial portion of the course grade, so please take it seriously. Take into account the weather conditions in your area and plan to collect on warm, sunny days early in the semester. Please don’t wait until the last minute to collect. Also, curation of the collection takes considerable time, so you want to leave the last few weeks before the collection is due to work on labeling and pinning, and of course identification. See Collecting and Preserving Insects handout.

Collections will not be returned to you unless you have made prior arrangements with your instructor. We cannot send you a bill for shipping costs, so please pre-pay if you would like your collection returned. If you send your collection by USPS, you can include stamps for the return shipping amount and an address label with your collection, and we will return your collection. Collections not returned will be donated for education and outreach events. The latter option is usually a good one, as collections sent twice through the mail often are not in such great condition!

Specific collection requirements
A. ENY 4161 (undergrad version of the course)
   1. Representatives of 12 insect orders
   2. Representatives of 75 insect families

B. ENY 6161 (grad version of the course)
   1. Representatives of 16 insect orders
   2. Representatives of 100 insect families

Please try to avoid submitting immature insects. If pinned, they shrivel, and as noted below, you should try to avoid submitting specimens in alcohol. Each specimen should have an order and family label, and should be grouped by order/family. Specimens should be arranged in phylogenetic order at both the order and family level based on the textbook. All specimens not identified to the family level should be placed at the end of their respective order and clearly marked as undetermined specimens.

Make and submit a typewritten content list of your entire collection. This list should provide each order and then family in phylogenetic order. A total of the number of families should be provided at the bottom of the content list. Alcohol specimens should either be placed in the collection held down by pins (this can be dangerous to your collection!) or in a separate container (much preferred). If turned in separately, please indicate this on your list. Also, include a reference list of keys or other sources used for determinations for each identification. So, for example, if you identify a staphylinid you might indicate:

Example 1. Coleoptera, Staphylinidae (Borrer and White, 1970, p. 160) or
Example 2. Coleoptera, Staphylinidae (Triplehorn and Johnson, 2005, p. 383) or

Please note that the insects must be collected and identified by you, and you need to tell me specifically where you got your identity. Do not submit specimens from other students, or that have been purchased.

For this class, you may pin or point all specimens. Only soft-bodied insects are curated in alcohol, but you are not required to use alcohol vials. The shipping of alcohol is becoming more and more restricted, so you may want to pin all of your specimens. Also, if you package vials in with pinned specimens they sometimes break loose and destroy the pinned specimens, so it is best if you don’t preserve insects in vials, but if you do, I recommend that you package them separately (obviously these will be out of ‘phylogenetic order’).

The insects should be submitted in a strong box of some type. If sent through the mail, they should be double boxed, and the inner box cushioned. Insects that are poorly curated will not be graded, and each collection should
be presented in a professional manner. Collections postmarked after the due date will not be accepted. Each specimen must be pinned or spread properly (if appropriate) and must be in good condition. All specimens should be identified to order and family, and should be properly labeled. Be sure to neatly arrange the insects under the order label. See Tips for Collecting and Preserving Insects handout: note that these photos are from the introductory entomology course, which has a smaller collection requirement; they serve to illustrate the basic requirements, but not the scale (size) of the collection.

Other information about this course:

**Academic Honesty, Software Use, UF Counseling Services, Services for Students with Disabilities**

In 1995 the UF student body enacted a new honor code and voluntarily committed itself to the highest standards of honesty and integrity. When students enroll at the university, they commit themselves to the standard drafted and enacted by students.

In adopting this honor code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the university community. Students who enroll at the university commit to holding themselves and their peers to the high standard of honor required by the honor code. Any individual who becomes aware of a violation of the honor code is bound by honor to take corrective action. The quality of a University of Florida education is dependent upon community acceptance and enforcement of the honor code.

**The Honor Pledge:** We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

On all work submitted for credit by students at the university, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.”

The university requires all members of its community to be honest in all endeavors. A fundamental principle is that the whole process of learning and pursuit of knowledge is diminished by cheating, plagiarism and other acts of academic dishonesty. In addition, every dishonest act in the academic environment affects other students adversely, from the skewing of the grading curve to giving unfair advantage for honors or for professional or graduate school admission. Therefore, the university will take severe action against dishonest students. Similarly, measures will be taken against faculty, staff and administrators who practice dishonest or demeaning behavior.

Students should report any condition that facilitates dishonesty to the instructor, department chair, college dean or Student Honor Court.

It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor.

This policy will be vigorously upheld at all times in this course.

**Software Use:**

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

**Campus Helping Resources**

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university’s counseling resources. Both the Counseling Center and Student Mental Health Services
provide confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance. The Counseling Center is located at 301 Peabody Hall (next to Criser Hall). Student Mental Health Services is located on the second floor of the Student Health Care Center in the Infirmary.

- University Counseling Center, 301 Peabody Hall, 392-1575, [www.counsel.ufl.edu](http://www.counsel.ufl.edu)
- Career Resource Center, CR-100 JWRU, 392-1601 ext: 0, [www.crc.ufl.edu](http://www.crc.ufl.edu)
- Student Mental Health Services, Rm. 245 Student Health Care Center, 392-1171, [www.shcc.ufl.edu/smhs](http://www.shcc.ufl.edu/smhs)

Alcohol and Substance Abuse Program (ASAP)

Attention Deficit Hyperactivity Disorder (ADHD)

Center for Sexual Assault / Abuse Recovery & Education (CARE)

Eating Disorders Program

Employee Assistance Program

Suicide Prevention Program

- Student Complaints
  [http://www.distance.ufl.edu/student-complaints](http://www.distance.ufl.edu/student-complaints)
- E-learning help desk
  [http://helpdesk.ufl.edu/](http://helpdesk.ufl.edu/)

**Students with Disabilities**

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues.

0001 Reid Hall, 392-8565, [www.dso.ufl.edu/dr](http://www.dso.ufl.edu/dr)