

Spring Semesters
Insect Classification
(ENY 4161, 6166)
Time TBA, Steinmetz Hall,
Rm TBA

Instructor: Dr. Marc Branham
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IF YOU FEEL ILL OR TEST POSITIVE FOR COVID19, PLEASE DO NOT COME TO CLASS.

The goal of this course is to provide you with a sound theoretical and practical understanding of both insect diversity and the practice of classifying organisms. The lectures will discuss the general principles of systematics, history of insect classification, construction and use of identification tools, nomenclature, and the biology and evolutionary history of the orders of hexapods. The laboratory work will focus on the means of recognition of the major groups of insects (to order and family) as well as in class exercises applying the concepts discussed in lecture. A collection is required that will further refine your ability to identify insects to the level of order, family and in many cases the level of species. 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, understand and employ the methods used by professionals to classify not only insects, but animals in general.

Although this course does not concentrate on systematic theory, an attempt is made to explain why competing classifications exist in insect taxonomy, and what existing classifications imply about broad patterns of evolutionary change and diversification within insects.

Learning Objectives:

After completing this course you should be able to:

- Sight identify all hexapods 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 illustrating the evolutionary relationships among hexapod orders.
- Collect insects and associated field data in different habitats using a variety of techniques.

- Curate specimens properly for deposition into a museum collection, including labeling, pinning, point mounting and preservation in ethanol.
- Describe the process of taxonomy: how species are described, named and classified.
- Explain the importance of insects to global biodiversity and conservation.

Course Prerequisites:

ENY 3005, Principles of Entomology, or a similar course dealing with the classification of insects.

REQUIRED Text:

Triplehorn, C.A. and N.F. Johnson. 2005. Borror and DeLong's Introduction to the Study of Insects, 7th edition. Thomson Brooks/Cole, Belmont, CA.

Additional Recommended Resource:

Borror, D.J. and R.E.White. 1970. Insects of America North of Mexico. Peterson Field Guide Series 19. Houghton Mifflin Co., Boston, MA.

Final Grading Scale:

Scale: Percentage	93–100	A
	90–92	A-
	87–89	B+
	83–86	B
	80–82	B-
	77–79	C+
	73–76	C
	70–72	C-
	67–69	D+
	63–66	D
	60–62	D-
	59–below	E

For further information about the current UF Grading Policies for assigning grade points, go to <http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>.

Grading Criteria:

Undergraduate

Exam 1	18%
Exam 2	18%
Lab exercises and quizzes	20%
Collection	34%
Class participation (collecting, discussions, etc.)	10%

Graduate

Exam 1	15%
Exam 2	15%
Lab exercises and quizzes	17%

Collection	30%
Library Project (Literature Review)	17%
Class participation (collecting, discussions, etc.)	6%

Course Schedule:

Week	Topic	Quiz
1	Collection methods and review of insect mouthparts	
	Study morphology (cockroach, fly, moth, bee)	
2	Taxonomy, systematics and classification; Homology	Quiz #1
	Insect pinning and curation, sign out of course related equipment	
3	Principles of Classification	
	Major lineages of insects	
4	Tools for identification - Keys and their use; packing insect specimens for shipment	Quiz #2
	Entognathous hexapods and minor insect Orders	
5	Collecting Field Trip (Feb. 7)	
	Ephemeroptera and Odonata; Major lineages of neoptera	
6	Orthopteroid Orders	Quiz #3
	Neuropteroids and Paraneoptera Lecture	
7	Mini Collection Due (Feb. 21), Review for Exam #1	
	<u>Exam #1 (Feb. 23)</u>	
8	Hemiptera, (Paper topic due)	Quiz #4
	A History of Insect Classification	

9		Zoological nomenclature	
		Species concepts and descriptions	
10	<u>SPRING BREAK</u>	<u>SPRING BREAK</u> (a good time to nab more insects)	
11		Coleoptera	Quiz #5
		Diptera	
12		FIELD TRIP - FL State Collection of Arthropods	
		Lepidoptera	
13		Open lab time and collecting	Quiz #6
		Hymenoptera, Grad. Lit. Review Due. (April 5)	
14		Guest Lecture	
		Open lab time	
15		Collection Due (April 17) Review for Exam #2	
		Open lab time, Equipment Return	
16		<u>Exam #2 (April 24)</u>	
	<u>NO CLASSES</u>	READING DAYS	
17		No Final Exam	

Lecture Exams:

Lecture exams will be composed of both written and practical sections. The written section will be composed of at least one (if not more) of the following type questions: multiple choice, short answer, fill in the blank or essay. The final lecture exam is not cumulative.

Laboratory Exercises and Quizzes:

The laboratory exercises and quizzes will only cover material presented in lecture or lab. No quizzes can be made up without prior approval, but the lowest quiz score will be dropped.

Exercises will generally focus on the students applying concepts recently presented, either individually or in a group setting.

Mini collection:

In late February, your mini collection will be due at the beginning of class . This is my way of making sure that you don't leave all of your collecting till the end of the course. On that date, you should plan on turning in specimens representing at least 8 orders that are correctly pinned, labeled and identified. In addition to your pinned insects (which are to be identified and properly labeled) please also include at least one point-mounted specimen and at least one specimen in a vial containing alcohol (EtOH). A "Collection Contents List" is also required with the Mini Collection (see requirements for main collection for details of how to format this.) As with your major collection requirement, please arrange the insect orders phylogenetically from most basal to most derived (i.e., in the order found in Triplehorn and Johnson).

Collection:

The collection requirement for (undergraduate students) is 18 Orders, 100 families and 15 species identifications; for (graduate students) it is 22 Orders, 120 families and 20 specimens determined to species.

Each collection is to be accompanied with a citation list of those materials used to make species determinations. If I cannot find a work listed in your list of citations, I will be suspicious of your determination and will investigate further... I suspect that most of the references you use for making species determinations will be books and scientific journals. If you use references from the www, you need to also include with your List of Citations a printed copy of the information available on the websites cited (in addition to citing the website (the citation should include its URL.))

Each correctly identified **order** is worth 2 points; each correctly identified **family** and **species** determination (genus and species) is worth 1 point – points will be awarded for each taxon only once. The remaining 25 points will be based upon the curatorial quality of the specimens (i.e., properly mounted and labeled). No credit will be given for specimens that are in such bad shape that we cannot identify them!

I will award +2pts extra credit for each additional (correctly identified) insect Order included in the collection that is above the Order requirement specified above.

If the collection (and its components) are turned in after (10am) on the specified late April date, 30pts. per day will be deducted from the collection grade (beyond 10am on specified date)

Collection Requirements:

- 1) In addition to a locality label, each specimen is to contain an identification label indicating to which Order and Family it belongs. For the specimens that are determined to species, the genus and species are to be placed on the identification label with the order and family names (see template example), and the borders of these labels (bearing species names) are to be colored green. The green borders will aid us in finding the species determinations while grading your collection.

- 2) All specimens belonging to each insect Order are to be grouped together under a separate “header label” (containing the name of the Order). This header label should be pinned to the bottom of the insect box. Insects that are correctly identified to Order (via the ID label on the same pin as the specimen) but are not placed under the correct “Order header label” will result in 2 points being subtracted from the overall score given to the collection.
- 3) With the insect collection, each student is required to turn in a “Collection Contents List.” This list should list how many specimens are present in the collection for every family. In addition, families need to be grouped within the Order they appear in the collection. **If no “Collection Contents List” is turned in with the collection, the collection will not be graded and a score of zero will be entered for the collection requirement.**

Ex. COLEOPTERA

Carabidae – 4 specimens
Dytiscidae – 1
Haliplidae – 1
Cantharidae – 4

LEPIDOPTERA

Nymphalidae – 3 specimens
Geometridae – 1
Danaiidae – 1
Saturniidae – 2

Note: The spelling of the names on the “Collection Content List” will be important – use care and be accurate.

- 4) Specimens should be both listed on the “Collection Content List” and placed in the Collection, in the order in which they appear in “Triplehorn and Johnson, 2005” as applies to Order only. Ex. from Protura to Hymenoptera. This is to ensure that your collection is organized from the most basal (primitive) to the most advanced (derived) taxa. This will allow you to see a progression of morphological specialization across Insecta and will aid us in locating certain insect taxa when grading your collection.
- 5) **The insect collection, “collection contents list” and “list of citations used for species determinations” are all due at the beginning of the period on specified date - late April). [If no lists, collection grade = 0.]**

Conditions Concerning Specimens to Be Used In Fulfillment of the Insect Collection Requirement:

- 1) **Specimens that were used for the collection requirement of any course must not be included in the collection required for this course. (Specimens turned in from this**

category will result in a collection grade of zero (and will constitute academic misconduct.)

- 2) Specimens to be used for the insect collection requirement must have either been collected by the student turning in the collection, or specimens collected by a classmate who is currently enrolled in the classroom section of ENY 4116 or 6166.
- 3) Specimens collected by a classmate that were subsequently traded or given to another classmate and used in their collection must bear a label which indicates who collected the insect.
- 4) All identifications of specimens are to be made by the owner of the collection. These identifications include those made for material acquired through trading with classmates.
- 5) Specimens obtained from protected area such as, but not restricted to, National (and State) Parks and Preserves, for which the collector does not possess a valid collecting permit, are illegal. The collection and possession of such specimens also constitute academic misconduct. Such occurrences WILL BE reported by the instructor. (I am required to do this).
- 6) Rules concerning “Academic Misconduct” apply to all specimens and specimen labels submitted (turned in) for the insect collection requirement of this course. A violation of these Rules could result in dismissal from the University.

Field Trips:

During the course of the semester we will go to a variety of habitats to maximize your exposure to immature insects. By doing so, it also maximizes the risk of coming across something that could harm you. Ticks, chiggers, widow spiders, mosquitoes, biting flies, reptiles, plants and other environmental hazards will be encountered during these trips, so dress accordingly. Appropriate dress includes shoes, long pants, long sleeve shirt and a hat. Although this recommendation does not completely eliminate the risks associated with outdoor activity, it does reduce it considerably. A change of clothes is a good idea if you are one that doesn't mind getting into your work. Insect/tick repellent and sunscreen may also necessary for these trips along with snacks and water.

In early Feb. , the class will have a required collecting trip to a location around Gainesville. We will meet in our classroom at the normal class time and will take Entomology Department vans to a suitable collection site and will return later.

Library Project -Literature Review (required for the graduate students):

The goal of the library project is to conduct a review of the published literature on a taxon of your choice. The taxon should be one of the smaller insect Orders or a major subgroup of one of the megadiverse Orders (Coleoptera, Diptera, Hymenoptera, or Lepidoptera). *Your choice of a taxonomic group must be made and approved by the instructor by **specified date, late Feb.*** The literature review should begin where your textbook leaves off, i.e., approximately 2005. You should summarize

findings on family-level (or higher) systematics, classification, keys, and fossils. Please include a synopsis of the current classification and a bibliography of important works. Do not depend solely on resources available on the Internet. I expect you to use the library. **Both a hard copy and an electronic copy of this literature review will be due at the beginning of class (early April)**

Attendance:

Students are responsible for all material distributed in and/or discussed in class. In the case of skipped classes, students are advised to obtain lecture notes and handouts from classmates unless there is a legitimate excuse, in which case I will be happy to help. Make-ups are not given except under circumstances of excused absence. Letting me know of a conflict or problem ahead of time may be all it takes to reach an arrangement.

Additional General Information: The following information applies to courses at the University of Florida.

Online Course Evaluation Process

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. Students are expected to complete course evaluations online via GatorEvals. Guidance on how to give feedback is available at: <https://gatorevals.aa.ufl.edu/students/> Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/> Summaries of course evaluation results are available to students at: <https://gatorevals.aa.ufl.edu/public-results/>

Academic Honesty

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following 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." You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

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.

For issues with technical difficulties for Canvas, please contact the UF Help Desk at:

- <http://helpdesk.ufl.edu>
- (352) 392-HELP (4357)
- Walk-in: HUB 132

Services for 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. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation

0001 Reid Hall, 352-392-8565, <https://disability.ufl.edu/>

Campus Helping Resources

Campus Helping Resources Students experiencing crises or personal problems that interfere with their general wellbeing are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides 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.

- University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, www.counseling.ufl.edu Counseling Services Groups and Workshops Outreach and Consultation Self-Help Library Wellness Coaching
- U Matter We Care, www.umatter.ufl.edu/
- Career Connections Center, First Floor JWRU, 392-1601, <https://career.ufl.edu/>.
- Student Success Initiative, <http://studentsuccess.ufl.edu>.

Student Complaints

- Residential Course: <https://sccr.dso.ufl.edu/policies/student-honor-code-studentconduct-code/>
- Online Course: <http://www.distance.ufl.edu/student-complaint-process>

Remember: your student fees have already paid for these services. Using them when needed is getting the best value for your money.