

TAXONOMIC ENTOMOLOGY

ENTOM 539

Fall 2020, 4 credits

Instructor: Dr. Elizabeth Murray, Department of Entomology
Washington State University

Course Logistics

Lectures (4 credits):
Mon & Wed: 11.10 - 12.00
online Zoom video

Labs (included, 0 credits):
1 in-person per week
Mon & Wed: 2.10 - 5.00
FSHN 354

professor:

Elizabeth Murray
(she/her)
e.murray@wsu.edu
phone: 509-335-2089
office: FSHN 260

For in-depth questions, I
prefer communicating by
phone or Zoom.

teaching assistants:

Paul Bergeron
paul.bergeron@wsu.edu

Abbey Hayes
abigail.hayes@wsu.edu

our online platform: Blackboard

go to the Blackboard site:
<https://learn.wsu.edu>

office hours for instructors
are by request; contact us!

Course description

This course is designed for graduate students in entomology. The course will provide a broad overview of insect diversity, morphology, phylogeny, evolution, and fossil history. We will discuss the origins of insects, evolutionary relationships among orders and families, the fossil record of insects, the methods commonly used to reconstruct phylogenies, and how our interpretation of the relationships of insects are changing with new data and methods.

Insects are the most diverse group of animals on the planet, due in a large part to their morphology. You will develop a good understanding of the basic morphological features of insects and how these features have been modified over 400+ million years of insect evolution. We will cover the comparative external morphology of adult insects. You'll learn important diagnostic characters for insect orders and families to aid in sight identification. You'll gain skills in collecting and curating specimens and working them through taxonomic keys.

Some of the skills you'll acquire in this course:

How to interpret a phylogeny & understand the phylogenetic methods section in a scientific paper.

How to collect, pin, and preserve insects so that they are ready to serve scientists for the next hundred+ years.

How to identify common insects to family.

How to build a website.

The instructors will provide – and expect from students – an atmosphere for learning that respects diversity and encourages a welcoming learning community. Respect in the classroom includes being on time for class (yes, even online!), directing attention to the speaker, refraining from browsing the internet during class meetings, and maintaining an inclusive environment for all participants.

Course Logistics

schedule:

we will have a 'flipped classroom' approach – this means that you will watch the posted lecture videos before class and we will use the class time to interact & discuss

lectures will be delivered via Zoom (the link is posted in Blackboard)

we will usually not meet online during the Monday lecture period, but you are expected to be online for lectures on Wednesdays

class communications: Microsoft Teams

please direct all course-related questions to our Microsoft Teams group, so that every student has the opportunity to benefit from the information

please also answer each other's questions on Teams when you can!

I'll respond to emails and Team communications within 48 hours on workdays. Abbey and Paul will also be monitoring.

Learning objectives

1. Understand basic relationships of insects and have a broad understanding of their natural history. Identify key innovations and life history strategies of major hexapod lineages. Master the ability to interpret a phylogeny & understand the phylogenetic methods section in a scientific paper.
2. Learn how to recognize insect orders and identify common insects to family. Practice collecting techniques necessary in the field of entomology. Develop insect identification skills in the field and in the lab using the teaching collection and taxonomic keys.
3. Learn how to collect, pin, and preserve insects so they can be used for hundreds of years. Develop skills in labeling, curating, and shipping hexapod specimens.
4. Develop an appreciation for systematics and taxonomy. Describe the process of describing and naming a species and understand the importance of natural history museums as a resource in the sciences.
5. Gain knowledge in science communication and web design. Write scientific information on Palouse insect species & peer review classmate's websites.

Special covid-19 considerations

Students are expected to abide by all current COVID-19 related university policies and public health directives, which could include wearing a cloth face covering, physically distancing, self-attestations, and sanitizing common use spaces. All current COVID-19 related university policies and public health directives are located at <https://wsu.edu/covid-19/>. Students who do not comply with these directives may be required to leave the classroom; in egregious or repetitive cases, students may be referred to the Center for Community Standards for university disciplinary action.

Textbook for lab: **Introduction to the study of insects**, 7th ed. Johnson and Triplehorn (2005).

Additional books you may find useful: **Pacific Northwest Insects** (Merrill A. Peterson), **Insects: Their Natural History and Diversity** (Stephen Marshall)

Other lab materials will be available in FSHN 354 and many documents & taxonomic keys will be provided electronically.

Assessments, schedule, and grading policy:

LAB:



- 5% participation & attendance
- 10% field notebook
- 5% lab quiz
- 30% final collection

lecture + lab contribute to the final course grade



LECTURE:



- 10% participation & attendance
- 15% lecture quizzes
- 10% final exam
- 15% webpage

LECTURE:

participation & attendance (10%): includes synchronous activities, in-lecture polling and answers, and occasional short home work

lecture quizzes (15%): 5 quizzes at 3% each; you'll take 6 total with lowest score dropped → the quizzes will be 10 points, open book – but timed, and cover recently-learned material

final exam (10%): take home

webpage (15%): The webpage project will involve scientific writing for the public, scientific illustration or photography, website design, and the use of our department insect museum collection. We'll work on it throughout the semester, with training and feedback. Due Nov. 30.

LAB:

participation & attendance (5%): includes occasional in-lab tasks or assignments

field record (10%): five field notebook entries & iNaturalist records to accompany them → navigate to our course project site at: <https://www.inaturalist.org/projects/entom539>

lab quiz (5%): in person quiz on family identifications; spelling counts!

final collection (30%): The largest single-graded item; details given elsewhere. Due Dec 11.

| Grade | Percentage Range |
|-------|------------------|
| A | 94-100 |
| A- | 90-93 |
| B+ | 87-89 |
| B | 84-86 |
| B- | 80-83 |
| C+ | 77-79 |
| C | 74-76 |
| C - | 70-73 |
| D+ | 67-69 |
| D | 60-66 |
| F | <60 |

Grading:

Expectations for student effort: For each hour of lecture equivalent, students should expect to have a minimum of two hours of work outside class.

DEADLINES: I expect all work to be on time. If you know in advance you'll need extra time, please contact me. Otherwise, 10% a day will be deducted for late work.

Schedule

The schedule will be modified as necessary. We will inform you & post updated info to Blackboard as needed. Please check Blackboard for monthly specific calendar information.

| Wk | Date | Day | Lecture | 'in-person' activity, quiz | Lab group schedule | Lab topic & activity |
|-------------------------------------------------|--------|-----|-----------------------------------------------------------------------------|----------------------------|------------------------|-------------------------------------|
| 1 | 24-Aug | Mon | Course overview; Insecta | survey | no in-person lab | intro to lab; via Zoom |
| | 26-Aug | Wed | how do we classify insects? morph, DNA, etc.; importance of phylogenies | tree-thinking | no in-person lab | intro to lab; via Zoom |
| 2 | 31-Aug | Mon | tree-building process & methods; trait mapping; comparative analyses | intuitive parsimony | A group Lab 1 | field trip 1; UI Arboretum |
| | 2-Sep | Wed | taxonomy and species delimitation | | B group Lab 1 | field trip 1; UI Arboretum |
| 3 | 7-Sep | Mon | Labor Day - no class | holiday | holiday | NO LAB |
| | 9-Sep | Wed | nomenclature, ICZN | quiz 1; submit question | B group Lab 2 | field trip 2; Colfax Trail |
| 4 | 14-Sep | Mon | insect morphology: bauplan and structures | | A group Lab 2 | field trip 2; Colfax Trail |
| Abbey | 16-Sep | Wed | Metazoa: Arcticulata vs. Ecdysozoa; Phylogeny of Arthropoda: Pancrustacea | | all A & B! Doug Yanega | invited speaker at 2:10 - 3:00 |
| 5 | 21-Sep | Mon | Phylogeny of Hexapoda & entognaths | | A group Lab 3 | field trip 3; Smoot Hill |
| | 23-Sep | Wed | Phylogeny of the apterygot insects and Paleoptera | quiz; guest: John Pfeiffer | B group Lab 3 | field trip 3; Smoot Hill |
| 6 | 28-Sep | Mon | Phylogeny of Polyneoptera I | | A group Lab 4 | field trip 4; Virgil Phillips Park |
| | 30-Sep | Wed | Phylogeny of Polyneoptera II | Kahoot | B group Lab 4 | field trip 4; Virgil Phillips Park |
| 7 | 5-Oct | Mon | Phylogeny of Paraneoptera I | | A group Lab 5 | intro to lab; wingless hexapods |
| | 7-Oct | Wed | Phylogeny of Paraneoptera II | quiz 3; website design | B group Lab 5 | intro to lab; wingless hexapods |
| 8 | 12-Oct | Mon | Phylogeny of Holometabola I | | A group Lab 6 | Polyneoptera |
| | 14-Oct | Wed | Phylogeny of Holometabola II | Kahoot | B group Lab 6 | activity: spreading Leps |
| 9 | 19-Oct | Mon | Phylogeny of Hymenoptera I | | A group Lab 7 | Paraneoptera |
| | 21-Oct | Wed | Phylogeny of Hymenoptera II | quiz 4 | B group Lab 7 | activity: WSUC museum visit |
| 10 | 26-Oct | Mon | Phylogeny of Coleoptera I | | A group Lab 8 | Hymenoptera, Neuropterida |
| Paul | 28-Oct | Wed | Phylogeny of Coleoptera II | Kahoot | B group Lab 8 | activity: point mounting, photos |
| 11 | 2-Nov | Mon | Phylogeny of Diptera I | | A group Lab 9 | Coleoptera + Strepsiptera |
| | 4-Nov | Wed | Phylogeny of Diptera I | quiz 5 | B group Lab 9 | optional activity: photography |
| 12 | 9-Nov | Mon | Phylogeny of Lepidoptera I | | A group Lab 10 | Diptera, Mecoptera, Siphonaptera |
| | 11-Nov | Wed | Veterans Day - no class | | holiday | NO LAB |
| asynchronous peer review of websites, Nov 12-13 | | | | | | |
| 13 | 16-Nov | Mon | ESA - no class due to ESA | | no class, ESA | NO LAB [ESA meeting] |
| | 18-Nov | Wed | ESA - class held: Phylogeny of Lepidoptera II | | B group Lab 10 | con't: activity: packing & shipping |
| 14 | 23-Nov | Mon | THANKSGIVING BREAK | | holiday | NO LAB |
| | 25-Nov | Wed | THANKSGIVING BREAK | | holiday | NO LAB |
| 15 | 30-Nov | Mon | 'key innovations'; diversification; evolutionary 'success' | | A group Lab 11 | Lepidoptera + Trichoptera |
| Abbey | 2-Dec | Wed | insect biogeography; distributions, relect taxa | quiz 6 | B group Lab 11 | activity: present your websites |
| 16 | 7-Dec | Mon | importance of natural history collections | | A group Lab 12 | LAB QUIZ! |
| | 9-Dec | Wed | wrap up & conclusions | | B group Lab 12 | activity: work on your collection |
| | 11-Dec | Fri | final collections due (125 families ID'd); last day of instruction for term | | | |
| | 18-Dec | Fri | take home final exams due; feel free to turn them in earlier in the week | drop lowest quiz score | | |

Students will be split into two groups for lab in order to maintain social distancing. You will attend either Monday or Wednesday. The two sections will go to the same sites for field trips.

Assignments & other deliverables:

There will be occasional assignments for both the lecture and lab. The TAs and I will remind you of deadlines, and some reminders will be automatically added to the Blackboard calendar.

Much of the homework will involve electronic submissions. I will let you know how to submit assignments, if needed. For assignments or in-lecture embedded 'quizzes' in Panopto (which are electronically recorded), automatically-generated scores will be available on Blackboard. Keep up with the lectures to get the participation points!

Attendance policy: Please contact me if you foresee any problems in attending class. We will be monitoring attendance for lectures and labs, and I'll check in with you if there are >3 absences. We are facilitating interactive learning in this course, so it's beneficial for you to attend classes.

In a typical week, you will have synchronous learning for four hours maximum — one lecture period and one lab period. Keep making progress on your collection!

Expectations:

You can expect that I and the TAs will strive to be fair and equitable. We want you to find the class engaging and beneficial, and we want you to do well and master the course content. Please let me know if there is something I need to know about you, or accommodations you may need. I will maintain flexibility with any circumstances that may arise this semester. I expect that students will put forth effort to succeed and will work to learn new skills, gain knowledge, and complete tasks. I hope you try to contribute your unique perspective during discussions, share knowledge when you can, and help us to maintain a collegial environment.

Inclusivity statement: We understand that our members represent a rich variety of backgrounds and perspectives. The instructor and the teaching assistants are committed to providing an atmosphere for learning that respects diversity. Please be open to the views of others, honor the uniqueness of your colleagues, and value each other's opinions and communicate in a respectful manner.

Academic integrity statement: All members of the university community share responsibility for maintaining and promoting the principles of integrity in all activities, including academic integrity and honest scholarship. Students are responsible for understanding the full Academic Integrity Statement found at <https://vpue.wsu.edu/policies/statements/>. Students who violate WSU's Academic Integrity Policy (identified in WAC 504-26-010(3) and -404) will receive a zero on the assignment, may fail the course, will not have the option to withdraw from the course pending an appeal, and will be reported to the Office of Student Conduct. If you have any questions about what is and is not allowed in this course, you should ask the course instructor.

Reasonable accommodation statement: Reasonable accommodations are available for students with a documented disability. All accommodations must be approved. For more information contact a disability specialist on your home campus. See information at: <https://gradschool.wsu.edu/rights-and-responsibilities/>

Religious observances or activities: Washington State University reasonably accommodates absences allowing for students to take holidays for reasons of faith or conscience or organized activities conducted under the auspices of a religious denomination, church, or religious organization. Reasonable accommodation requires the student to coordinate with the instructor on scheduling examinations or other activities necessary for course completion. Students requesting accommodation must provide written notification within the first two weeks of the beginning of the course and include specific dates for absences. Approved accommodations for absences will not adversely impact student grades. Absence from classes or examinations for religious reasons does not relieve students from responsibility for any part of the course work required during the period of absence. Students who feel they have been treated unfairly in terms of this accommodation may refer to Academic Regulation 104 – Academic Complaint Procedures.

Safety and emergency notification: Please sign up for emergency alerts on your account at MyWSU. For more information on this subject, campus safety, and related topics, please view the FBI's Run, Hide, Fight video and visit the classroom safety page <https://provost.wsu.edu/classroom-safety/>.

Lauren's Promise. I will listen and believe you if someone is threatening you. WSU Counseling and Psychological Services 509-335-2159 (crisis services line)