

# Entomology– Fall 2024

ZOOLOGY 3430 and 3435 – 3 Credits (+1 lab)

Utah Valley University

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## **Instructor Information**

Dr. Carl E Hjelman (he/him)

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## **Office hours:**

Monday 2:30-3:30pm, Thursday 11:30am-12:30pm or by appointment

## **Resources:**

### **Text (required):**

Lecture: Essential Entomology 2<sup>nd</sup> edition—McGavin and Davranoglou

Lab: Princeton Insect Field guide

Recommended: Other field guides, such as Kaufman, Audubon, Peterson, etc. may be beneficial

**Collecting Materials:** I will provide you with the basic supplies to get your collections going: Nets, forceps, pins, aspirators, vials, and other items. However, realize that there are other items that can also be used: Other nets, waders, kick screens, spreading boards, pinning blocks, blacklights, pitfall traps, and other items.

## **Course website:**

Canvas. Additional helpful resources are also available on <https://cehjelman.github.io>  
You can access these sites from any computer linked to the internet.

**Access to Canvas will be critical as assignments, grades, updates, and other announcements will be posted there.**

## **Course Information:**

This course is designed to be an introductory course in entomology for students with an advanced knowledge of basic biological principles and animal diversity. We will cover broad topics in entomology including insect biology, reproduction, physiology, morphology, taxonomy, systematics, phylogenetics, and evolution. Insects are the most diverse organisms on the planet, and we will explore their scope of morphological and

taxonomic variation, their specialization and diversity, and correlate all this information with major trends in insect evolution.

This will be a rigorous course, and you will be required to learn a great deal about insect morphology, taxonomy, phylogeny, and evolution. The course is designed to interweave lectures in morphology with systematics to give you a broad view of insect diversity and evolution. You will learn many insect groups and be able to identify on sight ~75 common families, all hexapod orders, and be able to reconstruct a phylogeny for these groups at the ordinal level.

A collection is required for the lab class. You will **need** to be very diligent at the beginning of the semester (while the weather is still good) to actively collect insects to meet this major requirement. Recognize that this is a major time commitment on your part, and **if you start after the first freeze it will be too late.**

You are required to sign up for the lab (ZOOLOGY 3435) portion of this course. The first few labs will focus on insect collecting. The second set will combine insect identification with labs on internal and external morphology. You will mostly likely have time during lab for insect identification and general collection management, but **you will most likely need to spend significant time outside of class collecting insects, performing identifications, and curating your collections.**

There will be a **couple required collecting trips occurring largely during class time** (Aug 30, Sept 20) that will occur off campus. You will need to arrange transportation for these events. There will be one optional, but highly encouraged, weekend collecting trip that will occur in multiple regions of the state (Sept 13-15). This will require camping for two nights, some hiking, and plenty of collecting. Transportation will be provided for this event. More detail will be provided shortly. Other collection opportunities will likely occur. Please pay attention to canvas announcements for more information.

### **Course Objectives:**

1. Diagram the reproduction systems, embryonic development and life histories of insects.
2. Explain the ecological importance of insects, particularly their relationships to plants and other animals (including humans).
3. Apply the principles of phylogenetics and systematics to entomological diversity.
4. Construct evolutionary trees using morphological and molecular data.
5. Interpret evolutionary trees derived from morphological and molecular data.
6. Classify the major groups of insects based on images and specimens.
7. Describe the anatomy and physiology of insects.
8. Create a quality insect collection of correctly curated and identified specimens.

### **Course Procedures:**

I have provided a preliminary schedule that we will follow, it includes the sequence of topics, reading materials, assignments, etc., however, keep in mind that this schedule is subject to change. You are responsible for all announcements made in class or online, and adjustments to schedule (even if you are not there). If you miss a class or come late after announcements have been made, you are responsible to find out from another student what announcements were made and what material was covered.

### **Lecture Notes:**

Lecture notes or a power point presentation will typically be posted before lecture when possible. These notes will not cover everything said in lecture, but they should prove a useful addition to your notes for understanding and reviewing the concepts.

### **Professor Responsibilities**

It will be my goal in this course to be prepared, organized, and provide a safe, productive environment to learn. Students can be expected to be treated fairly, and with respect. Additionally, all assignments will be graded and returned in a timely manner.

I will be available outside of class time to help any students who ask for it during student hours. If for any reason you cannot meet with me during the pre-determined times, you are welcome to contact me to discuss arranging an additional meeting time. You are always welcome to come by my office, but unless it is arranged in advance, I cannot guarantee I will be available.

The best method to reach me is through e-mail, however, please be patient and recognize that you may not always receive an immediate response. I will do my best to respond in a timely manner within reasonable hours, but e-mails sent late at night will not be responded to until the next day.

### **Disclaimer - Communication and Syllabus Changes**

All items in this syllabus are subject to change or modification to correct errors or accommodate extenuating circumstances. You are responsible for messages sent by me and other UVU officials to your UVU email address. If you do not regularly use this address, please forward your UVU email to the address you regularly use. Please check the email for important class announcements and updates.

### **Disclaimer – Artificial Intelligence and use of tools like ChatGPT**

Artificial intelligence (AI) is becoming an ever-prevalent tool in society and it is important to understand how this tool works. It is important to recognize this as a “tool” and not a “crutch”. AI is prone to “hallucinating” and giving incorrect or false results; it also does

not allow me to gauge **your understanding** of material. I encourage use of all resources for your work but ask that you make it your own and that you do not ask AI to complete your assignments for you. If you utilize AI, be sure to indicate it in your response that you used AI and indicate how you corrected the response and made it your own. If I feel you are not adequately responding or that you are relying on AI too much, I reserve the right to remove points on responses, up to zero credit.

**Assessment:**

Your final grade will be determined by the following formula (to be determined):

<u>Assignment</u>	<u>% of grade</u>
Quizzes and Assignments	20
Midterm Exam	15
Final Exam	20
Lab Practical	15
Insect collection	30
<b>Total</b>	<b>100</b>

- The class will not be graded on a curve
- Your final grade will be calculated on a percentage basis

<u>Cutoff</u>	<u>Grade</u>	<u>Cutoff</u>	<u>Grade</u>
93%	A	73%	C
90%	A-	70%	C-
87%	B+	67%	D+
83%	B	63%	D
80%	B-	60%	D-
77%	C+	<59.5%	E

**Assignments and Project Descriptions**

**Midterm Exam—Due Oct. 13 (15% of final grade)** : You will have one midterm exam taking place over the weekend of Oct. 10-13 (Due 11:59 pm Oct. 13). This exam will be on Canvas and will have the weekend to complete the exam, but will have a specific amount of time to complete the exam. This means once you start the exam, the clock will begin. More information will come as the exam comes closer. Expect multiple choice, short answer, matching, and long answer questions.

**Final Exam—Due Dec. 9 (20% of final grade)**

In a similar format to the midterm exam, the final exam will take place on Canvas over the window of Dec. 6 to Dec. 9 (by 11:59 pm), but you will have a specific amount of time to complete the exam once the exam starts.

**Lab Practical Final—Dec. 6 (15% of final grade)**

This lab practical will focus on identification of specimens in the lab. Be prepared to identify insects to order and family level, as well as identify specific morphological/anatomical sections of the insect body plan. This will take place in the allotted lab time.

**In-Class Quizzes/Assignments: (20% of final grade)**

In lab and class period, expect to see quizzes and assignments corresponding to material and readings. These may occur at the beginning of class or be part of group activities in class. These assignments are meant to gauge your understanding of the material and aid in studying for the comprehensive midterm, final, and lab practical.

**Insect Collection—Due Dec. 6 by lab time (2 pm) (30% of final grade):** You will turn in at the end of the semester a properly curated and accurately identified collection consisting of 30 families, 15 orders, and 75 specimens (these numbers are subject to change depending on how good the collecting is in the Fall).

The collection must consist of material you have collected yourself. While a certain amount of bartering with fellow classmates to exchange material is permitted, the intention of the collection requirement is to get you into the field to observe insects in their natural habitat, collect them, identify them, and properly curate them. **You are not allowed to use specimens that were collected by other students in prior classes or from collections assembled by others.** Just like any other university assignment, there is an expectation that the collection will be your own work. Specific details about the requirements and grading will be worked out in the future. The collection will teach you valuable skills in insect identification and teach proper curatorial techniques. Plan on spending significant amounts of time working on your collection.

**Late work:**

I will keep the window for submitting assignments open, but they will accrue a 10% grade deduction daily.

I understand that life can be chaotic and there are many things outside of your control. **If you are unable to complete an assignment for any reason by the due date, please let me know and we can work something out!** Remember to always let Dr. Hjelman know if you're going to be late!

**Cheating and plagiarism:**

I encourage students to work together to solve problems, unless otherwise explicitly stated. This does not mean copying answers. I do not tolerate cheating of any kind, including copying from another student on exams or assignments. I will impose one of

several penalties for cheating that range from a warning up to assigning a failing grade for the course. Please ask me if you are not sure about what constitutes plagiarism.

## **UVU Policies and Resources**

Policies and Success Strategies (Links to an external site.)

Accessibility Services (Links to an external site.)

- Students who need accommodations because of a disability may contact the UVU Office of Accessibility Services (OAS), located on the Orem Campus in LC 312. To schedule an appointment or to speak with a counselor, call the OAS office at 801-863-8747. Deaf/Hard of Hearing individuals, email [nicole.hemmingsen@uvu.edu](mailto:nicole.hemmingsen@uvu.edu) or text 385-208-2677.

Campus Resources (Links to an external site.)

Technology Support Services

For 24/7 technical support contact Instructure's Canvas Support Live Chat (Links to an external site.)

(385) 204-4930 (Available 24/7)

## **Student Care Statement**

Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to visit <https://www.uvu.edu/studentcare/> for access to a variety of resources. You may also email [care@uvu.edu](mailto:care@uvu.edu) for assistance.

All of us have a need to maintain mental health and benefit from the assistance of professionals to do so. UVU offers mental health services at very low cost (some are free). While there may be a wait list for individual counseling, group counseling may be available in some circumstances. Student Health Services is located in SC 221, telephone 801-863-8876 <https://www.uvu.edu/studenthealth/psych/>. The following community resources are available 24/7- the National Suicide Prevention Lifeline 1-800-273-8255 and the Safe UT Crisis Chat & Tip Line <https://safeut.med.utah.edu/>. You may also access the Crisis Text Line 741-741 or call 9-1-1. If an emergency is happening on campus, call campus police 801-863-5555.

**Tentative Course Schedule**

Here is a tentative schedule for topics. It is your responsibility to make up any work that you might miss if absent. All readings and assignments can be found on Canvas.

Week	Date	Title	Topic	Chapters
1	21-Aug	It's Entomology, not Etymology	Syllabus, Course Intro	
	23-Aug	<b>Lab:</b> Hand out collections, how to collect and curate		Section 3: pp 279-302
2	26-Aug	I think...	Systematics and Tree Thinking	Section 1: pp 1-8
	28-Aug	No... a spider is not an insect... but it's not that far off	Evolution of Insects from other arthropods	Section 1: pp 1-8
	30-Aug	<b>Lab:</b> Local Field Trip		
3	2-Sep	<b>LABOR DAY—NO CLASS</b>		
	4-Sep	The anatomy of "outside bones"	Insect body plans, external anatomy	Section 1: pp 8-34
	6-Sep	<b>Lab:</b> Internal Anatomy, Practice Pinning and Spreading		
4	9-Sep	continued external anatomy	continued external	Section 1: pp 8-34
	11-Sep	Internal anatomy	Digestion, circulation, nervous system	Section 1: pp 8-34
	13-Sep	Lab: Overnight/Weekend Collecting Trip		
5	16-Sep	3M: Mating, Metamorphosis, Molting	Mating, Metamorphosis, Molting	Section 1: pp 8-34
	18-Sep	Where do these terms keep coming from!?!?	Insect ecology: habitats and impact	
	20-Sep	Lab: Afternoon and evening Collecting Trip		

6	23-Sep	All these little guys, where are they hiding?	Basal Hexapods and soil dwellers	Section 2: pp 37-43, 60-68
	25-Sep	The good die young: Mayflies and evolution of wings	Ephemeroptera	Section 2: pp 45-51
	27-Sep	Lab: Basal Hexapods		
7	30-Sep	House of the Dragon(flies): they don't spit fire, but....	Odonata	Section 2: pp 51-59
	2-Oct	Do you want to blend in or not....: camouflage, behavioral plasticity, and acoustic communication	Polyneoptera	Section 2: pp 73-118
	4-Oct	Lab: Polyneoptera		
8	7-Oct	Did you know termites are cockroaches?	Polyneoptera	Section 2: pp 73-118
	9-Oct	What's biting trees, books, and other animals?	Psocodea	Section 2: pp 123-134
	11-Oct	Lab: Hemiptera, Thysanoptera, Psocodea		
9	14-Oct	Sucking and screaming: the real "bugs"	Hemiptera	Section 2: pp 134-155
	16-Oct	Wait, we can get viruses from something other than mosquitos?		
	18-Oct	<b>FALL BREAK—NO CLASS</b>		
10	21-Oct	An inordinate fondness for beetles	Coleoptera	Section 2: pp 172-189
	23-Oct	Acid, flashing lights, and chemical warfare		
	25-Oct	Lab: Coleoptera and Neuroptera		
11	28-Oct	Are these aliens? Plus, some ambush predators	Strepsiptera and Neuropterida	Section 2: pp 156-171, 189-196
	30-Oct	Did you know that wasn't a mosquito in the Jurassic World movie?	Diptera	Section 2: 196-227
	1-Nov	Lab: Hymenoptera, Trichoptera, and Lepidoptera		
12	4-Nov	Something's gotta eat that: flies and decomposition ecology	Diptera, Mecoptera, Siphonaptera	Section 2: 196-227



	6-Nov	Waterworld, minus Kevin Costner	Plecoptera and Trichoptera	Section 2: 69-73, 228-235
	8-Nov	Lab: Siphonaptera, Mecoptera, Diptera		
13	11-Nov	Insect Plant Interactions	Insect plant interactions	
	13-Nov	Lepidopterans	Lepidopterans	Section 2: 235-255
	15-Nov	Lab: Work and Collections and Practice IDs		
14	18-Nov	This is how we get ants...	Hymenoptera	Section 2: 255-277
	20-Nov	To Bee or not to Bee		
	22-Nov	Lab: Work on Collections and Practice IDs		
-	25-Nov	<b>THANKSGIVING BREAK—NO CLASS</b>		
	27-Nov			
	29-Nov			
15	2-Dec	Do you want to build a... Phylogeny?	Phylogeny reconstruction	
	4-Dec	Come on let's go and play		
	6-Dec	Lab: Collections Due and Lab Practical		

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