

## **ENTOMOLOGY 6310: INSECT PHYSIOLOGY AND MOLECULAR BIOLOGY**

**FALL SEMESTER 2021**

### **COURSE SYLLABUS**

**COURSE TIME:** Mondays & Wednesdays 9:35-10:55 am

**Location:** Columbus campus: 451 Kottman Hall

Wooster campus:

**CREDIT HOURS:** 3 hrs.

**MODE OF DELIVERY:** In-person

**PRE AND/OR CO-REQUISITES:** Graduate standing and previous ENTMLGY course

**Instructor:** Professor MEGAN MEUTI

[meuti.1@osu.edu](mailto:meuti.1@osu.edu)

**Office:** 232C Howlett Hall

**Office phone:** 614-688-2829

**Office hours:** M 1:00 – 3:00 pm; W 2:00 – 4:00 pm & by appt.

### **COURSE DESCRIPTION:**

Insects and other arthropods represent the most diverse group of organisms on Earth and play essential roles in natural and agricultural ecosystems. Furthermore, insects serve as model systems that enhance our understanding of several biological processes in other animals, including humans. Additionally, several insect species are agricultural pests while others transmit diseases that negatively impact human and animal health. In this course we will explore the physiological and molecular mechanisms that have contributed to the evolutionary success of insects, as well as the ways in which we have illuminated and manipulated aspects of insect physiology to our advantage. Topics of particular interest include insect growth and development, digestion and excretion, osmoregulation, respiration, circulation, sensory perception and communication. Throughout the course we will evaluate and critique primary scientific literature to get a sense of the past, present and future of the field of insect physiology, as well as the seminal experiments and techniques that illuminate(d) how insects function. We will also apply our knowledge in diverse ways; comparing and contrasting the physiology of insects with diverse life histories.

The goals of this graduate level course are not only for you to obtain mastery in understanding how insects function, but also to help you understand and appreciate how insect physiology relates to other aspects of insect ecology, evolution, behavior and control. Although this course will be intellectually challenging, it should also be one of the most exciting, fascinating, and useful courses that you take. Please be sure to help one another (i.e. study together, discuss topics outside of class with one another, share notes, critique one another's writing/thinking) and do not hesitate to let me know what I can do to help you succeed in this course and to fall in love with the wonders of insect physiology!

**LEARNING GOALS:**

- I. Master an understanding of how insects function.
- II. Become familiar with the past, present and future of insect physiological research.
- III. Synthesize information and apply what you know to diverse systems.
- IV. Understand the connections between insect physiology and molecular biology, and how these relate to insect evolution and ecology and can be used to improve human health and pest control.

**LEARNING OBJECTIVES:**

Successful students will be able to:

1. Discuss the relationship between molecular and anatomical structures that allow insects to function in their environments.
2. Illustrate how various molecular and physiological systems are interdependent.
3. Evaluate seminal experiments conducted by the major players in the field of insect physiology and how their work contributed to our current understanding of insect physiology.
4. Compare and contrast the molecular biology and physiological systems among insects with diverse life histories.
5. Effectively communicate aspects of insect physiology to diverse audiences.
6. Analyze the interchange between an insect species' physiology/molecular biology and its evolution, ecology, and behavior.
7. Predict which aspects of insect physiology can be used for control purposes.

**READING MATERIALS AND RESOURCES:**

- **Required Text:** *Physiological Systems in Insects*, 3<sup>rd</sup> Edition. 2013. Marc Klowden.

\*Note: You can use earlier editions of this book. However, pages on the assigned reading correspond to this, most recent edition of the text.

- Journal articles, videos and other materials will be posted to the course website on Carmen and/or provided in class

**All reading assignments must be completed prior to class.**

## COURSE FORMAT:

The course will primarily consist of interactive lectures. I expect you to stop me whenever you have a question, and you can expect me to ask you questions during the class period. Most classes will also have an active learning exercise where I will check for your understanding of the concepts that were presented, and also generate discussion among the class. Therefore, it is once again imperative ***that you come to class prepared, having thoughtfully read and annotated the assigned reading material and reviewed your notes.***

I will post Powerpoint slides of the lectures to the Carmen site after class. However, material will be presented that is not on the Powerpoint slides, such as diagrams, drawings, etc. Therefore, it is ***imperative that you attend each lecture and take NOTES.*** When you must miss class due to an illness, conference or other reason, please be sure to get notes from a friend and classmate. Terms that are important/I expect you to know will be written in blue font on the Powerpoint slides.

## TECHNOLOGY REQUIREMENTS:

- **Computer:** current Mac (MacOS) or PC (Windows 10) with high-speed internet connection.
- **Webcam:** built-in or external webcam, fully installed and tested for Zoom meetings with peers and/or the instructor.
- **Microphone:** built-in laptop or tablet mic or external microphone

If you do not have access to the technology you need to succeed in this class, review options for [technology and internet access](https://go.osu.edu/student-tech-access) (go.osu.edu/student-tech-access).

## REQUIRED SOFTWARE:

- Zoom (to connect with instructors and peers outside of class)
- Microsoft Office suite (e.g. Word, PowerPoint, Illustrator) or equivalent programs to create assignments.
  - Note that we do NOT expect you to purchase any expensive software for this course and are happy to work with you to find free programs/templates/software.
- Adobe Acrobat or equivalent programs to open and save assignments as PDFs

## TECHNOLOGY SUPPORT:

For help with your password, university email, CarmenCanvas, or any other technology issues, questions or requests, contact the IT Service Desk, which offers 24-hour support, seven days a week.

- **Self Service and Chat:** [go.osu.edu/it](https://go.osu.edu/it)
- **Phone:** [614-688-4357](tel:614-688-4357) (HELP)
- **Email:** [servicedesk@osu.edu](mailto:servicedesk@osu.edu)

## POLICIES AND EXPECTATIONS:

- **Class attendance:** 100% attendance is expected, and absences will prevent you from learning the material and earning full credit for course participation. Please see me immediately about conflicts due to conferences, research responsibilities or prior scheduling conflict. Also, please email me if you are ill or have a family or medical emergency that will keep you from class.
- **Participation and preparation:** Rather than a traditional bell-to-bell lecture, I want this course to be a *dialogue or lively discussion of fascinating topics among close colleagues*. In order to create this kind of learning environment, you should participate fully in each class. I expect you to have thoughtfully read the assigned material before each meeting. You should expect me to call on you; better yet, volunteer or raise your hand! Please feel free to ask me questions, add insights, and ask for clarification during class.
- **Scheduling and Deadlines:** Meeting deadlines is an important aspect of **professionalism** in science and all other careers. Please plan carefully. Exam schedules and deadlines for submitting assigned work are firm, and extensions due to research, teaching or assignments in other courses will only be granted if you ask BEFORE the deadline. Accommodations due to illness or other personal situations are granted with proper documentation (i.e. doctor's note, obituary). There will be a 10% penalty applied for every day after you turn in your assignments for up to 3 days. After this time, I will not accept your assignments for credit.
- **Grading philosophy:** As fellow teachers, you probably understand that you do not give your students points, nor take away points away from your students. Instead, you determine how many points your students have earned for their work. This is how I will assess your work.

I sincerely hope that you earn full credit on all assignments and am here to help you by clarifying any instructions and answering any questions that you have about course material. **Ultimately, your grade is up to you.** As you are all highly bright, hardworking and intelligent students, I am confident that you will be able to earn the grade that you want in this course. 😊

This course will require you to think critically, connect course concepts and apply what we are learning. Therefore, I encourage you to complete assignments as early as possible (e.g. a day before the deadline) so that you can ask any questions about what you should do/how your work will be assessed.

- **Grades and Grade Disputes:** Graded material will be made available to you either in class or via pick-up in my office within 2 weeks of the assignment deadline. I encourage you to carefully look over the feedback on your assignments. Please be sure to see me if you do not understand why any of your answers were incorrect/did not earn full credit. If you feel that a mistake was made while grading an exam or quiz, you have the right to dispute the grade. You must discuss your dispute with me no later than **two weeks after the graded quiz/exam has been made available to you**. After that time, the grade is final.

## POLICIES AND EXPECTATIONS (CONTINUED):

- **Academic Integrity: Do NOT lie, cheat, or plagiarize.** All quizzes and most assessments must be completed *individually and be your own work*. Specific instructions will be given for how you are to complete the collaborative group exam. In writing assignments, properly cite your sources of information, and acknowledge the help you receive from others. Some of your assignments will be assessed with a plagiarism checking software (TurnItIn and/or iThenticate).

**Unacceptable** behaviors include:

- Copying quiz questions or sharing them, **in any form**, with future students (e.g. posting them to a public Quizlet).
- Using notes or the internet during quizzes
- Copying assignments from other students.
- Appropriating someone else's ideas as your own (also known as plagiarism), which can include, but is not limited to, failing to cite sources and not writing the work in your own words.

Ohio State's policy on academic misconduct will be strictly observed; *if you are suspected of any academic misconduct, I must and will report you to the Committee of Academic Misconduct (COAM).* Below is their statement:

- "It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the [Code of Student Conduct](http://studentconduct.osu.edu) at <http://studentconduct.osu.edu>."

*If you have any questions about the above policy or what constitutes academic misconduct in this course, please let me know.*

- **Intellectual property:** As fellow educators, you are probably aware that generating course materials takes significant time and intellectual investment. Therefore, I consider my lectures, PowerPoints, quizzes, exams and other instructional materials to be my intellectual property. Please do not distribute or share my materials, either virtually or on paper without asking me first. Please also ask before recording lectures (audio or visual) and plan to use those recordings for your own personal review (e.g. do not distribute them). Recognizing that your work is also your intellectual property, I will not share or distribute your work without your permission.

## POLICIES AND EXPECTATIONS (CONTINUED):

- **Note-taking:** Using your laptop, tablet or smart phone to make calculations, access relevant databases and take notes are encouraged. However, research shows that ***students learn more and do better when they take notes by hand*** ([\*Bonner and Holliday, 2006 J. Research in Science Teaching\*](#)); ***therefore I strongly encourage you to write out your notes.*** 😊
- **Time commitment:** The university standard is that every 1 credit hour of class credit will require 1 hour of class time and 2 hours of outside class time. *Specifically, because this is a 3-credit hour course you should plan to spend approximately 6 hours/week outside of class.* Your time should be spent reading the textbook/assigned readings (2-3 hrs/week), working on course assignments (1-2 hrs/week), and reviewing your lecture and reading notes (1-2 hrs).
- **Contacting the instructor and office hours:** Please attend office hours whenever you have concerns about the course or are experiencing difficulties understanding course material. If you cannot attend during office hours, please send an email so we can arrange another time to meet. Attending office hours is my preferred method of communication, but I also will do our best to respond to all emails within 36 hrs during the week (M-F) and within 48 hrs over the weekend. If you do not hear from me in this timeframe, please feel free to send another email and/or drop by my office.
- **Staying informed:** We will closely follow the schedule on the syllabus and I will provide updates and reminders to ensure that you are staying on track. If I have to make modifications or adjustments to the course, provide further details or clarification, and/or schedule review sessions, I will either send a class email or post a course announcement on Carmen. Students are responsible for all information communicated via email and course announcements. Therefore, we expect you to *check the course website and your OSU email at least once every 24 hrs during the week.*
- **Statement of Intent:** By remaining in this course, you are agreeing to abide by the guidelines outlined in this syllabus. As the instructor, I reserve the right to update and/or correct this syllabus. I will notify you should there be a necessary change to the syllabus.

## SAFE AND HEALTHY BUCKEYES:

Health and safety requirements: All students, faculty and staff are required to comply with and stay up to date on all university safety and health guidance (<https://safeandhealthy.osu.edu>). If you have NOT been vaccinated this includes wearing a face mask in any indoor space and maintaining a safe physical distance at all times. Non-compliance will result in a warning first, and disciplinary actions will be taken for repeated offenses.

## YOUR MENTAL HEALTH:

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life Counseling and Consultation Services (CCS) by visiting [ccs.osu.edu](https://ccs.osu.edu) or calling (614) 292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at (614) 292-5766 and 24-hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-(800)-273-TALK or at [suicidepreventionlifeline.org](https://suicidepreventionlifeline.org)

**David Wirt**, [wirt.9@osu.edu](mailto:wirt.9@osu.edu), is the CFAES embedded mental health counselor. He is available for new consultations and to establish routine care. To schedule with David, please call 614-292-5766. Students should mention their affiliation with CFAES when setting up a phone screening.

## ACCESSING THE WRITING CENTER:

Many students struggle to clearly express their ideas in writing. Fortunately, the **Writing Center** offers free help with writing at any stage of the writing process for all students. During their sessions, consultants can work with you on anything from research papers to lab reports, from dissertations to résumés. Appointments are available in-person at 4120 Smith Lab, as well as for online. You may schedule an in-person or online appointment by visiting WC Online or by calling 614-688-4291. Please note that the Writing Center also offers daily walk-in hours—no appointment necessary—in Thompson Library. You do not have to bring in a piece of writing in order to schedule a writing center appointment. Many students report that some of their most productive sessions entail simply talking through ideas.

## DIVERSITY STATEMENT:

The Ohio State University affirms the importance and value of diversity of people and ideas. We believe in creating equitable research opportunities for all students and to providing programs and curricula that allow our students to understand critical societal challenges from diverse perspectives and aspire to use research to promote sustainable solutions for all. We are committed to maintaining an inclusive community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among all members; and encourages each individual to strive to reach their own potential. The Ohio State University does not discriminate on the basis of age, ancestry, color, disability, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, race, religion, sex, gender, sexual orientation, pregnancy, protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment.

To learn more about diversity, equity, and inclusion and for opportunities to get involved, please visit:

- <https://odi.osu.edu/>
- <https://odi.osu.edu/racial-justice-resources>
- <https://odi.osu.edu/focus-on-racial-justice>
- <http://mcc.osu.edu/>

In addition, this course adheres to **The Principles of Community** adopted by the College of Food, Agricultural, and Environmental Sciences. These principles are located on the Carmen site for this course; and can also be found at <https://go.osu.edu/principlesofcommunity>. For additional information on Diversity, Equity, and Inclusion in CFAES, contact the CFAES Office for Diversity, Equity, and Inclusion (<https://equityandinclusion.cfaes.ohio-state.edu/>). If you have been a victim of or a witness to a bias incident, you can report it online and anonymously (if you choose) at <https://studentlife.osu.edu/bias/report-a-bias-incident.aspx>.

## LAND ACKNOWLEDGEMENT STATEMENT:

We would like to acknowledge the land that The Ohio State University occupies is the ancestral and contemporary lands of the Shawnee, Potawatomi, Delaware, Miami, Peoria, Seneca, Wyandotte, Ojibwe and Cherokee peoples. The university resides on land ceded in the 1795 Treaty of Greenville and the forced removal of tribes through the Indian Removal Act of 1830. We honor the resiliency of these tribal nations and recognize the historical contexts that has and continues to affect the Indigenous peoples of this land.



## **CREATING AN ENVIRONMENT FREE FROM HARASSMENT, DISCRIMINATION, AND SEXUAL MISCONDUCT:**

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Office of Institutional Equity:

1. Online reporting form at [equity.osu.edu](https://equity.osu.edu),
2. Call 614-247-5838 or TTY 614-688-8605,
3. Or Email [equity@osu.edu](mailto:equity@osu.edu)

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.

The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information:

1. Any human resource professional (HRP);
2. Anyone who supervises faculty, staff, students, or volunteers;
3. Chair/director; and
4. Faculty

## REQUESTING DISABILITY ACCOMMODATIONS:

The university strives to make all learning experiences as accessible as possible. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's request process, managed by Student Life Disability Services. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

## IMPORTANT DATES (\*Note: these are subject to change. [Please see registrar linked here](#)):

- Last date to drop without receiving a “W” on your record: **Friday September 17, 2021**
- Last date to drop with a “W” and without petitioning: **Friday October 29, 2021**

## ASSIGNMENTS AND GRADES

Your grade is based on performance in the following areas:

- **1% Initial Meeting:** Within the first two weeks of classes, you need to schedule and meet with me for 15 minutes. The purposes of this meeting are so that we can get to know each other so that you feel comfortable coming to future office hours and come up with strategies for you to succeed in the course 😊 (10 points).
- **10% Course Participation:** 100% attendance is expected. To participate fully in class, you must thoughtfully read and annotate the assigned material before each meeting. Active, vocal contribution is expected from all members of the class and will be the primary determinant of class participation grade.
- **10% Quizzes:** Approximately 11 quizzes (each worth 10 points) will be given over the course of the semester, but only the top 10 quizzes will count towards your grade. Quizzes will generally be unannounced and given in class, but they might be announced or given as take-home assignments. If more than one quiz is missed (e.g., lengthy illness, family emergency) then a make-up quiz can be rescheduled ONLY if a legitimate, documented excuse (e.g., illness, family emergency) is provided to the instructor within a 3 days of returning from the absence.

## ASSIGNMENTS AND GRADES (CONTINUED)

- **20% Homework Assignments (four 50-point assignments):** To help you review for and prepare for exams, you will be given 4 homework assignments throughout the semester. Each assignment will be worth 50 points. The assignments are designed to enhance your understanding of course concepts and exercise higher-level, critical thinking skills. They will be posted on the Carmen website approximately 2 weeks before they are due. Please read the assignment and instructions as soon as possible and let me know if you have any questions. Assignments are due on Fridays by 11:59 pm, and 10% of the total grade will be deducted for up to 3 days after the deadline. Unless stated otherwise, you must complete these assignments individually, without the help or input of your classmates/friends.
- **9% Exam Review Sessions:** Prior to each in-person exam, a course session will be reserved to review the topics on the exam. You will choose or be assigned a topic that you will present to the class during a short (5-10 minute) period. Each of your presentations will be worth 45 points.
- **35% Two Individual, In-person Exams:** There will be one exam scheduled during class (150 points; 15% of total grade) and one final exam (comprehensive; 200 pts; 20%) at the end of the semester. These exams will consist of defining key terms, creating diagrams/models and answering free-response essay questions. The final exam may also contain some multiple choice questions.
- **15% Collaborative Take-home exam (worth 150 points):** Near the middle of the semester you will complete a collaborative, take-home exam with 2-3 of your classmates. For this exam, you will answer some questions similar to those on the in-person exams, read classical and primary literature, and apply what you have learned to analyze and interpret molecular data.

## GRADING SCALE:

This course is out of 1,000 points and uses OSU's standard grading scale. Hence,

Letter	Points
A	930-1000
A-	900-929
B+	870-899
B	830-869
B-	800-829
C+	770-799
C	730-769
C-	700-729
D+	670-699
D	630-669

## TIPS FOR SUCCESS

- Take advantage of all the resources available to you.
  - Your Instructor-feel free to ask me questions before, during, or after class. Stop by my office hours or schedule an appointment to see me. ☺
  - Your peers- form study groups with your classmates. Discussing information and/or teaching your peers is a fantastic way to better learn.
  - Your textbook, and other resources: The textbook, while quite dense, has all of the information that you will need. If something is unclear and/or you need additional background on an area, please look up terms online or in one of your other biology textbooks or books at the library. Also there are no shortage of helpful YouTube videos on all sorts of biological concepts/principles that can help you.
  - The Dennis Learning Center offers several free tutoring options, including individual appointments with learning specialists that can help you develop better motivational and study practices. [Click here for more information](#).
  - The Writing Center. [Link here](#) and see information above.
  - Caring and Consultation Services. [Link here](#) and see information above.
- Develop good study habits.
  - Read the chapters in your textbook before class and take reading notes. A good technique for getting through dense textbooks is **SQ3R**. It stands for Survey, Question, Read, Rephrase and Review.
    - **Survey** the text for major headings and figures to get a sense of what you'll read
    - **Question**: Write a few questions about the headings, emboldened terms.
    - **Read** the text one paragraph at a time
    - **Rephrase**: In your own words, the major idea of the paragraph, figure/diagram that you have just read. WRITE THIS DOWN in your reading notes.
    - **Review**: Return to the questions that you initially developed and ensure that you can answer them. Review the major headings and figures again to ensure that you understand them.
  - Take notes and ask questions during class!!!!
  - Make sure to complete and review your homework assignments. These assignments put the concepts we learn in lecture into practice. You may find a few of these questions (or similar questions) on the exams!
  - Look over quiz questions and understand where and why you failed to earn full credit.
  - COME TO OFFICE HOURS!!!! Ask questions that you have about the reading material, lecture notes, homework assignments, quizzes, and exams. That is why I am here!

## TIPS FOR SUCCESS (CONTINUED)

- Review the material regularly. Try to do a little something for this course every day of the week. Cramming at the last minute is not a good strategy!
  - You need to devote approximately 3 hours of quality study time outside of class per week for every hour spent in class. That means that you should be spending ***approximately 6 hours of outside study time per week for this class.***
- Anticipate/write out possible quiz and exam questions, and answer them without using your notes/textbook.
- “Teach” the material to your peers, or act like you’re teaching it to your parents, friends or imaginary students. It sounds crazy, but as many of you know, by teaching/explaining the material to others, we actually learn it better ourselves.
- Develop good time management skills. Time management is difficult in all stages of your career. By developing good habits now, you will set yourself up for success in the future.
- Get enough sleep!

## COURSE SCHEDULE:

Week	Week Day	Date	Before Class	During Class	After Class
0	W	8/25/2021	NA	Course overview and knowledge assessment quiz	Schedule appt with Megan
1	M	8/30/2021	Read/watch posted materials	Molecular Biology Refresher	Meet with Megan (10 participation points)
	W	9/1/2019	Papers on RNAi and CRISPR/Cas9	Insect Molecular Biology: Modern techniques	
2	M	9/6/2021	No Class: Labor Day		A1: Socratic teaching interview to explain to friend/family member how IGR's work, and the potential of RNAi and gene drive-based control.  <i>Assesses Learning Objectives 2, 5 and 7</i>  <b>Due Fri. Sept. 17, 2021</b>
	W	9/8/2019	Read Klowden pgs. 1-19 (Signaling systems to PTTH)	Introduction to Insect Hormones	
3	M	9/13/2021	Read Klowden pgs 40-58 (JH, CA & other neuropeptides)	The Corpora Allata and Juvenile Hormone	
	W	9/15/2021	Read Klowden pgs. 19-40 (PTTH, ecdysteroids)	Brain neuropeptides and the prothoracic gland	

## COURSE SCHEDULE (CONTINUED):

Week	Week Day	Date	Before Class	During Class	After Class
4	M	9/20/2021	Read Klowden pgs 89-112	Integument	Study notes and prepare for exam review session
	W	9/22/2021	Read Klowden pgs 112-130 (Molting)	The molting process	
5	M	9/27/2021	Lecture & Reading Notes	Catch-up/ Student -led review session	Study
	W	9/29/2019	Review	In-person Exam 1	Relax!
6	M	10/4/2021	Read Klowden pgs. 197-228	Reproduction: Generating egg and sperm	A2: Compare and contrast the reproductive, respiratory and digestive systems of insects with diverse life histories.  <i>Assesses Learning Objectives 1, 4 &amp; 6</i>  <b>Due Friday Oct 15<sup>th</sup></b>
	W	10/6/2021	Read Klowden pgs. 149-181	Embryogenesis	
7	M	10/11/2013	Read Klowden: pgs. 446-467	Respiration: Structure and function of tracheal system	
	W	10/13/2021	Read Klowden 305-338	Insect Digestion	
8	M	10/18/2021	Read Klowden 415-436	Insect Digestion II	Prepare topic for review session
	W	10/20/2021	Read Klowden 305-338	Guest lecture by Dr. Piermarini: Insect Osmoregulation	
9	M	10/25/2021	Lecture and reading notes	SKID/Catch-up	Take home exam 2:  <i>Assesses Learning Objectives 2, 3, and 6</i>
	W	10/27/2019	Posted readings for take-home exam	Group Take-home Exam Meeting	
10	M	11/1/2019	No class; ESA Meeting		<b>Due Sunday Nov. 7th</b>
	W	11/3/2021	Read Klowden: pgs. 366-391	Circulation (Recorded lecture; No class)	

## COURSE SCHEDULE (CONTINUED):

Week	Week Day	Date	Before Class	During Class	After Class	
11	M	11/8/2021	TBD	Guest Lecture by Dr. Short: Insect Immunity	A3: Insect flight and neuropesticides  <i>Assesses Course Learning Objectives 1, 3 &amp; 7</i>  <b>Due Friday Nov 19<sup>th</sup></b>	
	W	11/10/2021	Klowden pgs. 477-490	Insect Muscles		
12	M	11/15/2021	Read Klowden pgs. 529-557	Nervous system: structural organization		
	W	11/17/2019	Read Klowden: pgs. 557-565; 609-616	Sensory Physiology: Mechanoreception		
13	M	11/22/2021	Read posted review articles	Ecophysiology: Diapause	A4: Insect diapause: Evolution, hormonal regulation, and ecological significance  <i>Assesses Course Learning Objectives 2, 4 &amp; 6</i>  <b>Due Friday Dec 3<sup>rd</sup></b>	
	W	11/24/2021	No Class: Thanksgiving Break :)			
14	M	11/29/2021	Read Klowden: pgs. 617-634	Sensory Physiology: Chemoreception		
	W	12/1/2021	Read Klowden pgs. 565-582; 603-608	Sensory Physiology: Photoreception		
14	M	12/6/2021	Read Klowden pgs. 255-277; 283-285	Behavioral physiology	Prepare for final exam	
	W	12/8/2021	Prepare review session materials	Student-led Review Session		

**Final Exam Monday Dec 13, 2021  
10:00 am – 11:45 am**