

Insect Behavior Syllabus

ENTMLGY 5490 Spring 2023

Course Information

- **Course times and location:** Wednesdays and Fridays 9:35AM-10:55AM in Jennings 140 or Wooster Science Bldg 300. Instructor will lecture from Jennings on Wednesday and WSB on Friday with live Zoom to other classroom.
- **Credit hours:** 3
- **Mode of delivery:** Hybrid in person and Zoom live

Instructor

- **Name:** P. Larry Phelan
- **Email:** phelan.2@osu.edu
- **Phone Number:** 330-263-3728
- **Office location:** Science Building 252 [Wooster]
- **Office hours:** Tuesdays and Thursdays from 1:00 pm - 4:00pm or as arranged
- **Preferred means of communication:**
 - My preferred method of communication for questions is **email**.
 - My class-wide communications will be sent through the Announcements tool in CarmenCanvas. Please check your [notification preferences](https://go.osu.edu/canvas-notifications) (go.osu.edu/canvas-notifications) to be sure you receive these messages.

Course Prerequisites

Junior standing

Course Description

The behavior of insects mediates all aspects of their ecological interactions and evolution. This course will describe the multitude of amazing behaviors expressed by insects and explore how behavior determines their survivorship and fitness. We will discuss the selective forces and constraints driving the evolution of behaviors and the proximal mechanisms that make possible complex expression within the comparatively simple insect nervous system. Specific topics include behavioral ecology and evolution, sociality, learning and cognition, as well as applied aspects of insect behavior.



Learning Outcomes

By the end of this course, students should successfully be able to:

- Appreciate the extraordinary diversity of behaviors and signaling mechanisms that insects have evolved to adapt to their environment.
- Recognize the physiological and ecological pressures that both drive and constrain the evolution of behavior in insects.
- Understand the proximal mechanisms that allow insects to encode information and respond in an appropriate manner at the morphological, neuronal, and hormonal levels.
- Be able to evaluate critically contrary positions in unresolved questions and recognize how personal philosophy and background inform those positions.
- Become familiar with the experimental methodologies used to study insect behavior.
- Be aware of the ways in which understanding behavior is used to control populations of pest and beneficial insects.

How This Course Works

Course Materials and Technologies

Textbook

- No textbook is required for this class. Required readings will be posted on Carmen ahead of some lectures.

Recommended/Optional Materials and/or Technologies

- Alcock, John. 2013. **Animal Behavior: An Evolutionary Approach**. Oxford University Press.
- Matthews, Robert W. and Matthews, Janice R. 2010. **Insect Behavior**, 2nd ed., Springer, Dordrecht, Netherlands.

Required Equipment

- **Computer:** current Mac (MacOS) or PC (Windows 10) with high-speed internet connection.

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

Required Software

Microsoft Office 365: All Ohio State students are now eligible for free Microsoft Office 365. Visit the [installing Office 365](https://go.osu.edu/office365help) (go.osu.edu/office365help) help article for full instructions.

CarmenCanvas Access

You will need to use [BuckeyePass](https://buckeyepass.osu.edu) (buckeyepass.osu.edu) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you do each of the following:

- Register multiple devices in case something happens to your primary device. Visit the [BuckeyePass - Adding a Device](https://go.osu.edu/add-device) (go.osu.edu/add-device) help article for step-by-step instructions.
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes, good for 365 days, that can each be used once.
- [Install the Duo Mobile application](https://go.osu.edu/install-duo) (go.osu.edu/install-duo) on all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at [614-688-4357 \(HELP\)](tel:614-688-4357) and IT support staff will work out a solution with you.

Technology Skills Needed for This Course

- Basic computer and web-browsing skills
- [Navigating CarmenCanvas](https://go.osu.edu/canvasstudent) (go.osu.edu/canvasstudent)
- [CarmenZoom virtual meetings](https://go.osu.edu/zoom-meetings) (go.osu.edu/zoom-meetings)

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
- **Phone:** [614-688-4357 \(HELP\)](tel:614-688-4357)
- **Email:** servicedesk@osu.edu



Grading and Faculty Response

How Your Grade is Calculated

Assignment Category	Points
Midterm exam	30%
Critical paper reviews (top 2 of 3 grades)	30%
Final exam	30%
Class participation	10%

See [Course Schedule](#) for due dates.

Descriptions of Major Course Assignments

Academic integrity and collaboration: Discussion among students concerning lectures and critical reviews is encouraged; however, written assignments should represent your own original work.

1. Exams

Description: The midterm and final exams are administered as closed-book short answer and essay format.

2. Critical reviews

Description: Students will develop their critical thinking skills by learning to critique scientific research articles. Using a provided rubric, critical reviews will be evaluated on ability to identify elements of the study's scientific argument and assess how well the authors support their conclusions.

3. Class participation

Description: As indicated above, I place high value on class participation. When actively engaged, you will learn more from the class and get more out of it. I recognize that speaking in class is difficult for many students. I will strive for a class environment where everyone is comfortable to talk. Asking for clarification or other questions particularly helps classmates learn as well so this activity is valued and reflected in the grading rubric. Students



uncomfortable speaking in class may contribute by posting questions or observations to the Discussion Board in CarmenCanvas.

Late Assignments

All assignments and due dates are noted on Carmen; any changes will be announced via Carmen and/or email. Without an excused absence, a late assignment will be subject to 10% grade deduction during the first two hours, with additional 10% deductions accruing for every hour it is late. Notify me if you anticipate an issue with submitting your work on time.

Instructor Feedback and Response Time

Remember that you can call [614-688-4357 \(HELP\)](tel:614-688-4357) at any time if you have a technical problem.

- **Preferred contact method:** If you have a question, please contact me first through my Ohio State email address. I will reply to emails within **24 hours on days when class is in session at the university**.
- **Class announcements:** I will send all important class-wide messages through the Announcements tool in CarmenCanvas. Please check [your notification preferences](http://go.osu.edu/canvas-notifications) (go.osu.edu/canvas-notifications) to ensure you receive these messages.
- **Discussion board:** I will check and reply to messages in the discussion boards as soon as possible or at least once mid-week and again at the end of the week.
- **Grading and feedback:** For assignments submitted before the due date, I will try to provide feedback and grades within **seven days**.

Grading Scale

93–100: A
 90–92.9: A-
 87–89.9: B+
 83–86.9: B
 80–82.9: B-
 77–79.9: C+
 73–76.9: C
 70–72.9: C-
 67–69.9: D+
 60–66.9: D
 Below 60: E



Other Course Policies

Discussion and Communication Guidelines

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful, particularly as this class includes students at different stages of their education from college Juniors to Ph.D. candidates.

- **Writing style:** Critical reviews are not meant to be formal papers; I am less concerned about grammar and punctuation than content. On the other hand, if I cannot follow the logic of a sentence due to errors in grammar, spelling, or structure, I will have to grade accordingly.
- **Tone and respect:** I insist on maintaining a supportive learning community where everyone feels safe and where people can disagree amicably. Again, this is particularly true with the range of students participating. Remember that sarcasm or irony does not always come across online.
- **Backing up your work:** Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.
- **Synchronous sessions:** When the instructor is lecturing from the alternate campus, you are welcome to attend via Zoom from your location of choice. You should keep your camera on during lectures to get the most out of the time and to limit the delay of turning your camera on when you are called on. You are always welcome to use the [free, Ohio State themed virtual backgrounds](http://www.osu.edu/downloads/zoom-backgrounds.html) (www.osu.edu/downloads/zoom-backgrounds.html). Remember that Zoom and the Zoom chat are our classroom space where respectful interactions are expected.

Academic Integrity Policy

See *Academic Integrity and Collaboration* (above) for guidelines about collaboration and academic integrity in the context of this class.

Ohio State's Academic Integrity Policy

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the university's [Code of Student Conduct](http://studentconduct.osu.edu) (studentconduct.osu.edu), and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the university's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the university

or subvert the educational process.” Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the university’s *Code of Student Conduct* is never considered an excuse for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by university rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the university’s Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the university. If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- [Committee on Academic Misconduct](http://go.osu.edu/coam) (go.osu.edu/coam)
- [Ten Suggestions for Preserving Academic Integrity](http://go.osu.edu/ten-suggestions) (go.osu.edu/ten-suggestions)
- [Eight Cardinal Rules of Academic Integrity](http://go.osu.edu/cardinal-rules) (go.osu.edu/cardinal-rules)

Copyright for Instructional Materials

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

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,
2. Call 614-247-5838 or TTY 614-688-8605,
3. Or Email 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 member."

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>.

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. No matter where you are engaged in distance learning, The Ohio State University's Student Life Counseling and Consultation Service (CCS) is here to support you. If you find yourself feeling isolated, anxious or overwhelmed, [on-demand mental health resources](https://go.osu.edu/ccsondemand) (go.osu.edu/ccsondemand) are available. You can reach an on-call counselor when CCS is closed at [614- 292-5766](tel:6142925766). **24-hour emergency help** is available through the [National Suicide Prevention Lifeline website](https://suicidepreventionlifeline.org) (suicidepreventionlifeline.org) or by calling [1-800-273-8255\(TALK\)](tel:18002738255). [The Ohio State Wellness app](https://go.osu.edu/wellnessapp) (go.osu.edu/wellnessapp) is also a great resource.

Accessibility Accommodations for Students with Disabilities

Requesting Accommodations

The university strives to make all learning experiences as accessible as possible. 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 \(SLDS\)](#). After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. 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.

Disability Services Contact Information

- Phone: [614-292-3307](tel:614-292-3307)
- Website: slds.osu.edu
- Email: slds@osu.edu
- In person: [Baker Hall 098, 113 W. 12th Avenue](#)

Accessibility of Course Technology

This online course requires use of CarmenCanvas (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations as early as possible.

- [CarmenCanvas accessibility](http://go.osu.edu/canvas-accessibility) (go.osu.edu/canvas-accessibility)
- Streaming audio and video
- [CarmenZoom accessibility](http://go.osu.edu/zoom-accessibility) (go.osu.edu/zoom-accessibility)

Course Schedule

Refer to the CarmenCanvas course for up-to-date due dates.

Week	Date	Lec#	Topics, Readings, Assignments, Due Dates
			A. INTRODUCTION
1	11&13-Jan	1-2	Course objectives, Conceptual frameworks for behavior
			Communication
			B. BEHAVIORAL ECOLOGY & PROCESSES
			<i>Mating and reproduction</i>
2	18&20-Jan	3-4	Ultimate causality- Sexual selection/Mating strategies
3	25&27-Jan	5-6	Proximal mechanisms- Chemical
4	01&03-Feb	7-8	Proximal mechanisms- Auditory
5	08&10*-Feb	9-10	Proximal mechanisms- Visual
			<i>Phytophagy & host plant finding/selection</i>
			Ultimate causality
6	15&17-Feb	11-12	Proximal mechanisms- Chemical
			Proximal mechanisms- Visual
			<i>Zoophagy & Prey-/Host-finding</i>
			Ultimate causality
7	22-Feb	13	Proximal mechanisms- Active vs passive mechanisms
	24-Feb		MID-TERM EXAM
			<i>Defense against predation</i>
8	01&03-Mar	14-15	Ultimate causality
			Proximal mechanisms
			C. PROXIMAL MECHANISMS OF MOVEMENT
9	08&10-Mar	16-17	<i>Movement- Local search</i>
			<i>Movement- Non-source-directed</i>
			Dispersal, migration, navigation

10	15&17-Mar		INSTRUCTIONAL BREAK – NO CLASS
			D. BEHAVIORAL PHYSIOLOGY
			<i>Neural organization of behavior- Sensory inputs</i>
11	22&24*-Mar	18-19	Behavioral endocrinology- hormones
			Behavioral endocrinology- rhythms
			Encoding information- Integration of sensory input
12	29&31-Mar	20-21	Directionality
			Odor quality
13	05-Apr	22	Polarized light & color vision
	07-Apr	23	Neural organization of behavior- Motor outputs
			E. COMPLEX BEHAVIORS
14	12*-Apr	24	Behavioral plasticity & learning
	14-Apr	25	Cognition
15	19-Apr	26	Behavior & Origins of Social Systems - Raczkowski
			F. APPLICATIONS OF BEHAVIOR
	21-Apr	27	Managing insect populations
	26-Apr		FINAL EXAM 10:00AM-11:45AM

*Indicates due dates for Critical Reviews

Dates of major course assignments highlighted in scarlet

