

# Pollinator Biology and Conservation Syllabus

ENTMLGY 5150 Spring 2022

## Course Information

- **Course times and location:** 7-week session 2, MWF 3:00-4:20PM; Location 136 Jennings
- **Credit hours:** 2
- **Mode of delivery:** In-person

## Instructor

- **Name:** James P. Strange
- **Email:** [strange.54@osu.edu](mailto:strange.54@osu.edu)
- **Phone Number:** 612-292-9325
- **Office location:** 216 Kottman Hall
- **Office hours:** Mondays 4:30-5:00 pm and Thursdays from 9:00-10:00 a.m.
- **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](https://go.osu.edu/canvas-notifications)) to be sure you receive these messages. I will make the same announcements during in-person lecture as well.

## Course Prerequisites

ENTMLGY 4600 or Graduate Standing.

## Course Description

This course explores the biology and conservation of animal (primarily insect) pollinators of plants. The main focus of the course will be to explore diversity of species that serve as vectors for plant pollen, their life histories, and how humans manage these species for plant production. Because many of our economically important pollinators are insects (e.g., bees, moths, flies and beetles) we will focus heavily on those taxa. The course will conclude by focusing on threats to pollinators, and conservation and management strategies.



# Learning Outcomes

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

- Name the major modes of pollination and the organisms that vector pollen.
- Express the importance, in ecological and economic terms, of pollinators to humans.
- Define the major biological, societal, and political issues related to pollinator conservation.

# How This Course Works

**Mode of delivery:** This course is 100% in-person.

**Credit hours and work expectations:** This is a 2 credit-hour 7-week course. According to [Ohio State policy](#), students should expect to spend 4 hours per week in direct instruction (in-person lectures) in addition to 8 hours of homework (reading and assignment preparation, for example) to receive a grade of (C) average. While most of this course is lecture based, we may travel by foot within the immediate vicinity of our classroom outdoors to further understanding of these topics. The instructor will alert you in class and on Carmen the session before potentially travelling outdoors. If you anticipate any difficulty in participating in this type of session, please notify your instructor to make accommodations, and refer to the accommodations section of this syllabus.

**Attendance and participation requirements:** Research shows regular participation is one of the highest predictors of success. With that in mind, I have the following expectations for everyone's participation:

Students are expected to attend all lectures. If you have a situation that might cause you to miss a class, discuss it with me as soon as possible. Formal attendance will not be taken at class, but material in the course is not covered entirely by the text; attendance will be necessary to receive all lecture information. Special accommodations will not be granted for unexcused absences from this course.

It is the student's responsibility to inform the instructor for reasons for an excused absence from the class as soon as possible. Legitimate excused absences include the following: participation in an activity of an official University organization, verifiable illness (see below), verifiable family emergencies, subpoenas, jury duty, military service, and professional development (e.g., grad school visits). It is the student's responsibility to notify the instructor of any expected, excused absence as far in advance as possible. A verifiable illness is an absence due to illness that is accompanied by a note or documentation by a qualified medical individual. The instructor will discuss accommodations for excused absences with students when they submit their excuses.



# Course Materials, Fees and Technologies

## Required Materials

- Pollinators and Pollination by Jeff Ollerton; Pelagic Publishing Ltd, 2021. ISBN 9781784272289

## Optional Materials

- Pollination: The Enduring Relationship Between Plant and Pollinator by Timothy Walker; Princeton University Press, 2020. ISBN 9780691203751

## Required Equipment

- **Computer:** current Mac (MacOS) or PC (Windows 10) with high-speed internet connection.
- **Webcam:** built-in or external webcam, fully installed and tested
- **Microphone:** built-in laptop or tablet mic or external microphone
- **Other:** a mobile device (smartphone or tablet) to use for BuckeyePass authentication

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

**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 \(go.osu.edu/canvasstudent\)](https://go.osu.edu/canvasstudent)
- [CarmenZoom virtual meetings \(go.osu.edu/zoom-meetings\)](https://go.osu.edu/zoom-meetings)
- [Recording a slide presentation with audio narration and recording, editing and uploading video \(go.osu.edu/video-assignment-guide\)](https://go.osu.edu/video-assignment-guide)
- Use of scientific search engines such as Web of Science, Google Scholar, etc. to access primary literature.

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



# Grading and Faculty Response

## How Your Grade is Calculated

| Assignment Category                                    | Points     |
|--------------------------------------------------------|------------|
| Weekly Quizzes (Weeks 2-7; drop one lowest quiz grade) | 100        |
| Final Exam                                             | 100        |
| Pollinator Fact Sheet                                  | 100        |
| Plant Reproductive Biology Fact Sheet                  | 100        |
| <b>Total points</b>                                    | <b>400</b> |

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

Graduate and undergraduate students will be assessed in this course using the same metrics for all quizzes, exams and assignments. The grading metrics for the fact sheet will be different between the undergraduate and graduate students, graduate students will be expected to provide appropriately cited primary literature and work quality and detail appropriate to publishable extension materials, while the level of detail and amount of primary literature will be lower for undergraduate students.

## Descriptions of Major Course Assignments

### Weekly Quizzes

**Description:** Six weekly quizzes will be given in class (see schedule of assignments). These weekly quizzes will evaluate student understanding of the lecture material presented in the previous week and the reading assignments, although some cumulative understanding of all prior material will be needed.

**Academic integrity and collaboration:** These quizzes are closed book. They will be timed to 15 minutes (unless other arrangements have been made per disability statement) and be primarily multiple choice, fill in the blank, and short answer. Quizzes are worth 20 pts each and the lowest of the six quiz grades will be dropped for the final grading.

### Final Exam

**Description:** Students will be evaluated on their learning with a final exam. This exam will include portions of multiple choice, short answer questions, and long answer essay questions



designed to illustrate the students understanding of the concepts. The exam is cumulative.

**Academic integrity and collaboration:** The exam will occur in person during finals week. Students should not work with others.

## Pollinator and Plant Reproductive Biology Fact Sheets

**Description:** Two two-page Extension style fact sheets will be assigned. The plant fact sheet will focus on the pollination biology of a single plant species and will draw from primary literature (with appropriate citations) to outline the biology and ecological/economic importance of the plant. The pollinator fact sheet will similarly outline the role of the pollinator in pollination of plants. Fact sheets should be understandable by a general audience. The assignments will be discussed in the first week of the course and examples of fact sheets and references appropriate to student status (undergraduate or graduate) will be supplied to the students.

**Academic integrity and collaboration:** Each student must turn in a fact sheet for each assignment (pollinator or plant reproduction) that represents their own work; however, collaboration is permitted and encouraged. Each fact sheet is worth 100 points.

## Late Assignments

Please refer to Carmen for due dates. Due dates are set to help you stay on pace and to allow timely feedback that will help your complete subsequent assignments. Late materials are subject to a reduction in grade by 10% for each 24-hour period overdue. If you are unable to turn in an assignment due to an excused absence, the instructor will discuss a modified due date with you when you submit your excused absence reason.

## Instructor Feedback and Response Time

I am providing the following list to give you an idea of my intended availability throughout the course. 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 (Monday-Friday)**.
- **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. All class announcements will also be given during in-person lecture.
- **Grading and feedback:** For assignments submitted before the due date, I will try to provide feedback and grades within **seven days**. Assignments submitted after the due date may have reduced feedback and grades may take longer to be posted.



## 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

## Academic integrity policy

All quizzes and the final exam will be taken in-person, closed book during scheduled class time. Specific collaboration instructions for fact sheet assignments will be discussed in class as indicated by the schedule. The expectation for all assignments in this course is that students turn in their own work and should not turn in copies of another student or scholar's work.

## 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* ([studentconduct.osu.edu](http://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 web page ([go.osu.edu/coam](http://go.osu.edu/coam))
- *Ten Suggestions for Preserving Academic Integrity* ([go.osu.edu/ten-suggestions](http://go.osu.edu/ten-suggestions))
- *Eight Cardinal Rules of Academic Integrity* ([go.osu.edu/cardinal-rules](http://go.osu.edu/cardinal-rules))

## 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>). Non-compliance will result in a warning first, and disciplinary actions will be taken for repeated offenses.

## 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.

## Commitment to a diverse and inclusive learning environment and 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](http://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 member.



## 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>.

## 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.

## Accessibility accommodations for students with disabilities

### Requesting 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](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 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 with your instructor.

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

# Course Schedule

Refer to the CarmenCanvas course for up-to-date due dates. Students can expect to be prepared for lecture material through the reading and review of the listed readings.

| Week                                       | Points | Topics                                                                                                                      | Readings (Ollerton) | Assignments (value)                                                                                         |
|--------------------------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------|
| 1                                          |        | Course overview<br>Pollination overview: Plant reproduction, floral anatomy, abiotic pollination                            | Chapter 1 and 3     |                                                                                                             |
| 2                                          | 10     | Animal Pollinators: Bats, Birds, Butterflies, and Bees<br>Discuss Plant Reproductive Biology Fact Sheet Assignment (3/7/22) | Chapter 2 and 4     | Quiz in class 3/9/22: Plant Reproductive Biology (20)                                                       |
| 3/14-3/18/22; Spring Break; no assignments |        |                                                                                                                             |                     |                                                                                                             |
| 3                                          | 10     | Entomology Meetings: Lectures online (Monday and Wednesday)<br>Coevolution, Syndromes, and Systems of Pollination           | Chapter 5 and 6     | Quiz in class 3/21/22: Pollinators (20)                                                                     |
| 4                                          | 35     | Importance of Pollination for Humans, Agriculture, and Ecosystems<br>Discuss Pollinator Fact Sheet Assignment               | Chapters 7-9        | Quiz in class 3/28/22: Coevolution (20)<br>Plant Reproductive Biology Fact Sheet (100); Due 3/30/22 11:59PM |
| 5                                          | 10     | Threats to Pollinators, Management of Bees                                                                                  | Chapter 10 and 11   | Quiz in class 4/4/22: Pollinators and Humans (20)                                                           |
| 6                                          | 35     | Conservation of Pollinators                                                                                                 | Chapter 12 and 13   | Quiz in class 4/11/22: Threats to Pollinators (20)<br>Pollinator Fact Sheet Due                             |



|                   |     |                                                      |            |                                                         |
|-------------------|-----|------------------------------------------------------|------------|---------------------------------------------------------|
|                   |     |                                                      |            | 4/15/22 by 11:59PM (100)                                |
| 7                 | 10  | Current Trends in Pollination Research               | Chapter 14 | Quiz in class 4/18/22: Conservation of Pollinators (20) |
| 8<br>4/25/22 only |     | Review for final exam                                |            |                                                         |
| Finals week       | 100 | Final Exam; Friday April 29 <sup>th</sup> , 4-5:45PM |            | 100                                                     |

