Syllabus 2024: Pollinators ENTOM 120

Course: Pollinators**,** ENTOM 120, 3 credits
Format: Lecture, Tuesday & Thursday 1:05 – 2:20 PM
Location: 124A Waters Hall
Offering: Every spring semester
Instructor: Dr. Brian Spiesman
Email: bspiesman@ksu.edu
Office: 234 Waters Hall
Office hours: By appointment

Course Description

Welcome to Pollinators! This course will examine the diversity of animal pollinators, their ecology, current threats to pollinators, and their conservation. We will explore some of the details of these topics through lecture, readings, discussions, in-class projects, and an independent research project.

When most people think about pollinators, they think mainly of just one species: the honey bee, *Apis mellifera*. However, there are at least 20,000 different species of bees, not to mention the thousands of other butterfly, moth, beetle, wasp, hummingbird, bat, and lizard species that pollinate flowering plants. Plants and their animal pollinators have co-evolved in a way that has helped drive the diversity of forms we see – not only in the number of species but in how pollinators interact with plants, how animals use flowers to survive and reproduce, and how flowers attract pollinators. This biodiversity is critical for maintaining our natural ecosystems and providing humans with food. However, it has become clear that many pollinator populations are in decline, which is mainly driven by human-caused factors.

In the first part of the course, we will explore pollinator diversity and get a sense of what it means to be a pollinator. Later in the course we will learn about their ecology, threats, and strategies for conservation. Students will develop a research project on pollinators and present their findings to the class.

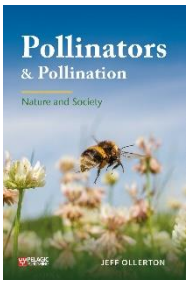
Student learning objectives

Upon course completion, you will be able to:

1. Understand the diversity of animal pollinators and the diverse ways they function as pollinators.
2. Understand some of the basic concepts of pollinator ecology.
3. Understand how and why pollinators are important for agriculture and nature.
4. Understand some of the threats to pollinator biodiversity and the consequences of pollinator loss for ecosystems.

5. Critically read literature on pollinators, including peer-reviewed scientific papers and news stories.
6. Understand the scientific method.
7. Develop a research project.
8. Enhance your ability to communicate science orally and in written form.

Textbooks and course materials
There is no required textbook. However, it is recommended that students buy Ollerton to supplement course lectures. Additional readings will be posted on canvas.



Ollerton, J. 2021. **Pollinators & Pollination: Nature and Society**. Pelagic Publishing. 289 pp. ISBN: 9781784272289

Other readings will be provided in PDF format and posted on Canvas. Required readings for each week will be announced in advance.

Attendance Policy
Students are expected to attend all lectures. However, if you are ill, please stay at home and contact Dr. Spiesman once you are feeling better. Make up work for quizzes, class discussions, and in-class activities will not be allowed (unless under special circumstances arranged in advance with Dr. Spiesman) because students can drop their lowest scores in each of these categories.

Students who may need special accommodations for coursework will need to speak with me by the end of the second week of class, 26 January 2024, to make certain that these accommodations can be met.

Expectations for a 3 credit-hour course
This class meets for 75 minutes, twice a week over the Spring semester (16 weeks) and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc.) for about 3 hours out of classroom for every class period.

Course Grading
Letter grades will be assigned based on the total number of points earned by the end of the semester in the class. The final score will be based on:

Participation	10 pts
Discussions (4)	40 pts
In-class activities (7)	70 pts
Quizzes (7)	70 pts
Research project	130 pts
Midterm exam	100 pts
Final exam	120 pts
TOTAL	**540 pts**

Grade	**Point range**
A	486 - 540
B	432 - 485
C	378 - 431
D	324 - 377
F	< 323

Summary of class activities:

Participation

Your score for overall participation will be based on attendance and engagement in lectures, in-class activities, and participation in class discussions. Asking and answering questions, engaging with your peers on group problems is noticed and encouraged.

Discussions

For class discussions (40 pts total), we will use readings from the scientific literature to help you understand pollinator issues, how pollinators are studied using the scientific method. The ability to critically read and interpret this literature will help you evaluate the science on pollinators but also general news items on a range of topics. In 4 sessions throughout the semester, you will be asked to read papers for discussion in small groups of 2 or 3 and all together as a class. Students will take turns being discussion leaders to help facilitate discussions. To prepare, all students will need to carefully read the assigned papers and be prepared to inform the rest of the class about their content so they can participate in thoughtful discussions. ***Students can drop their 1 lowest discussion score, thus, make-up discussions will not be allowed.***

In-class activities

We will have 7 in-class activities (10 points each). ***You can drop your lowest score; thus, students will not be allowed to make up missed in-class activities.*** Activities will be designed to explore some of the concepts presented in lecture and may be indoor lab-style activities or outdoor observations.

Quizzes
There will be 9 quizzes (10 pts each) throughout the semester that will cover material presented in lectures and readings and will take place at the beginning of class. ***Your lowest 2 quizzes for the semester will be dropped.*** No makeup quizzes will be given so if you miss class on a day that a quiz is given, this will count as one of your 2 dropped quiz scores.

Exams
There will be 2 exams, an in-class midterm (100 pts) and an in-class final (120 pts). Exams will include questions from the readings, class activities, and lecture material. There will be a student-driven review session where students can ask questions about the material before each of the exams.

Research Project
To evaluate your ability to synthesize the material learned in the course and to think critically about current issues around pollinators, you will design, conduct, and present an individual research project (130 pts total).

The project will have three components:

A. Designing and writing up in outline form, a proposal for your research (40 pts)
2. Collecting and analyzing data from observations in the field or from online sources to answer your research questions (40 pts)
D. Presenting your research findings to the class with a short PowerPoint presentation (50 pts)

More detail will be given later in the semester on the project, but briefly, you will first design a project centered around an interesting research question. You will submit an outline of your project plan that must be approved by Dr. Spiesman before you can begin. After approval, you may begin collecting data based on your proposed methodology. You will have some in-class time to work on your project, but it is expected that you will also work on your project outside of class time. Contact Dr. Spiesman if you have any questions or problems along the way. Weather is probably the biggest variable to consider for projects that depend on observing visitation, so plan accordingly. Your project results will be presented to the class at the end of the semester.

Extra credit
You may receive extra credit for making sightings of the 6 bumble bee species in Kansas. Five points per species for a maximum of 30 points. Sightings must be original

by you and of live bees in nature. To receive points, you must show me an image of your sighting with date and location. You can use the BeeMachine app if you like to record your sighting, but app use is not required.

Technology in class

Out of respect for your instructors and classmates, please turn off your mobile devices before the start of class. If you have a need or preference to use a laptop during lecture, that's fine. However, research suggests that writing notes on paper helps you learn and study better. If you choose to use a laptop, please stick to using it for notetaking and course-related activities. Audio or video recording in class is prohibited without prior permission. The use of generative AI, such as ChatGPT, etc., are not allowed for coursework unless specifically directed to use it.

Office hours and communication

Office hours will be by appointment. I am flexible with scheduling so please contact me with any questions or concerns. I communicate with students via email so *please be sure to check your email!*

Tentative schedule for lectures, discussions, and exams

Week	Day	Date	Topics	Notes	Readings
1	T	16-Jan	Class cancelled		
	Th	17-Jan	Introductions, course outline		Ollerton CH 1
2	T	23-Jan	Garden of 1000 Bees Pollinator diversity		
	Th	25-Jan	Pollinator diversity	**Quiz 1**	Ollerton CH 2
3	T	30-Jan	In-class bee identification	**Bee ID activity**	
	Th	1-Feb	Plant diversity & reproduction, evolution of pollination strategies		Ollerton CH 3,5
4	T	6-Feb	In-class discussion	**Discussion 1**	Janousek et al.
	Th	8-Feb	Pollinator behavior: specialization & generalization, interaction networks	**Quiz 2**	Ollerton CH 4
5	T	13-Feb	Interaction networks continued	**Network activity**	Ollerton CH 4
	Th	15-Feb	Behavior & Ecology I	**Quiz 3**	Ollerton CH 6,7
6	T	20-Feb	Behavior & Ecology II	**Population activity**	Ollerton CH 6,7
	Th	22-Feb	Guest Lecture: Dr. Cloyd: honey bees & beekeeping		
7	T	27-Feb	In-class discussion	**Discussion 2**	Brosi & Briggs
	Th	29-Feb	In-class activity	**Bee hotel activity**	Ollerton CH 8-9
8	T	5-Mar	Midterm Review	**Quiz 4**	
	Th	7-Mar	**Midterm exam**		
9	T	12-Mar	Spring Break (no classes)		
	Th	14-Mar	Spring Break (no classes)		
10	T	19-Mar	Landscape Ecology		TBD
	Th	21-Mar	Project Intro, studying pollinators, scientific method		
11	T	26-Mar	NCB Meeting (no class)		
	Th	28-Mar	Pollinator decline	**Project Outline due**	Ollerton CH 14
12	T	2-Apr	In-class butterfly activity	**Butterfly activity, Quiz 5**	Ollerton CH 10,11
	Th	4-Apr	In-class discussion	**Discussion 3**	Page & Williams
13	T	9-Apr	Citizen science	**Quiz 6**	Ollerton CH 12,13
	Th	11-Apr	Pollinator observation at gardens	**Observation activity**	
14	T	16-Apr	In-class discussion	**Quiz 7, Discussion 4**	Mason & Arathi
	Th	18-Apr	In-class project time		
15	T	23-Apr	In-class project time		
	Th	25-Apr	In-class time to work on presentations	**Project conclusions due**	
16	T	30-Apr	**Project presentations**	**Project Presentations**	
	Th	2-May	Final Exam Review	**Last day for extra credit**	
17	T	7-May	**Final Exam**		

1. Statement Regarding Academic Honesty

Kansas State University has an Honor and Integrity System based on personal integrity, which is presumed to be sufficient assurance that, in academic matters, one's work is performed honestly and without unauthorized assistance. Undergraduate and graduate students, by registration, acknowledge the jurisdiction of the Honor and Integrity System. The policies and procedures of the Honor and Integrity System apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, and via distance learning. A component vital to the Honor and Integrity System is the inclusion of the Honor Pledge which applies to all assignments, examinations, or other course work undertaken by students. The Honor Pledge is implied, whether or not it is stated: "On my honor, as a student, I have neither given nor received unauthorized aid on this academic work." A grade of XF can result from a breach of academic honesty. The F indicates failure in the course; the X indicates the reason is an Honor Pledge violation.

2. Statement Regarding Students with Disabilities

Students with disabilities who need classroom accommodations, access to technology, or information about emergency building/campus evacuation processes should contact the Student Access Center and/or their instructor. Services are available to students with a wide range of disabilities including, but not limited to, physical disabilities, medical conditions, learning disabilities, attention deficit disorder, depression, and anxiety. If you are a student enrolled in campus/online courses through the Manhattan or Olathe campuses, contact the Student Access Center at accesscenter@k-state.edu, 785-532-6441; for K-State Polytechnic campus, contact Julie Rowe, Diversity, Inclusion and Access Coordinator, at jarowe@ksu.edu or call 785-826-2971.

3. Statement Defining Expectations for Classroom Conduct

All student activities in the University, including this course, are governed by the Student Judicial Conduct Code as outlined in the Student Governing Association By Laws, Article V, Section 3, number 2. Students who engage in behavior that disrupts the learning environment may be asked to leave the class.

4. Statement on Mutual Respect and Inclusion in K-State Teaching and Learning Spaces

At K-State, faculty and staff are committed to creating and maintaining an inclusive and supportive learning environment for students from diverse backgrounds and perspectives. K-State courses, labs, and other virtual and physical learning spaces promote equitable opportunity to learn, participate,

contribute, and succeed, regardless of age, race, color, ethnicity, nationality, genetic information, ancestry, disability, socioeconomic status, military or veteran status, immigration status, Indigenous identity, gender identity, gender expression, sexuality, religion, culture, as well as other social identities.

Faculty and staff are committed to promoting equity and believe the success of an inclusive learning environment relies on the participation, support, and understanding of all students. Students are encouraged to share their views and lived experiences as they relate to the course or their course experience, while recognizing they are doing so in a learning environment in which all are expected to engage with respect to honor the rights, safety, and dignity of others in keeping with the K-State Principles of Community https://www.k-state.edu/about/values/community/.

If you feel uncomfortable because of comments or behavior encountered in this class, you may bring it to the attention of your instructor, advisors, and/or mentors. If you have questions about how to proceed with a confidential process to resolve concerns, please contact the Student Ombudsperson Office. Violations of the student code of conduct can be reported here https://www.k-state.edu/sga/judicial/student-code-of-conduct.html. If you experience bias or discrimination, it can be reported here https://www.k-state.edu/report/discrimination/.

5. Statement for Copyright Notification

Copyright 2024 (Brian Spiesman) as to this syllabus and all lectures. During this course students are prohibited from selling notes to or being paid for taking notes by any person or commercial firm without the express written permission of the professor teaching this course. In addition, students in this class are not authorized to provide class notes or other class-related materials to any other person or entity, other than sharing them directly with another student taking the class for purposes of studying, without prior written permission from the professor teaching this course.