ENY 6207: Ecology and Conservation of Pollinators, 3 credits

Meeting details: Summer, online asynchronous

Instructor: Dr. Rachel Mallinger

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352-273-3962

Office Hours: By appointment, in person or via Zoom

Course Description: This course will examine interactions between animals and the plants that they pollinate, current threats to pollinator populations, and the conservation of pollinators worldwide. In this course, we will explore these topics through readings, discussion, outdoor observations, and a research proposal.

Course Background: Welcome to Ecology and Conservation of Pollinators! Pollinators are keystone species in both natural and agricultural habitats, responsible for the reproduction of an estimated 87% of flowering plants including many crops. In recent years, documented declines in some pollinator species have heightened awareness of pollinator conservation. In the first half of this course, we will explore the fascinating world of pollination ecology, including plant-pollinator interactions, co-evolution, and pollinator foraging behaviors. In the second half of the class, we will discuss the conservation status of pollinators, including stressors such as climate change, land-use change, pesticides, and pathogens. Students will conduct field observations on pollinator/pollination ecology and develop a research proposal.

Prerequisites: College-level general biology is required**;** a course in botany (e.g. BOT 2010C), ecology (e.g. PCB 4043C) or entomology (ENY 3005) is encouraged but not required. Graduate student standing is required.

Learning Objectives: By the end of the class, students will be able to:

1. Describe the role of pollinators in both natural and agricultural systems, and the breadth of animal pollinator taxa.
2. Explain basic concepts of pollination ecology and relate these concepts to observable phenomena in nature.
3. Diagnose factors affecting pollinator populations today, and assess the consequences of pollinator declines for biodiversity and global food production.
4. Analyze, interpret and critique scientific literature.
5. Develop a research proposal.
6. Communicate science in written and oral formats.

Required materials: No textbook is required for this course. Readings for the course will be provided to students via the course website in Canvas.

Grades and assignments:

	600 points total
discussion engagement and small assignments	150 pts
quizzes (8)	80 pts
presentation	75 pts
response to presentations	15 pts
research proposal	100 pts
proposal peer-review	20 pts
midterm exam	80 pts
final exam	80 pts

Discussion and small assignments: Engaging in discussion using Canvas discussion tool or Flip (10 pts per engagement) and completing small assignments (10-20 pts per assignment) throughout the semester. Some assignments will be done in groups.

Quizzes: There will be 10 quizzes throughout the semester that will cover the assigned readings for each day. Your lowest 2 quizzes for the semester will be dropped, and your grade for this component will be based on the best 8 of 10 quizzes. These quizzes will only cover the assigned readings (not lecture material).

***Presentations*:** Students will present a 15-minute presentation to the class on a topic of their choice related to the course using Flip. Students are encouraged to develop a presentation that could be presented at a conference or for a thesis/dissertation defense provided it is new and not recycled from a previously developed presentation. Responding to fellow student presentations will be worth an additional 15 pts of your course grade.

Research proposal: Students will develop a research topic for a proposal related to pollination ecology or pollinator conservation. Students will then write individual research proposals including a background, justification, objectives and hypotheses, methods, and expected results. Proposal drafts will be peer-reviewed in student pairs, and your review of a classmate's paper will account for 20 points of your total course grade. Students are encouraged to develop proposals related to their thesis or dissertation research, and/or written in the format of a proposal intended to be submitted for funding.

Exams: There will be 2 exams including questions from the assigned readings as well as lecture material. The second exam will cover the second half of the course only. Exams will be open material with the exception that you are not to discuss your exam with anyone.

Grade distribution:

Grade	Points (undergraduate)	Points (graduate)	Percentages
A	465 - 500	558 - 600	93.0 - 100
A-	450 – 464.99	540 – 557.99	90.0 – 92.99
B+	435 – 449.99	522 – 539.99	87.0 – 89.99

B	415 – 434.99	498 – 521.99	83.0 – 86.99
B-	400 – 414.99	480 – 497.99	80.0 – 82.99
C+	385 – 399.99	462 – 479.99	77.0 – 79.99
C	365 – 384.99	438 – 461.99	73.0 – 76.99
C-	350 – 364.99	420 – 437.99	70.0 – 72.99
D	300 – 349.99	360– 419.99	60.0 – 69.99
E	299.99 and below	359.99 and below	59.99 and below

Grades and Grade Points

For information on current UF policies for assigning grade points, see https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Course schedule:

Module/ Week	Title	Readings	Lectures	Quizzes	Assignments
1	Course introduction	Willmer Chapter 1	Introduction lecture		Survey (5 pts)
2	Plant mating systems, floral traits, and rewards	Eckert et al. 2010; Ishii et al. 2008; Willmer Ch. 3 (OPTIONAL)	Plant mating systems; Plant floral traits and rewards	Quiz 1 on Eckert et al. 2010 (10 pts); Quiz 2 on Ishii et al. 2008 (10 pts)	Discussion engagement (10 pts); Outdoor observations (15 pts)
3	Plant-pollinator coevolution	Anderson and Johnson 2008; Memmott 1999	Plant-pollinator coevolution and pollination syndromes; Plant-pollinator networks; Making a network	Quiz 3 on Anderson and Johnson 2008 (10 pts)	Discussion engagement (10 pts); Network activity (15 pts)
4	Local and global trends	Hall and Ascher 2010; Pascarella et al. 1999; Bawa 1990	Native bees and other native insect pollinators; Local and global trends in plant-pollinator interactions	Quiz 4 on Bawa 1990	
5	Pollinator behavior	Knauer and Schiestl 2015; Cakmak et al. 2009	Learning and recruitment; Optimal foraging theory; Foxglove video	Quiz 5 on Knauer and Schiestl 2015 (10 pts)	Discussion engagement (10 pts); Foxglove observations (5 pts)
6	Pollinator behavior continued	Barrios et al. 2016; Rader et al. 2012	Pollination efficacy; Crop pollination and managed bees	Quiz 6 on Barrios et al. 2016 (10 pts); Quiz 7 on Rader et al. 2012 (10 pts)	Choose one: Outdoor observations or crop pollination activity (15 pts) **Presentations due (75 pts)**

7	Research methods and scientific writing	selected sections from Dafni 1992; Schimel 2001 pages 3 – 34; proposal	Research methods; Scientific writing		Methods reflection (10 pts); Discussion engagement (10 pts) **Research topic due for feedback (0 pts)**
8	Introduction to pollinator conservation	Potts et al. 2010; Colla et al. 2012	Introduction to conservation		**Midterm covering Modules 1-7 (80 pts)**
9	Pollinator stressors	Krauss et al. 2003; Steffan-Dewenter et al. 2002; Kudo and Ida 2013	Land-use change; Climate change etc; Calculating land-use change metrics	Quiz 8 on Krauss et al. 2003	Land-use exercise (15 pts) **Research proposal drafts due**
10	Pollinator stressors continued	Singh et al. 2010; Wilson and Carril 1.7; Rundlof et al. 2015	Pests and pathogens; Pesticides	Quiz 9 on Rundlof et. al 2015	**Peer reviews due (20 pts)**
11	Conservation	Colla and MacIvor 2017; Inouye et al. 2017; Brittain et al. 2013; one state conservation plan	Conservation plans; Integrated crop pollination		Conservation plan activity (15 pts) **Final research papers due (100 pts)**
12	Conservation continued	Kremen and M'Gonigle 2015	Restoration and pollinator plantings; Seed mix activity introduction	Quiz 10 on Kremen and M'Gonigle 2015	Seed mix activity (15 pts) **Response to student presentations due (15 pts)**
13					**Second exam on modules 8 - 12 (80 pts)**

Attendance and Make-Up Work

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

Online Course Evaluation Process
Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at https://evaluations.ufl.edu. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results.

Academic Honesty
As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: "*We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment*."

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code.

Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation

0001 Reid Hall, 352-392-8565, **www.dso.ufl.edu/drc/**

Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575,* **www.counseling.ufl.edu/cwc/**

Counseling Services

Groups and Workshops

Outreach and Consultation

Self-Help Library

Wellness Coaching

- U Matter We Care, **www.umatter.ufl.edu/**
- *Career Resource Center,* First Floor JWRU, 392-1601, **www.crc.ufl.edu/**

Student Complaints

Residential Course: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf
Online Course: http://www.distance.ufl.edu/student-complaint-process