

ENT 2920 Special Topics: Insect Pest Management Spring 2019 (3 credits)

Course Information

Meeting Time: MW 12:00 pm to 1:15 pm

Location: 485 Hodson Hall

Prerequisites: General Biology (BIOL 1009) or equivalent

Instructor Information

Instructor: Dr. Sujaya Rao

Email: sujaya@umn.edu

Office: 222 Hodson Hall

Office Hours: Wed. after class, or by appointment

Audience and Content

Special Topics: Insect Pest Management is designed for upper division undergraduates in any major or minor. The course will emphasize principles of insect pest management and draw from examples related to agricultural, horticultural and landscape and urban systems. Conventional (nonorganic) and organic approaches, the use of social media and modern technology, and economic, environmental and social consequences of diverse tactics (chemical, cultural, biological, genetic, etc.) will be covered by the Instructor and, on occasion, by guest lecturers. Student debates on pesticide-pollinator and genetic engineering issues will provide real-world context and insights on complexities of insect pest prevention and management.

Learning Outcomes

By the end of the term, students will:

- Increase **knowledge** of the core principles associated with management of insect pests in conventional (nonorganic) and organic farming systems.
- **Comprehend** the advantages and limitations of management of insect pests using diverse tactics (chemical, biological, cultural, genetic, etc.).
- **Apply** their knowledge and comprehension of insect pest management principles to addressing challenges of producing pest-free commodities while conserving beneficial insects including pollinators.

Course materials

- Pedigo, LP and Rice, ME. 2009. *Entomology and Pest Management*. 6th Ed. (Other Options?)
- Radcliffe's IPM World Textbook (open access, <https://ipmworld.umn.edu/>)

Weekly Lectures

- Week 1: Lecture 1 Introduction to the course; what makes an insect a pest or a beneficial
Lecture 2 Historic perspective and current concepts of insect pest management
- Week 2: Lecture 1 Types of insect pests, damage and mouth parts
Lecture 2 Yield loss, economic thresholds, decision making
- Week 3: Lecture 1 Insect growth and development (incomplete and complete metamorphosis)
Lecture 2 Degree-day models and their use in IPM
- Week 4: Lecture 1 Ecological concepts – pest abundance and distribution, changes over time
Lecture 2 Sampling – need, process, techniques
- Week 5: Lecture 1 Midterm
Lecture 2 Insecticides for management of pests: Historic to Current
- Week 6: Lecture 1 Protection of crop pollinators: Honey bees and Native bees.
Lecture 2 Pesticide and pollinator controversy
- Week 7: Lecture 1 Biological Control (BC) – History, Strategies, Risks
Lecture 2 Natural enemies – parasitoids, predators, pathogens
- Week 8: Lecture 1 Cultural control strategies
Lecture 2 Host Plant Resistance (HPR)
- Week 9: Lecture 1 Behavior-modifying chemicals: Sex Pheromones, Deterrents/Repellents
Lecture 2 Insect Growth Regulators (IGRs)
- Week 10: Lecture 1 Midterm
Lecture 2 Genetic tactics /Genetic engineering – Overview, Prospects & Challenges
- Week 11: Lecture 1 Genetic engineering – controversy (Debate)
Lecture 2 Advances in genetic tactics: The promise of RNAi, CRISPR
- Week 12: Lecture 1 Conventional versus organic pest management
Lecture 2 Insect resistance to diverse tactics
- Week 13: Lecture 1 IPM implementation: Case studies in field crops
Lecture 2 IPM implementation: Case studies in horticultural crops
- Week 14: Lecture 1 Case studies in human dwellings
Lecture 2 Case studies in landscapes and greenhouses
- Week 15: Lecture 1 Minimizing negative impacts - Early detection, Rapid response
Lecture 2 Modern/future technology approaches – drones, apps, smart sprayers
- Week 16: Final Exam

Class Participation

Keeping abreast of current insect issues: Over the semester, each student will prepare three ‘one-slide, 1-minute’ lightning talks on an insect issue that they heard about through the media (radio, television, newspaper). The presentations will be made at the beginning of regular lectures. A sign-up sheet will be used for students to select the days of their lightning talk presentations.

Debates - Addressing multiple/opposite perspectives: Students will work in groups and prepare arguments from the perspectives of opposing/multiple stakeholder groups related to the pesticide-pollinator conflict and GMO issues.

Quizzes: During lectures, five unannounced quizzes will test student knowledge and understanding of material covered the previous week.

Assignment

Prepare an essay on the use of modern technology and social media in management of pests associated with your major/minor. The essay should be two pages (single-spaced (~1,000 words)). Due date: the last week of the semester.

Assessment:

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Midterm 1	75
Midterm 2	75
Final Exam	100
Class Participation	30
Debates	20
Quizzes	50
Assignments	100

Grading:

A	94.0 – 100%
A-	90.0 – 93.9%
B+	87.0 – 89.9%
B	84.0 – 86.9%
B-	80.0 – 83.9%
C+	77.0 – 79.9%
C	74.0 – 76.9%
C-	70.0 – 73.9%
D+	67.0 – 69.9%
D	64.0 – 66.9%
D-	60.0 – 63.9%
F	below 60%

Additional Course and University Policies Student Conduct

The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation, that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University, and that does not threaten the physical or mental health or safety of members of the University community.

As a student at the University of Minnesota you are expected to adhere to the Board of Regents' Student Conduct Code, which can be accessed here:

http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf.

Students whose behavior is deemed to be disruptive (as defined in the Student Conduct Code) or in violation of any other part of the Student Conduct Code will be asked to leave the classroom, and may be referred to the Office of Student Conduct and Academic Integrity. Students whose behavior suggests the need for counseling or other assistance may be referred to their college office or to University Counseling and Consulting Services. Students whose behavior violates the Student Conduct Code

Academic Integrity: Students are expected to do their own assigned work. If it is determined that a student has engaged in any form of Academic Dishonesty, he or she may be given an "F" or an "N" for the course, and may face additional sanctions from the University. Academic dishonesty in any portion of the academic work for a course shall be grounds for awarding a grade of F or N for the entire course. See the Student Conduct Code for more information about this policy:

http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf.

Academic Freedom & Responsibility: Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.

Reports of concerns about academic freedom are taken seriously, and there are individuals and offices available for help. Contact the instructor if you have any concerns. Other sources of help include the Associate Dean of the college, or the Vice Provost for Faculty and Academic Affairs in the Office of the Provost.

Sexual Harassment: "Sexual harassment" means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature. Such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. Such behavior is not acceptable in the University setting. For additional information, please consult the Board of Regents Policy on sexual harassment: <http://regents.umn.edu/sites/regents.umn.edu/files/policies/SexHarassment.pdf>

Student 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 and may reduce your ability to participate in daily activities. University

of Minnesota services are available to assist you. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website:

<http://www.mentalhealth.umn.edu>.

Equity, Diversity, Equal Opportunity, & Affirmative Action: As an instructor, I welcome and embrace a diversity of opinions and experiences in my classroom. The University provides equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult the Board of Regents Policy on Equity, Diversity, Equal Opportunity, & Affirmative Action:

http://regents.umn.edu/sites/regents.umn.edu/files/policies/Equity_Diversity_EO_AA.pdf.

Accommodations for Students with Disabilities: The University of Minnesota is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations.

If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact DS at 612-626-1333 to arrange a confidential discussion regarding equitable access and reasonable accommodations.

If you are registered with DS and have a current letter requesting reasonable accommodations, please contact your instructor as early in the semester as possible to discuss how the accommodations will be applied in the course.

For more information, please see the DS website, <https://diversity.umn.edu/disability>. **

Please do not hesitate to contact the instructor if you have any questions or concerns about any of these policies! **