

COURSE SYLLABUS
ENTO/PLPT 813 BIOLOGICAL CONTROL OF PESTS
SPRING 2021

I. Instructors

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II. Course Objectives

The overall course objective is to familiarize students with the principles and practices of using natural enemies and antagonists to manage the abundance of, and damage caused by, pests (invertebrates, plant pathogens, and weeds). Primary focus will be placed on the biological control of pests of plant systems (agricultural, landscape, wildlands).

Specific Learning Objectives

By the end of the course, students will be able to:

1. Identify some of the more common natural enemies that can be used for controlling invertebrate pests, plant pathogens and weeds; and identify the relative advantages and disadvantages of using various types of natural enemies.
2. Express the ecological, physiological and biochemical processes involved in biological control
3. Explain the various strategies by which natural enemies are employed to control pests and how the different strategies fit into an integrated pest management framework
4. Outline the risks and benefits of using various forms of biological control
5. Identify the economic and regulatory factors that affect biological control development and commercialization.
6. Develop an outline of a biological control program for specific production systems

III. Course Structure

All course materials, including lectures, quizzes and exams, will be available in the course site in Canvas, the instructional system used at UNL. In addition, posting of assignments and submission of completed assignments will be conducted through Canvas. To access Canvas, go to the following website: <https://canvas.unl.edu/>

The course is divided into 4 parts, or ‘modules’, each lasting 3 to 4 weeks. Within each module, there are: 1) a set of 6 to 8 lectures, each with associated reading and quizzes; 2) weekly discussions; 3) a Module Assignment; and 4) a Module Exam. In addition, each student will complete a Term Project during the course. More information about each of these activities is provided in the following section. Links to all lectures, quizzes, assignments and exams within a module, along with their deadline, are presented within a separate Module page in Canvas. The

document *Course Schedule*, also available in Canvas, provides the schedule of all course activities and topics covered.

IV. Learning Activities

Lectures, reading and quizzes

There will be 6 to 8 lectures per module containing narration and slides. Lectures will be supported by readings from textbooks and articles that will be available as PDF files or as links to webpages. There is a quiz for each lecture. Each will have either a true-false/multiple choice-type format with a time limit or short essay format with no time limit. Lectures within a module can be accessed at any time during the course. It is recommended, however, that students view lectures following the weekly sequence presented in the *Course Schedule*. All quizzes given within a week must be completed by the end of the scheduled week. Each quiz will be worth 3 to 5 points. The total quiz points accumulated at the end of the course is worth 20% of the course grade.

Weekly discussions

There will be a Discussion in Canvas each week pertaining to the week's topics, beginning the Monday of that week and ending the following Monday. Three to 4 framing questions will be offered each week, presented in different threads. Everyone is expected to participate in at least 12 weekly discussions, participation being defined as responding to one of the framing questions, and/or to the responses of others in the class. One point will be earned for participating each week and the total will account for 10% of the course grade.

Discussion etiquette: We ask you to provide thoughtful ideas and responses, and to be courteous in your exchanges. Please remember that conflict is inevitable, but combat is a choice. Rude or ad hominem remarks will not be tolerated. The instructors will only respond directly to any of your comments if you make a particularly good point, or if the discussion needs redirecting or correction.

Module Assignment

For each module, there is one assignment that is due 1 week prior to the end of the module. See the *Course Schedule* for due dates. The format and topic vary with each assignment. Assignments submission will be made available to other students for peer review or discussion during the last week of the module. Each assignment will be graded by the instructor and the total points accumulated at the end of the course is worth 16% of the course grade.

Module Exam

An exam will be open from Tuesday through Thursday following the end of a module. It will cover the topics presented during the module. There will be a combination of multiple choice, short answer, and short essay questions. The four Module Exams together will be worth 24% of the course grade.

Term Project

Each student will select a term project topic under the guidance of the instructors. The final product can be in the form of a written report or a video, and is due at the end of the course. Each student will submit a proposal for the term project, including a preliminary literature search, by the end of Module 1, a progress report at the end of Module 2 and a rough draft at the end of Module 3. Instructors provide comments at all

preliminary stages. The term project is worth 30% of the course grade. More information regarding the term project is available in the course site in Canvas.

V. Grading

Cumulative scores from each of the five activities will be weighed in this manner: module exams, 24% of the grade; quizzes, 20%; module assignments, 16%; term project, 30%; weekly discussions, 10%. The percentages earned in each of the five are added together to determine the ‘final percentage’. The final course (letter) grade will be determined from the final percentage according to this scale:

<u>Final percentage</u>	<u>Letter grade</u>
90%	A
80%	B
70%	C
60%	D
<60%	F

Students enrolled on Pass/Fail basis must achieve 80% in order to earn a “Pass”. The scale may be adjusted downward depending upon the class curve.

VI. Other Information

Exam policy

Make up quizzes, exams, and module assignment will be available to students who experience illness or other crises.

Accommodating Student Disabilities

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience barriers based on your disability (including mental health, chronic or temporary medical conditions), please let the instructors know immediately so that we can discuss options privately. To establish reasonable accommodations, we may request that you register with Services for Students with Disabilities (SSD). If you are eligible for services and register with their office, make arrangements with me as soon as possible to discuss your accommodations so they can be implemented in a timely manner.

SSD contact information: 117 Louise Pound Hall Bldg.; 402-472-3787

Help with Canvas

For technical issues click the ‘?’ button on the far left side of the Canvas page. Contact the instructors for issues specific to course content, e.g. lecture videos, quizzes and assignments.

UNL Library Services

UNL library services can be accessed at <https://libraries.unl.edu/>. Library resources more specific to this course can be accessed from Canvas by clicking the “UNL Library Resources” button at the left side of the page.

ACADEMIC HONESTY

Students are expected to adhere to guidelines concerning academic dishonesty as specified in Entomology’s Academic Integrity Policy (<http://entomology.unl.edu/dishonesty.shtml>). As a student at UNL, you enjoy rights and protections under the student code of conduct

(<http://stuafs.unl.edu/dos/code>) and are obligated to conduct yourself in compliance with the code. Academic dishonesty can involve cheating; fabrication or falsification of information; plagiarism; or misrepresenting illness, injury, accident, etc., to avoid and/or delay an examination/quiz or the timely submission of academic work and assignments. Disciplinary action imposed may range from a warning (written or oral) to assigning the student a final course grade of F for the semester. The instructor may choose to assign zero or partial credit for a specific assignment, quiz, examination or written report in which academic dishonesty was involved.

If a student wishes to appeal a claim of academic dishonesty, the following process must be followed. First, the student must submit a written appeal to the instructor of the course and state their reason(s) for appealing. If this student appeal cannot be resolved with the course instructor, then the student must immediately submit their appeal statement within seven days to the Department's Curriculum Committee for their recommendation. If a satisfactory solution to this appeal is still not reached with the Department Curriculum Committee, the student's written appeal will then be forwarded to the Department Head. If a satisfactory solution is still not achieved at the Department Head level, the student may then submit their written appeal statement to the College of Agricultural Sciences and Natural Resources (CASNR) Dean's Office. The appeal process for the College of Agricultural Sciences and Natural Resources will then be followed as outlined by the College.

Students are encouraged to contact the instructor for clarification of these guidelines if they have questions or concerns

Mental Health and Wellbeing Resources

UNL offers a variety of options to students to aid them in dealing with stress and adversity. Counseling and Psychological & Services (CAPS) is a multidisciplinary team of psychologists and counselors that works collaboratively with Nebraska students to help them explore their feelings and thoughts and learn helpful ways to improve their mental, psychological and emotional well-being when issues arise. CAPS can be reached by calling 402-472-7450. Big Red Resilience & Well-Being provides one-on-one well-being coaching to any student who wants to enhance their well-being. Trained well-being coaches help students create and be grateful for positive experiences, practice resilience and self-compassion, and find support as they need it. BRRWB can be reached by calling 402-472-8770.

ENTO/PLPT 813 Biological Control of Pests – Spring, 2021 Course Schedule

Module & Start Date	Week & Start Date	Lecture Topics	Weekly Activities & Deadline	Module Activities & Deadlines
1: Jan 25	1 Jan 25	1-1. IPM and biological control 1-2. Definition and history of biological control 1-2 Addendum. Approaches to biological control	Quiz 1-1 Quiz 1-2 Week 1 Discussion Feb 1	<ul style="list-style-type: none"> • Natural Enemy Fact Sheets due Feb 15 • Term project proposal, including preliminary literature search, due Feb 22 • Module 1 Exam open Tuesday Feb 23 until Thursday Feb 25 11:59 PM
	2 Feb 1	1-3. Ecology of biological control – part 1 1-4. Ecology of biological control – part 2	Quiz 1-3 Quiz 1-4 Week 2 Discussion Feb 8	
	3 Feb 8	1-5. Biology of parasitoids – part 1 1-6 Biology of parasitoids – part 2	Quiz 1-5 Quiz 1-6 Week 3 Discussion Feb 15	
	4 Feb 15	1-7. Biology of predators – part 1 1-8. Biology of predators – part 2	Quiz 1-7 Quiz 1-8 Week 4 Discussion Feb 22	
2: Feb 22	5 Feb 22	2-1. Classical/importation biological control of weeds by arthropods 2-2. Classical/importation biological control of arthropods – part 1 2-3. Classical/importation biological control of arthropods – part 2	Quiz 2-1 Quiz 2-2 Quiz 2-3 Week 5 Discussion Mar 1	<ul style="list-style-type: none"> • Module 2 Assignment due Mar 8 • Term project progress report due Mar 15 • Module 2 Exam open Tuesday Mar 16 until Thursday Mar 18 11:59 PM
	6 Mar 1	2-4. Conservation bio control of arthropods – part 1 2-5. Conservation biocontrol of arthropods – part 2	Quiz 2-4 Quiz 2-5 Week 6 Discussion Mar 8	
	7 Mar 8	2-6. Augmentation biological control of arthropods – Part 1 2-7. Augmentation biological control of arthropods – Part 1 2-8. Risks and issues with biological control of arthropods	Quiz 2-6 Quiz 2-7 Quiz 2-8 Week 7 Discussion Mar 15	

3: Mar 15	8 Mar 15	3-1. Concepts relating to pathogens as biocontrol agents: host interactions 3-2. Concepts relating to pathogens as biocontrol agents: environmental influences	Quiz 3-1 Quiz 3-2 Week 8 Discussion Mar 22	<ul style="list-style-type: none"> • Entomopathogen Fact Sheets due Apr 5 • Term project rough draft due Apr 12 • Module 2 Exam open Tuesday Apr 13 until Thursday Apr 15 11:59 PM
	9 Mar 22	3-3. Regulation and commercialization of biopesticides 3-4. Viruses in Biological Control (Ruberson)	Quiz 3-3 Quiz 3-4 Week 9 Discussion Mar 29	
	10 Mar 29	3-5. Entomopathogenic fungi: biology 3-6. Entomopathogenic fungi: applications in biocontrol	Quiz 3-5 Quiz 3-6 Week 10 Discussion Apr 5	
	11 Apr 5	3-7. Entomopathogenic bacteria 3-8. Entomopathogenic nematodes and symbiotic bacteria	Quiz 3-7 Quiz 3-8 Week 11 Discussion Apr 12	
4: Apr 12	12 Apr 12	4-1. Biology of weed pathogens 4-2. Importation and augmentation biological control of weeds using fungal pathogens	Quiz 4-1 Quiz 4-2 Week 12 Discussion Apr 19	<ul style="list-style-type: none"> • Weed Pathogen/Plant Disease Biocontrol Agent fact sheets due Apr 26 • Term project final product due May 3 • Module 4 Exam open Tuesday May 4 until Thursday May 6 11:59 PM
	13 Apr 19	4-3. Biology of microbes for control of plant pathogens: antagonism 4-4. Biology of microbes for control of plant pathogens - parasitism & induced resistance	Quiz 4-3 Quiz 4-2 Week 13 Discussion Apr 26	
	14 Apr 26	4-5. Conservation & enhancement biological control of plant pathogens 4-6. Augmentation biological control of plant pathogens	Quiz 4-5 Quiz 4-6 Week 14 Discussion May 3	