PLS 6635 Weed Management for Organic and Sustainable Cropping Systems

Spring, 2026
Course Format (Hybrid), 3 Credits
MWF Period 3, 9:35 AM to 10:25 AM; Rm 1308 Fifield Hall

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Office hours: Zoom or in-person office hours, Tuesdays, 10 am – 12 pm or by appointment (See Canvas for Zoom link)

Course Zoom Link for REC Students

A Zoom link will be provided in Canvas for use by students at Research and Education Centers. Gainesville students will attend in person.

Course Description

Ecological principles can be applied in agroecosystems to manage weeds sustainably. Alternative weed management approaches that are less dependent on herbicides and utilize ecological processes detrimental to weeds and their propagules will be emphasized. Students will learn actively by critically analyzing pertinent literature and participating in discussions of supplemental reading.

Course Learning Objectives

Upon successful completion of this course, you will be able to:

- Explain the similarities and differences between ecological weed management and conventional weed management
- Describe how ecological approaches can be utilized to manage weeds and explain their constraints
- Select and recommend ecological weed management practices that are approved for use in organic cropping systems
- Critically analyze and discuss weed science journal articles
- Prepare a grant proposal that addresses a weed management challenge in conventional agriculture in a sustainable or improves weed management in an organic cropping system

Course Prerequisites

HOS 3020C - Principles of Horticultural Crop Production, ALS 3153 Agricultural Ecology or equivalent.

Textbooks, Learning Materials, and Supply Fees

Required textbook: None

Recommended textbooks

Hatcher, P.E. and R.J. Froud-Williams. 2017. Weed Research: Expanding Horizons. John Wiley & Sons, Hoboken, NJ.

Liebman, M., C.L. Mohler, and C.P. Staver. 2001. Ecological Management of Agricultural Weeds. Cambridge University Press, Cambridge.

Mohler, C.L., J.R. Teasdale, and A. DiTommaso. 2021. Manage Weeds on Your Farm: A Guide to Ecological Strategies. SARE Outreach. https://www.sare.org/resources/manage-weeds-on-your-farm/.

Upadhyaya, M.K. and R.E. Blackshaw. 2007. Non-chemical Weed Management: Principles, Concepts and Technology. CABI, Wallingford.

Zimdahl, R.L. 2018. Fundamentals of Weed Science. Academic Press. Cambridge, MA.

Supplemental learning materials

Booth, B.D., S.D. Murphy, and C.J. Swanton. 2010. Invasive plant ecology in natural and agricultural systems. Second edition. CABI Publishing.

Bowman, G. 2001. Steel in the field: a farmer's guide to weed management tools. Sustainable Agriculture Network, Beltsville.

Chauhan, B.S. and G. Mahajan. 2025. Recent Advances in Weed Management. Springer Nature Switzerland, Cham. *(New edition covers different topics)*

Chauhan, B.S. and G. Mahajan. 2014. Recent Advances in Weed Management. Springer, New York Heidelberg Dordrecht London.

Håkansson, S. 2003. Weeds and weed management on arable land: an ecological approach. CABI Publishing.

Radosevich, S.R., J.S. Holt, and C.M. Ghersa. 2007. Ecology of Weeds and Invasive Plants: Relationship to Agriculture and Natural Resource Management, 3rd Edition. John Wiley & Sons, New York.

Ross, M.A. and C.A. Lembi. 2008. Applied Weed Science: Including the Ecology and Management of Invasive Plants. Prentice Hall, Upper Saddle River.

Instructor Interaction Plan

This is a hybrid course with Gainesville students attending in person and off-campus students participating synchronously via Zoom. Outside of class students may consult with Dr. Chase during office hours, by appointment or by email. Utilizing the Canvas email is advised to reduce the likelihood of your email being missed.

Required Technology & How to Obtain the Technology

Off-campus students will need Wi-Fi access capable of running Zoom. UF computer recommendations are available at: https://it.ufl.edu/get-help/student-computer-recommendations/. A camera, microphone, and speakers/headphones are necessary.

Technical and digital information literacy skills

You are expected to be proficient in the use of databases such as AGRICOLA and Web of Science for literature searches and PowerPoint for scientific presentations or acquire proficiency during the course.

Communication Guidelines

Please communicate as early as possible with me about any challenges that are adversely affecting your performance in the course. I encourage you to use office hours or to request an appointment so that I can address any questions or concerns that may arise. I am happy to receive email communications as well and will aim for a response time of 48 hours or less.

Class Demeanor/Expectations

Polite interruptions of class for appropriate student questions and comments are strongly encouraged to promote student learning. Your participation in class activities such as discussion must be respectful of other students and the instructor. Mobile phones should be muted to avoid disruptions.

Technical Support

UF Computing Help Desk & Ticket Number: All technical issues require a UF Helpdesk Ticket Number. The UF Helpdesk is available 24 hours a day, 7 days a week.
https://helpdesk.ufl.edu/ | 352-392-4357

Weekly Course Schedule

Week	Topic	Assessment	Due Dates
1	Introduction; Weeds; and Ecological Weed Management		
2	MLK Holiday; Guest Lecture; Weed Classification & Life History		
3	Documentary – What Plants Talk About; Weed Crop Interactions	Canvas Quiz; Discussion	Jan 25
4	**Biofumigation Discussion***; National Organic Program; Preventive Weed Management	Canvas Quiz; Discussion	Feb 1; Feb 2
5	Cultural Weed Management		
6	Physical Weed Management; **Exam 1**	Exam 1	Feb 18

Week	Topic	Assessment	Due Dates
7	Physical Weed Management; **Soil Solarization Discussion***	Canvas Quiz; Discussion	Feb 22; 23
8	Mechanical Weed Management – Tillage and Cultivation		
9	Automated & Autonomous Weeders; Biological Control of Weeds; **Weed Seed Predation Discussion***	Canvas Quiz; Discussion	Mar 12; 13
10	*Spring Break*		
11	**Exam 2**; Biological Control of Weeds	Exam 2	Mar 23
12	Biological Control of Weeds; **Targeted Rangeland Grazing Discussion***; Chemical Weed Control	Canvas Quiz; Discussion	Mar 31; Apr 1
13	Chemical Weed Control		
14	**Unmanned Aerial Vehicle Use for Weed Management Discussion***; Herbicide Resistance and Herbicide Tolerant Crops; IWM vs EWM	Canvas Quiz; Discussion	Apr 12; Apr 13
15	Grant Proposal Presentations (Apr 20, 22)	Grant Proposals	Apr 22
16	Final Exam Week	**Exam 3**	Apr 29; 3-5 pm

*Student Moderated Discussion

Grading Policy

Course grading is consistent with UF grading policies.

Course Grading Structure

Assignment Type	Point Value	Percent of Final Grade
Examinations: Three examinations; essay type and short answer responses.	500	50
Discussion Moderation: Student moderators will select a journal article on a weed management topic to be read by the class. The moderator will lead an in-depth discussion of the article beginning with a 10-min overview and followed by discussion of the article beginning with instructor-assigned questions. The moderator will close the discussion by highlighting the keys points discussed.	100	10
Discussion Prompt Responses: Students will have a week to view video or read assigned journal articles and complete prompting questions in a Canvas quiz. (5 assignments, 20 points each)	100	10
Discussion Participation: In-class discussion of video or journal articles in a critical and thoughtful manner using responses to the prompting questions as a starting point is required of all students. (5 assignments, 20 points each)	100	10
Grant Proposal and Presentation: Students will develop a grant proposal on a sustainable and/or organic weed management problem formatted for submission to the Southern SARE Graduate Student grant program.	200	20

Grading Scale

Grade	Points	Percentage
A	900 to 1000	90 to 100
B+	850 to 899	85 to 89.9
B	800 to 849	80 to 84.9
C+	750 to 799	75 to 79.9
C	700 to 749	70 to 74.9
D+	650 to 699	65 to 69.9
D	600 to 649	60 to 64.9
E	0 to 599	0 to 59.9

Academic Policies and Resources

Academic policies for this course are consistent with university policies. See https://syllabus.ufl.edu/syllabus-policy/uf-syllabus-policy-links/

Campus Health and Wellness Resources

Visit https://one.uf.edu/whole-gator/topics for resources that are designed to help you thrive physically, mentally, and emotionally at UF. Please contact UMatterWeCare for additional and immediate support.

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.

Privacy and Accessibility Policies

- Instructure (Canvas)
  - Instructure Privacy Policy
  - Instructure Accessibility
- Zoom
  - Zoom Privacy Policy
  - Zoom Accessibility

Additional information

Grant Proposal

A written grant proposal as well as a 10-minute PowerPoint presentation are the grant proposal deliverables. Rubrics will be available in Canvas that explain how points will be

assigned. Use of large language models is not permitted in this assignment ***except for identifying an appropriate topic***. Large language models for the latter purpose are available at the UF Navigator website: https://ai.ufl.edu/teaching-with-ai/for-uf-faculty/navigator/. Once you have identified a title, submit it to Dr. Chase for approval. Once approved, you will use databases such as AGRICOLA and Web of Science to conduct a literature search using pertinent keywords to identify appropriate references from which you will source information for writing your grant proposal.

Information for this assignment was sourced from the Southern SARE Graduate Student Grants Call for Proposals (CFP): https://southern.sare.org/grants/apply-for-a-grant/graduate-student-grants/. Only the following elements of the CFP are required for the assignment.

1. **Project Title**

   Although the actual CFP allows a wide range of proposals. Only proposals pertinent to weed management for sustainable and/or organic cropping systems are allowed for this course.

2. **Applicant's Name**

   Use your name for grading purposes. However, if you later choose to submit this proposal to the agency, your advisor will need to be the applicant since students cannot be principal investigators for grant proposal submitted through the University of Florida.

3. **Project Abstract**

   Provide a brief abstract or project summary. (Although the abstract appears early in the document, it should be the last section you write since it summarizes the proposal). *Limited to 250 words.*

4. **Statement of Problem**

   Provide a statement of the problem being addressed and how it is related to, or affects, the sustainability of agriculture. Discuss your rationale and justification for the proposed objectives. Begin the Statement of the Problem with the phrase: "The purpose of this project is to…". *Limited to 500 words.*

5. **Objectives**

   A list of concise project objectives. *Limited to no more than 500 words.*

6. **Project Relevance to Sustainable Agriculture**

   You must explain how your project is relevant to sustainable agriculture. State how the project and the expected results contribute to agricultural sustainability. Do not simply indicate that your project addresses an element of sustainable agriculture, explain how your project will address it and make it more sustainable. Make sure that your work, even though it is making a part of a system more sustainable, does not make the whole system

or another part of it, less sustainable. Does your project use genetically engineered varieties or organisms? If so, state how their use will contribute to your project and make agriculture more sustainable. (Note GMOs are not permitted in organic systems). *Limited to 1,000 words.*

7. **Approach and Methods**

   Provide a description of the materials and methods that you will use, demonstrating how your solution works in addressing the statement of the problem. What is the methodology? There must be a direct relationship between the approach and methods and the project relevance to sustainable agriculture. *Limited to 1,000 words.*

8. **Timetable**

   Provide a timetable of the work to be completed. (Students can apply for up to $22,000 of funding for a period not exceeding 2 years). *Limited to 500 words.*

9. **Literature Cited**

   Use citations as appropriate in sections 4, 6, and 7. Provide a reference list of the 6 to 12 refereed journal articles that were as sources for developing the research project being proposed. *Limited to 500 words.*