



**WDS6005 – Weed Management for Organic  
and Sustainable Cropping Systems**

3 CREDITS

Spring Semester 2020

MWF Period 2, 8:30 to 9:20 AM

2316 Fifield Hall

**INSTRUCTOR**

Dr. Carlene A. Chase  
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**OFFICE HOURS**

Thursdays 10 am - 12 pm  
Fridays 1 pm - 3 pm or by appointment.

**COURSE DESCRIPTION**

Ecological principles can be applied in agroecosystems to manage weeds sustainably. The utility of ecological weed management in organic cropping systems will be explored. Students will learn actively by critically analyzing and discussing pertinent literature, serving as a discussion leader, and proposing research to sustainably address weed management challenges.

**LEARNING OBJECTIVES**

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

- Distinguish between ecological and conventional weed management.
- Interpret the National Organic Program's Crop Pest, Weed, and Disease Management Practice Standard in order to utilize and recommend approved organic weed management practices.
- Effectively utilize refereed journal articles to augment their knowledge of ecological weed management for research as well as for written and oral communication.
- Identify weed management constraints and utilize ecological principles to design studies to address such constraints.

**PREREQUISITE**

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

**TEXTBOOKS:** There is no required textbook.

**Recommended Texts**

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

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.

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

### Supplemental 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.

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

Radosevich, S.R., J.S. Holt, and C.M. Ghera. 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.

### COURSE GRADE

Assignments	Points
<u>Examinations</u> : Three examinations, essay type and short answer responses.	600
<u>Discussion moderator</u> : Select a current journal article (published within the past 5 years) on the assigned topic and share the selected article with the class at least 1 week in advance of the scheduled discussion. Prepare a 15-minute presentation to provide background information on the topic using the article, other related journal articles, text books etc. Prepare 4 to 6 questions to stimulate the discussion.	100
<u>Quizzes</u> : Students will complete quizzes based on journal articles assigned for discussion.	100
<u>Grant proposal and presentation</u> : 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
TOTAL	1000

### GRADING SCALE

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

Additional information on current UF grading policies for assigning grade points can be found here:

- *Grading policy*, <https://catalog.ufl.edu/graduate/regulations/#text> and <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>.

## **COURSE POLICIES**

### Attendance and Make-up Policy

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:

- *UF Attendance policy*, <https://catalog.ufl.edu/graduate/regulations/#text> and <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

### Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs as early as possible in the semester.

### Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

### University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students 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.” The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor.

### 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 when appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

### Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see:

<http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>.

### Campus Resources

#### *Health and Wellness*

- *U Matter We Care*: If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) or 352 392-1575 so that a team member can reach out to the student.
- *Counseling and Wellness Center*: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.
- *Sexual Assault Recovery Services (SARS)*: Student Health Care Center, 392-1161.
- *University Police Department*: 392-1111 (or 9-1-1 for emergencies), [www.police.ufl.edu](http://www.police.ufl.edu).

#### *Academic Resources*

- *E-learning technical support*: 352-392-4357 (select option 2) or e-mail to [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu). <https://lss.at.ufl.edu/help.shtml>.
- *Career Resource Center*: Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.
- *Library Support*: <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.
- *Teaching Center*: Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <https://teachingcenter.ufl.edu/>.
- *Writing Studio*: 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <https://writing.ufl.edu/writing-studio/>.
- *Student Complaints*: [https://www.dso.ufl.edu/documents/UF\\_Complaints\\_policy.pdf](https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf).

## COURSE SCHEDULE

Date	Topics/Learning Experiences
Week 1	<ol style="list-style-type: none"> <li>1. Introduction and Orientation</li> <li>2. Weeds – Ecological Definition, Adverse Effects and Utility</li> <li>3. Ecological Weed Management</li> </ol>
Week 2	<ol style="list-style-type: none"> <li>1. Weed Life History</li> <li>2. Preventive Measures</li> <li>3. The National Organic Rule - Permitted Practices</li> </ol>
Week 3	<ol style="list-style-type: none"> <li>1. Herbicides permitted in organic cropping systems</li> <li>2. Weed-Crop Interactions, Competition</li> </ol>
Week 4	<ol style="list-style-type: none"> <li>1. Weed-Crop Interactions, Critical Period of Weed Interference</li> <li>2. Documentary - Nature: What Plants Talk About</li> <li>3. Allelopathy</li> </ol>
Week 5	<ol style="list-style-type: none"> <li>1. Biofumigation</li> <li>2. Cultural Weed Management</li> <li>3. <b>Examination 1 – February 7, 2020</b></li> </ol>
Week 6	<ol style="list-style-type: none"> <li>1. Cultural Weed Management</li> <li>2. <b>Quiz. Cultural Weed Management (Student-Moderated Discussion)</b></li> <li>3. Cultural Weed Management</li> </ol>
Week 7	<ol style="list-style-type: none"> <li>1. Physical Weed Control – Mulches</li> <li>2. <b>Quiz. Physical Weed Control – Soil Solarization (Student-Moderated Discussion)</b></li> <li>3. Physical Weed Control – Thermal methods</li> </ol>
Week 8	<ol style="list-style-type: none"> <li>1. Physical Weed Control – Grits (<i>Titles for grant proposals are due</i>)</li> <li>2. Anaerobic Soil Disinfestation</li> <li>3. Mechanical Weed Control – Tillage</li> </ol>
	<b>NO CLASS – Spring Break</b>
Week 9	<ol style="list-style-type: none"> <li>1. Mechanical Weed Control – Cultivation</li> <li>2. <b>Quiz. Automated Weed Control (Student-Moderated Discussion)</b></li> <li>3. <b>Examination 2 – March 13, 2020</b></li> </ol>
Week 10	<ol style="list-style-type: none"> <li>1. Introduction to Biological Control of Weeds</li> <li>2. <b>Quiz. Weed Seed Predation (Student-Moderated Discussion)</b></li> <li>3. Biological Control Using Microorganisms/Bioherbicides</li> </ol>
Week 11	<ol style="list-style-type: none"> <li>1. Livestock for Weed Management</li> <li>2. <b>Quiz. Livestock for Weed Management (Student-Moderated Discussion)</b></li> <li>3. Chemical Weed Control – Synthetic Herbicides (1)</li> </ol>
Week 12	<ol style="list-style-type: none"> <li>1. Chemical Weed Control – Synthetic Herbicides (2) (<i>Grant proposal drafts are due</i>)</li> <li>2. Precision Herbicide Application</li> <li>3. Chemical Weed Control – Soil fumigants</li> </ol>
Week 13	<ol style="list-style-type: none"> <li>1. Herbicide resistance</li> <li>2. <b>Quiz. Sustainability of Herbicide-Resistant Crops (Student-Moderated Discussion)</b></li> <li>3. Unmanned aerial vehicle use for weed management</li> </ol>
Week 14	<ol style="list-style-type: none"> <li>1. Integrated Weed Management vs Ecological Weed Management</li> <li>2. <b>Grant Proposal Presentations</b></li> <li>3. <b>Submit grant proposal</b></li> </ol>
Week 15	<ol style="list-style-type: none"> <li>1. Review for Exam</li> <li>2. <b>Examination 3 – April 29, 2020</b></li> </ol>

## Grant Proposal Format

**Project Abstract:** Limited to no more than 250 words.

**Statement of Problem, Rationale and Justification:** Statement of the problem being addressed, rationale and justification for objectives and the impact of the anticipated project. Begin the statement of the problem as: *"The purpose of this project is to"* ... Limited to 500 words.

**Project Relevance to Sustainable Agriculture:** State how the project and the expected results contribute to agricultural sustainability. Don't simply tell us that your project addresses an element of sustainable agriculture, tell us 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. No more than 500 words.

**Objectives:** A numbered list of concise project objectives limited to no more than 500 words.

**Approach and Methods:** A brief description of the methods to be used for each objective, numbered according to their corresponding objective. **There must be a direct relationship between the approach and methods and the project relevance to sustainable agriculture.** Approach and Methods is limited to no more than 1000 words.

**Timetable:** Limited to no more than 500 words.

**Literature Cited:** A minimum of 8 refereed journal articles is required.

**Grant Proposal Presentation:** Students will make a 10-minute PowerPoint presentation of their grant proposals.