



THE OHIO STATE UNIVERSITY

SYLLABUS: HCS 7821, SPRING 2019

ENVIRONMENTAL PHYSIOLOGY OF MANAGED PLANT SYSTEMS

Course overview

Instructor, Date and Time

Instructor: Dr. Alexander Lindsey

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Phone number: 614-292-3864

Office: 312A Kottman Hall, 2021 Coffey Road, Columbus

Office hours: By Appointment, or before class (to be determined based on student requests)

Time and Date: MWF 9:10-10:05AM (3 Credits)

Location: 244 Kottman Hall (Columbus) or 121 Fisher Auditorium (Wooster)

Course description

An advanced study of the interaction of cultivated plants with their environment. HCS 7821 applies and integrates core fundamentals of physical and biological science to provide a robust understanding of the physiological basis for crop response to environmental factors at an advanced level, recognition of the responses on the whole plant and canopy level, and provides opportunities for students to develop skills in professional communication.

Prereq: HCS 5621. Not open to students with credit for HCS 821.

Course Goals

By the end of this course:

1. Students will be able to characterize and quantify environmental factors affecting plant growth and development in cropping situations
2. Students will understand how plants sense and respond to environmental factors
3. Students will be able to apply their knowledge of plant response to environmental factors to explain abnormal plant symptomology.

Program Learning Goals

This course will help students achieve following Horticulture and Crop Science Graduate Program Learning Goals:

1. Demonstrate scientific competence in horticultural and/or agronomic sciences
2. Appreciate diverse issues within horticultural and agronomic sciences
3. Use appropriate form of communication effectively at a professional level

Course materials

Optional Textbooks

1. AH Fitter and RKM Hay. Environmental Physiology of Plants, 3rd ed. Academic Press (2002).
2. H Lambers, FS Chapin III & TL Pons. Plant Physiological Ecology, 2nd ed. Springer (2008).
3. L Taiz, E Zeiger, IM Moller & A Murphy. Plant Physiology and Development, 6th ed. Sinauer Associates Inc. (2015).
4. R Hay & J Porter. The Physiology of Crop Yield 2nd ed. Blackwell Publishing (2006).

Required Journal Articles

This course will be discussing research published in primary literature, and articles published on different crops and environmental stresses will be posted to Carmen by the start of each unit. Discussion of articles will be a component of the course, and students are expected to read the articles and prepare to participate in discussion of the materials. Discussion questions may be provided for the assigned articles, and completion of the questions with accompanying discussion will account for 10% of the grade (see below).

Grading and faculty response

This course will be graded using the OSU Standard format. Students' attendance and participation in class is expected. Exams will be offered during the course schedule. **Late assignments are subject to a 10% late penalty per day late.**

Grades

Evaluation or Assignment	Percent of Grade
Case Studies and Assignments (6 activities)	30%
Discussion Activities	10%
Midterm Exam	30%
Final Project (incl. Friday April 26, 10-11:45AM)	30%

Case Studies and Assignments

Throughout the semester, various case studies will be shown and discussed. At least six assignments showing an image or a descriptive analysis of symptomology will be provided, and students will be asked to address specific objectives regarding each case. Only the six highest scores for each student will contribute the grade.

Final Project Expectations

Students are expected to prepare a course lecture related to how plants react to environmental conditions, stress, or stimuli. Upon completion of an advanced degree, most professionals will be expected or required to develop seminars and/or lecture materials. To gain experience in this, students will be expected to develop a 30-35-minute long lecture or seminar related to the way plants interact with the environment. The students will get to choose the topic plant species, the system of production, and the aspect(s) that will be covered in that time period. More details will be discussed later in the semester. Additionally, you will be expected to provide peer-reviews of the presentations to assist in providing feedback.

Grading scale

This course is graded on the OSU standard format.

A	93-100%	C	73-76%
A-	90-92%	C-	70-72%
B+	87-89%	D+	67-69%
B	83-86%	D	60-66%
B-	80-82%	E	<59%
C+	77-79%		

Attendance, participation, and discussions

Student participation requirements

Your attendance and participation is essential for the success of this course. The following is a summary of everyone's expected participation:

- **In Class Participation:**
Students are expected to attend in-person course lecture and guest speaker events. Course material will be uploaded to Carmen for students to review. Case studies and exams will be discussed.
- **Office hours:**
Office hours, are optional. Students are welcome to schedule office hours times with course instructors by appointment if they need additional help with course material.

Discussion and communication guidelines

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Writing style:** All written materials presented in class should be of professional standard, using correct grammar, spelling, and punctuation.
- **Tone and civility:** Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably.
- **Citing your sources:** When we have academic discussions, please cite your sources to back up what you say. (For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.)

Other course policies

Academic integrity policy

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's *Code of Student Conduct* is never considered an "excuse" for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's *Code of Student*

Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- The Committee on Academic Misconduct web pages ([COAM Home](#))
- *Ten Suggestions for Preserving Academic Integrity* ([Ten Suggestions](#))
- *Eight Cardinal Rules of Academic Integrity* (www.northwestern.edu/uacc/8cards.htm)

Accommodations for accessibility

Requesting accommodations

If you would like to request academic accommodations based on the impact of a disability qualified under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, contact your instructor privately as soon as possible to discuss your specific needs. Discussions are confidential.

In addition to contacting the instructor, please contact the Office for Disability Services (<http://ods.osu.edu>) at [614-292-3307](tel:614-292-3307) or ods@osu.edu to register for services and/or to coordinate any accommodations you might need in your courses at The Ohio State University.

Accessibility of course technology

This course requires use of Carmen (Ohio State's learning management system). If you need additional services to use these technologies, please request accommodations with your instructor.

- [Carmen \(Desire2Learn\) accessibility](#)
- Synchronous course tools

Course Topics*

1. Plant Adaptation
2. Climate, Energy, and the Environment
3. Light
 - a. Nature of light
 - b. Plant-light interactions
4. Water
 - a. Water properties
 - b. Water relations in plants
 - c. Stress response to water
5. Temperature
 - a. Thermal environment of plants
 - b. Plant responses to changes in thermal environment

6. Nutrients and Xenobiotics

- a. Nutrient requirements of crops
- b. Nutrient and xenobiotic uptake
- c. Nutrient and xenobiotic metabolism

7. Methods for environmental monitoring and management

*Duration and/or complete coverage of each topic is subject to change relative to course progress, student enrollment and participation, and specific interests of students enrolled.