



Horticultural Physiology

HOS 6307 - 3 CREDITS

Monday and Wednesday 9:35 AM to 10:25 AM (3rd period)

Friday 9:35 AM to 11:30 AM (3rd and 4th periods)

Fall 2023

[Zoom link](#)

COURSE FORMAT

This is a 100% online, synchronous course. Course lectures and interactive activities will take place during our scheduled meeting time (see above). Attendance is mandatory, but lecture videos will be published as an additional tool to supplement student learning. Links and all other learning materials will be published in Canvas. This course also includes a weekly journal club.

INSTRUCTOR

Gerardo Nunez, Ph.D.

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Fifield Hall 1113

(352) 273 - 4765

Office hours: Wednesdays 4:00 PM to 5:00 PM via Zoom

COURSE DESCRIPTION

This course covers basic plant physiology concepts with an emphasis on horticultural crops. Topics include water uptake and transport, ion uptake, photosynthesis, respiration, and source-sink relations.

LEARNING OBJECTIVES

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

- Summarize the physical and biological principles by which horticultural crops take up and transport water and ions
- Summarize the photochemical and biochemical phenomena that mediate carbon and energy flux in photosynthesis and respiration in horticultural crops
- Evaluate how environmental factors and horticultural practices impact water and nutrient uptake, photosynthesis, respiration, and - ultimately - horticultural productivity
- Interpret and diagram horticultural crop physiology data and write scientific reports
- Write an article review that demonstrates a thorough understanding of plant physiology concepts, skillful use of academic language, and collegiality and the ability to provide positive feedback.
- Moderate a journal club discussion about a recently published horticultural physiology article

COURSE MATERIALS

Textbooks

There is no required textbook for this course. The following textbook can be used to supplement and extend lecture topics.

- Fundamentals of Plant Physiology Taiz, Zeiger, Moller, & Murphy (ISBN 9781605357904)

Course Website

This course has a comprehensive mini-site in Canvas. Take time to familiarize yourself with the course site. Digital copies of this syllabus, and other learning materials can be found there.

- *E-Learning in Canvas*, www.elearning.ufl.edu

Technology

This is an online course. Thus, access to reliable technology is paramount to student success. You will need to have access to a personal computer, web camera, and microphone to attend lectures, participate in class, and take exams. **Your camera must be turned on for the duration of class.** Please, be mindful of your appearance, privacy, and surroundings.

You will also need to have access to broadband internet. **Your internet connection should allow for a smooth web conference experience or smooth video playback.** If you have trouble streaming videos (e.g., from Hulu or Netflix) on your WiFi connection, you will not be able to take an online exam. Mobile phones (“Hot Spots” or data) are almost certainly not a good idea.

COURSE GRADE

1. Exams

45 points

The purpose of these assessments is to evaluate student content retention and ability to synthesize information. Students will be evaluated through three cumulative exams administered in Canvas with HonorLock. Each exam will be graded out of 15 points. Exams will include short- and long-answer questions focused on the most-recent 5 weeks of lecture material. Exams #1 and #2 will take place during regularly scheduled classes. Exam #3 will take place during finals week at the time indicated by the University Registrar (see dates below). Practice exams will be available a week before each exam and an after-hours review session will be held the evening before each exam.

Exam	Date
Exam #1	10/04/23
Exam #2	11/08/23
Exam #3	12/13/23 at 10:00 AM

2. Homework

20 points

The purpose of these assignments is to connect experimental data with plant physiology concepts and scientific writing. Students will receive data from a simple horticulture physiology experiment. Then, they will analyze the data using statistical software, illustrate the data as publication-ready graphs, and summarize their findings in a brief (~300 words) scientific report. Students can refer to personal notes, textbooks, online tutorials, and other sources, but they must work individually. Scripts for statistical analysis using R will be provided by the instructor, but students can use any software they prefer. Homework assignments will be submitted through Canvas and processed with originality-checking software. There will be three homework assignments in the semester; each will be graded out of 10 points. The two highest scores from each student will be used to compute the homework final grade.

3. Journal Club

35 points

The purpose of this exercise is to expose students to the plant physiology research environment (journals, methods, approaches, etc.), practice clear and effective communication, and expand on the knowledge covered during lectures. We will focus on whole-plant physiology articles published in reputable, peer-reviewed journals (e.g. JASHS, Tree Physiology, TPJ, JXB etc.) within the past five years. The instructor will provide a list of articles that will be discussed during the semester. Students will select an article and date to moderate the discussion. Moderators will prepare a presentation where they share the strengths and weaknesses of the article at hand. Subsequently, they will lead the academic debate about this article. Finally, moderators will grade everyone else's article evaluations. All students will prepare a 500-word written valuation and 3 questions about the article at hand. Submitting text produced by generative IA tools, such as ChatGPT, is strictly forbidden. Both moderators and discussants will participate in the oral discussion of the article. A total of 35 points can be earned from the following components:

Role	Assessment	Points possible
Moderator	Presentation	10 points
Moderator	Peer assessment of evaluations	5 points
Everyone	Article evaluation	10 points
Everyone	Article discussion	10 points

GRADING SCALE

A	=	92 – 100 points	C+	=	< 80 - 77 points
A-	=	< 92 - 90 points	C	=	< 77 - 73 points
B+	=	< 90 - 87 points	C-	=	< 73 - 70 points
B	=	< 87 - 83 points	D+	=	< 70 - 67 points
B-	=	< 83 - 80 points	D	=	< 67 - 63 points

D- = < 63 - 60 points

E = < 60 points

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

- *Grading policy*, www.catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

COURSE POLICIES

Attendance

Students are encouraged to attend every class. Attendance will be taken based on the screen name you use in Zoom. Your screen name must be your first name and last-name initial (for example, my screen name will be Gerardo N.). For additional help on how to customize your Zoom profile, see this resource:

- *Customizing your profile*, <https://support.zoom.us/hc/en-us/articles/201363203-Customizing-your-profile>

Absences will be excused, late assignments will be graded, and make up-exams will be provided for documented emergencies as per UF's attendance policy. However, I am aware that sometimes life throws you a *curve ball*. Thus, you are allowed one no-questions-asked absence per semester. You cannot use your no-questions-asked absence on a date when exams, journal club discussions, or assignments are due. Subsequent unexcused absences will make you ineligible for all extra credit assignments.

Additional information about UF's attendance policy can be found here:

- *Attendance policy*, www.catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Zoom Etiquette

Students are expected to be respectful learners. As such, you should arrive to and leave from class on time. Your camera must be turned on for the duration of our class, but your microphone can be muted. You should be ready to answer questions using your microphone. The chat feature must be used exclusively for course-related communication. Links and files should be shared and transferred using Canvas and email as appropriate (Zoom is not an acceptable method for assignment submission).

Challenging a Grade

All discrepancies in grading must be resolved within 7 days of the grade being posted in canvas. The instructor's memory is frail. Thus, grade disputes older than 7 days old will not be entertained unless proper excuse is provided (see attendance policy).

Email

Email will be the main means of communication between us. Hence, it is critical that all course-related emails are polite, professional, and as different from a text message as possible. You must use your Gator Link email. Canvas messages will not be answered. I will reply to all emails within 2 business days of receiving them. For additional recommendations, consult:

- *Email etiquette*, <https://www.inc.com/business-insider/email-etiquette-rules.html>

Written Communication

Effective written communication is essential for student and professional success. Whether you go on to become a horticulturist, an accountant, or a CEO, written communication will be a critical skill in your toolbox. Thus, I place great emphasis on coaching and participating in professional, context-specific written communication. Proper spelling, grammar, and punctuation are expected in all course assignments. You are encouraged to use the resources provided by the UF Writing Studio to develop or enhance your writing skills. Free one-on-one tutoring (live and on-line) is available to enrolled students.

- *UF Writing Studio*, 302 Tigert Hall, 846-1138, www.writing.ufl.edu/writing-studio/

Academic Honesty

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 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 or TAs in this class. For more information regarding the Student Honor Code, please see:

- *UF Honor Code*, <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>

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.

Campus Resources

If you are experiencing crises or personal problems that interfere with your general wellbeing, I encourage you to utilize the university’s counseling resources. The UF Counseling and Wellness Center provides confidential counseling services at no cost for currently enrolled. Additionally, resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *Counseling and Wellness Center*, 3190 Radio Road, 392-1575, www.counseling.ufl.edu
- *Career Connections Center*, CR-100 Reitz Union, 392-1601, www.career.ufl.edu
- *U Matter We Care*, www.umatter.ufl.edu/
- *Student Success Initiative*, <http://studentsuccess.ufl.edu>

Students with Disabilities

The Disability Resource Center (DRC) coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the

classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues.

If you would like to request classroom accommodations, you must first register with the DRC. The DRC will provide you with documentation that you must deliver to the instructor when requesting accommodations.

- *Disability Resource Center*, 0020 Reid Hall, 392-8565, www.disability.ufl.edu

Course Evaluation Process

Student assessment of instruction is an important part of the effort to improve teaching and learning. At the end of the semester, you are expected to provide professional and respectful feedback on the quality of instruction in this course. Guidance on how to give feedback in a professional and respectful manner is available here:

- *Providing professional and respectful feedback*, <https://gatorevals.ua.ufl.edu/students/>

Students will be notified when the evaluation period opens, and they can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via:

- *Course evaluations*, <https://ufl.bluera.com/ufl/>

Student Complaints

You can file and resolve any complaints about your experience in this course in the following site:

- *Student complaints in online courses*, www.distance.ufl.edu/student-complaint-process

In-class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third-party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

In-person Training

We will have an in-person training on Monday October 23rd. Infrared gas analyzers (IRGA) are ubiquitous in plant biology research. Unfortunately, using them is complicated and they are prone to errors and inaccuracies. In this training, we will use IRGAs and plants subjected to different forms of stress to learn to calibrate, use, and interpret photosynthesis and respiration data. The training will be held face-to-face in HortTeach 131 at UF Main Campus in Gainesville, FL.

Schedule of Topics - Fall 2023

Week of	Lecture topics
Module 1. Plant water relations	
Aug 23	Introduction to the course Plant cells, tissues, and organs
Aug 28	Water potential and stomatal function
Sep 5	Long distance water movement and transpiration
Sep 11	Daily transpiration patterns Factors affecting transpiration
Sep 18	Ion movement across the plasma membrane Isohydric and anisohydric plants
Module 2. Photosynthesis	
Sep 25	Light-dependent reactions of photosynthesis
Oct 2	CO ₂ fixation reactions (C3)
Oct 9	CO ₂ concentrating mechanisms (C4 and CAM) Factors affecting photosynthesis
Oct 16	Photosynthesis in a changing planet
Oct 23	Sucrose and starch synthesis ** In person training Monday 10/23/23 at 3:00 PM Horticultural Sciences Teaching Facility (Hort Teach 131)
Module 3. Sugar use and transport	
Oct 30	Glycolysis and the TCA cycle Electron transport and ATP synthesis
Nov 6	Alternative pathways for respiration Factors affecting respiration
Nov 13	Phloem loading and unloading Phloem translocation
Nov 20	Source-sink competition
Nov 27	Source-sink management and premium produce
Dec 4	Carbohydrate fluxes in woody perennials