



**HORTICULTURAL
SCIENCES**

Horticultural Physiology

HOS 4304 - 3 CREDITS

Fall 2024

MEETING TIMES AND LOCATIONS

Monday, Wednesday, and Friday

11:45 AM to 12:35 PM (5th period)

Blueberry Research Building BLRB 154

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

in person or via Zoom

PRE-REQUISITES

BOT 2010C or BSC2010

PRE-REQUISTE KNOWLEDGE

Students are expected to be familiar with basic plant anatomy and morphology and horticultural farming systems at the start of this course. Additionally, students are expected to be familiar with basic chemistry and physics concepts, such as chemical bonds, kinds of organic molecules, electronegativity, light measurements, and kinds of energy (potential, chemical, kinetic, radiant, and electrical).

COURSE DESCRIPTION

This course covers basic concepts and processes of plant physiology, including water relations, nutrient absorption, photosynthesis, respiration, and carbohydrate partitioning. In order to deliver meaningful mastery of these contents, this course utilizes a combination of lectures and active-learning activities.

LEARNING OBJECTIVES

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

- Identify the parts of the plant at the cellular, tissue, and organ level.
- Summarize the physical and biological phenomena by which plants take up and transport water
- Summarize the photochemical and biochemical phenomena that mediate carbon fixation and energy flux in photosynthesis and respiration
- Synthesize how environmental conditions and cultural practices impact water uptake, photosynthesis, respiration, and - ultimately - horticultural productivity
- Write a paragraph that demonstrates a thorough understanding of plant physiology concepts and

skillful use of academic language (terminology, tone, and grammar).

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 “Start Here”, “Syllabus”, and module tabs in the navigation menu. Digital copies of this syllabus, and other learning materials can be found there.

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

COURSE GRADE

1. Class participation

10 points

At the beginning of every class, two students will be chosen at random and asked to provide a 2-minute verbal summary of the previous lecture. Additionally, throughout the course there will be opportunities for students to interact with the instructor by asking or answering questions. Class interaction and class summaries will be graded according to the rubrics below. The sum of your class summary and class interaction scores will be used as your participation grade. These scores will be updated in canvas after each exam. If you are absent or late on the day you are called to give your verbal summary, you will receive a 0, unless you have a properly documented excuse.

Frequency of class interaction	Score
Never	1
Rarely	2
Sometimes	3
Often	4
Always	5

Quality of class summary	Score
Poor	1
Fair	2
Good	3
Very good	4
Excellent	5

2. Homework

20 points

Students will be evaluated through three homework assignments. These assignments will contain 3 to 5 questions aimed at connecting plant physiology knowledge with horticultural applications and/or ecological performance. Each question must be answered in paragraph format in 150 words or more. Correct grammar, punctuation, and spelling are expected. Students can refer to personal notes, textbooks, and other sources, but they must work individually. Submitting text produced by generative IA tools, such as ChatGTP, is strictly forbidden. All work submitted for credit by students will be analyzed with originality-checking software –including ZeroGTP.

Each homework assignment will take approximately 2 hours of time to complete. We will discuss the correct answers to the homework questions during the class period that immediately follows the homework deadline. There will be three homework assignments in the semester; each will be graded out of 10 points. Your two highest scores will be used to compute your final grade.

Exam	Due date
Homework #1	09/30/24
Homework #2	11/04/24
Homework #3	12/04/24

3. Exams

60 points

Students will be evaluated through three cumulative exams. 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). Each exam will be graded out of 20 points. Exams will include short- and long-answer questions focused on the most-recent 5 weeks of lecture material. Exams will evaluate students' knowledge, critical thinking, and writing ability. The best way to prepare for the exams is to complete homework assignments and practice exams conscientiously. Practice exams will be available a week before each exam and an optional review session will be held the evening before each exam.

Exam	Date
Exam #1	10/04/24
Exam #2	11/08/24
Exam #3	12/11/24 10:00 AM

Students will have the option of adding **+2 extra credit points** to their exam #1 and exam #2 grades if they improve and re-write their answers to the integrative learning question in each exam within 48 hours of receiving their scores. Extra credit points will be assigned to perfect and near-perfect answers. No partial credit will be given in the extra credit assignment. Students who chose not to complete the extra credit will neither receive points nor be penalized.

4. Crossword puzzle

10 points

This course includes over 100 technical terms. We will use crossword puzzles to help you learn these terms and incorporate them into your vocabulary. During the week prior to each exam, you will answer a crossword puzzle that contains terms and definitions from the 5 most recent weeks of lecture. Each crossword puzzle will have a minimum of 20 terms. These crossword puzzles will serve as study tools for exams. Crossword puzzles will be due 72 hours before each exam in Canvas.

GRADING SCALE

A	=	92 – 100 points	C	=	< 77 - 73 points
A-	=	< 92 - 90 points	C-	=	< 73 - 70 points
B+	=	< 90 - 87 points	D+	=	< 70 - 67 points
B	=	< 87 - 83 points	D	=	< 67 - 63 points
B-	=	< 83 - 80 points	D-	=	< 63 - 60 points
C+	=	< 80 - 77 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 a *photo book*. You must contribute to the creation of the course *photo book* by emailing the instructor a clear photo of your face during the first week of the semester.

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, or assignments are due.

Subsequent unexcused absences will make you ineligible for 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

This course requires active student participation. Students are expected to participate by asking and answering questions during lecture, as necessary. Also, there will be multiple, non-graded activities that provide opportunities for additional engagement. In most lectures, students will be invited to answer online prompts (delivered through QR codes that link to polleverywhere.com) using their cellular phones or other mobile devices. Students are expected to participate in these polls and discuss their answers with the whole class or in breakout groups.

Classroom Etiquette

Students are expected to be respectful learners. As such, you should arrive to and leave from class on time. Students who arrive 5+ minutes after the start of class will be marked late. Three late arrivals will be considered an absence.

Students should refrain from using electronic devices (laptops, tablets, and cellular phones) for activities that do not pertain to this course. Activities such as talking, texting, sleeping, eating, and studying for other classes should also be avoided. Students who repeatedly engage in disruptive behavior during a class period will be marked absent and/or asked to leave the room.

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. 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/

Response Time and Feedback

I will reply to course emails within 48 hours of receiving them (barring for an emergency). If your email is time-sensitive (for example, an issue with a timed assignment), please indicate "Time sensitive" in the email subject line. I will make every attempt to respond to time sensitive emails received during business hours in a timely manner.

Exams and homework will be graded within 14 days of the assignment closing. Since both kinds of assignments are due at the end of each module, I will prioritize exams over homework. I use assignment rubrics and the comments section to provide positive and formative feedback about student answers.

Once a grade is posted, I recommend you review your submission to find my feedback. If you have additional questions about your submission, please do not hesitate to visit me during office hours.

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. Finally, I ask that we set up a meeting to help me understand how to create the best learning environment for you.

- *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.aa.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/>

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.

Podcast

Student feedback suggests that I am a very fast-paced speaker. I will try my best to slow down, but -just in case I speed up- I will post audio recordings of all lectures in canvas within 7 days of the live lecture. Only classroom-based lectures will be recorded. Please, bear in mind that your contributions will also be recorded. Audio recordings will not be posted for class periods when attendance is below 90% of the total enrollment in the course. The outdoor classroom we will be using does not have video recording capabilities. Thus, recording video lectures is not an option for this course.

HORTICULTURAL PHYSIOLOGY

Schedule of Topics - Fall 2024

Week of	Lecture topics
Module 1: Plant-water relations	
Aug 23	Introduction to the course The plant cell
Aug 26	Plant tissues, tissue systems, and organs
Sep 04	Water potential and water movement
Sep 09	Stomatal function Transpirational flux equation
Sep 16	Daily transpiration patterns Factors affecting transpiration
Sep 23	Water deficit
Module 2: Photosynthesis	
Sep 30	Light-dependent reactions of photosynthesis
Oct 07	CO ₂ fixation reactions (C ₃ , C ₄ , and CAM)
Oct 14	Factors affecting photosynthesis
Oct 21	Optimizing photosynthesis for horticultural production
Oct 28	Respiration (Glycolysis, TCA cycle, Electron transport, ATP synthesis)
Module 3: Sugar use and transport	
Nov 04	Factors affecting respiration
Nov 13	Sucrose and starch synthesis
Nov 18	Phloem loading and unloading Phloem translocation
Dec 02	Sink allocation
Nov 04	Growing an award-winning tomato