PLSC 333- Plant Physiology and Nutrition

Department of Plant Sciences
University of Tennessee
Spring semester, 2021

Part I. Course Information

Instructor
Dr. Kellie J. Walters
259 Plant Biotech.
E-mail: waltersk@utk.edu
Phone: (865) 974-8822
Web: https://utia.tennessee.edu/person/?id=20271

Teaching Assistant
Mr. Kurt Wedegaertner
E-mail: kwedegae@vols.utk.edu

Meeting Time and Location
Tuesday and Thursday, 1:10 to 2:25 PM; Online on Zoom

Final Exam
Wednesday, May 5 3:30 – 6:00 pm

Course Description

PLSC 333 focuses on physiological principles as they relate to landscape design and construction, residential plant management, commercial plant production, agronomic production, and public horticulture: photosynthesis and transpiration, respiration, water and hormonal relations, mineral nutrition, plant development, and response to the environment. There is a focus on how production practices influence plant productivity and quality.

Course Communication

Office hours are Tuesday and Thursday from 2:30 to 3:30. Additional meeting times may be arranged by making an appointment. The best way to reach me outside of class is by sending me an e-mail. I strongly encourage you to ask questions at any time and not wait unit the day before the exam. Your University email address will be used to communicate course information. You are responsible for staying up to date with email communications.

Learning Environment

This is a fully online course, which means you are not required to travel to campus to complete this course. There may be an option towards the end of the semester to participate in completely optional outdoor labs. You will participate in this course using Canvas, the University of Tennessee's Learning Management System. Lectures will be posted online. You are expected to review the lectures and other course material to prepare for class. Synchronous sessions will be conducted using Zoom where webcam use during breakout groupwork and audio capabilities are mandatory. During class, expect to participate and engage, solving problems with your group based on the lecture and reporting to the entire class.

How to Be Successful in This Course

Students are expected to **complete** pre-class assignments and quizzes, **attend** virtual class, and **participate** in in-class quizzes and activities. Reviewing material and preparing for class is integral to success in this course, as reflected in course points. Above all, it is expected that you **think** about the concepts and apply them as best you can.

It is expected that students will pay attention to deadlines outlined in announcements or the syllabus and be aware of upcoming assignments and assessments. If any class questions, ideas, or concerns arise, reach out to Dr. Walters in a timely manner. Students are encouraged to review UT's Online Programs information for How to be Successful in an Online Course.

Learner's Responsibility

- Be prepared for all classes
- Be respectful of others
- Actively contribute to the learning activities in and outside of class
- Contribute to group activities
- Ask for instructor clarification when needed
- Read and (if necessary) respond to communications from the instructor
- Abide by the UT Student Code of Conduct
- Think and be creative!

Instructor's Responsibility

- Be prepared for all classes
- Evaluate all fairly and equally
- Be respectful of all students
- Create and facilitate meaningful learning activities
- Abide by the University Codes of Conduct

Course Materials

You will find more value in lectures if you have already familiarized yourself with the topic and can listen to the lectures already knowing some of the basics. Reading before class will also help you identify areas that need clarification and allow you to ask more specific questions.

- *Required Text:*
  Plant Physiology and Development, 6th ed. ISBN-13: 978-1605352558, Taiz, Zeiger, Moller, and Murphy
  Or
  Fundamentals of Plant Physiology, 1st ed. ISBN-13 978-1605357904, Taiz, Zeiger, Moller, and Murphy
  These texts are very similar (some chapters are the same). I will primarily be referring to *Fundamentals of Plant Physiology* because it is less dense and does not go as in-depth. However, *Plant Physiology and Development* is also available electronically.

- *Internet access:*
  Students must have a working computer that meets the system requirements for using Zoom, a microphone, and a webcam in order to participate in online classes and to complete assignments. **If you need any equipment to complete this course online, you can submit a**

technology request at forms.utk.edu/tech-request. Students may be able to participate in class by using resources available in an on-campus computer lab.

- ***Zoom:*** This course will be utilizing Zoom to meet in live, online sessions using webcams and audio. Be sure to use the meeting link as provided to join the class meeting sessions. Please use your UTK Zoom account rather than a personal account to ensure your attendance and in-class participation is accounted for. In-class points will not be given if issues arise from using the wrong account.
- **Canvas:** As a student registered for this course, you are automatically loaded into the course Canvas site. It should appear on your homepage. Course announcements and materials will be posted on this site. Additionally, assignments, quizzes, and exams will be completed and/or submitted through Canvas unless otherwise specified. Submission through email will not be accepted.
- **LockDown Browser:** This course requires the use of a LockDown Browser and a webcam for online exams. The webcam can be built into your computer or can be the type that plugs in with a USB cable. You will need to download and install the LockDown Browser from this link: https://download.respondus.com/lockdown/download.php?id=645740725
- Additional Canvas and Zoom resources are available for students unfamiliar with these online environments.

Technical Support: For Technical issues, contact the OIT HelpDesk by phone at (865) 974-9900, chat, or at the Walk-in HelpDesk,. For IT and Computing issues, use the online Contact Form. **Again, if you need any equipment to complete this course online, you can submit a technology request online at forms.utk.edu/tech-request.**

Part II. Course Goals, Objectives, and Expectations

Course Goals

Upon completion of PLSC 333 students will be able to discuss physiological principles as they apply to their field of plant science. They will be able to think critically, leveraging their knowledge of principles including photosynthesis, respiration, transpiration, water and hormonal relations, mineral nutrition, and plant development to solve issues and improve production

Course Behavior

I expect a professional and congenial atmosphere where we all feel: 1) welcome; and 2) respected. We will be learning together and, in order to get the greatest benefits of the class, need to feel comfortable participating and engaging with each other.

Please *do*…
…ask questions.
…ask for clarification.
…be creative.
…stop by my office (or set up a zoom meeting, dang COVID).
…be excited- this is going to be a really fun course!
Please *do not*…
…use offensive language.
…work on other tasks while in class.

Assignments and Grading

Exams

Five examinations, 100 points each, will be utilized to evaluate progress. The use of the LockDown browser will be required.

Quizzes

Every class period will be preceded by a 5-point "quiz" to check knowledge. An additional quiz will be given in-class and, after completing the quiz individually, groups will form to complete the quiz and correct any answers or misconceptions.

Manuscript Review

The ultimate goal of attending college is to prepare you for your career. You may not think reviewing primary literature will prepare you for any career besides academia. However, getting information "straight from the source" can give you a leg up in any position. You will write a 25-point review summary for two manuscripts in this course.

Podcast

The dreaded group project, but in the form of a podcast. Both individual and group grades will be given. Each group's podcast episode will revolve around one or more topic discussed in class and how it can be applied to your area of plant science. The episode will involve interviewing a progressive industry member regarding their perspectives on your plant physiology/nutrition topic. Innovativeness and creativity is highly encouraged.

Activity Participation/Attendance

While this course is online, it is expected that students attend every class with their webcam on throughout the entire class. It is also expected that students have access to a microphone and have the ability to unmute to communicate with the class as needed. A variety of activities will take place throughout this course. These activities are meant to reinforce ideas and foster thinking and application. This is arguably the most important part of the course.

Total point breakdown

Item	Points
Exams	
Exams 1 - 5	100 each
Subtotal	**500**
Quizzes	
Pre-class quiz	5 each
In-class individual quiz	
In-class collaborative quiz	
Subtotal	**345**
Projects	
Manuscript Review Paper (2)	25 each
Subtotal	**50**
Group Podcast	
Group	75 each
Individual	
Subtotal	**150**
Class attendance and activity participation	
Actively participating in in-class activities	5 each
Subtotal	**120**
Grand total	**1,165**

Grading

Final grades will be assigned in accordance with the UT grading scale. For further explanation about student UT Grades and GPA or other policies related to academic standing, please reach out to OneStop.

Letter Grade	Percentage
A	≥ 93%
A-	90% to < 93%
B+	87% to < 90%
B	83% to < 87%
B-	80% to < 83%
C+	77% to < 80%
C	73% to < 77%
C-	70% to < 73%
D	60% to < 70%
F	< 60%

Part III. Course Outline and Schedule

	Lecture date	Preparation	Topic, course activity
Section 1: Energy			
1	Jan. 21	Review syllabus	Course outline; How to think; How the class will work
2	Jan. 26	Video; Chapter 1 ["Overview of plant structure" through "the endomembrane system" only]	Plant and cell architecture
3	Jan. 28	Videos; Chapter 7 [pieces- refer to the video for the highlights and use the book as a reference if you would like to read more in-depth]	Introduction to Light; Photosynthesis: Light reactions
4	Feb. 2	Video; Chapter 8 [pieces]	Photosynthesis: Carbon reactions; Respiration
5	Feb. 4	Video; Chapter 9	Photosynthesis: Physiological and ecological considerations Pt. 1
6	Feb. 9	Video; Chapter 9	Photosynthesis: Physiological and ecological considerations Pt. 2
7	Feb. 11		**Exam 1**
Section 2: Water			
8	Feb. 16	Video, Chapter 2	Water characteristics
9	Feb. 18	Video, Chapter 2	Water and plant cells
10	Feb. 23	Video, Chapter 3	Water balance
11	Feb. 25	Dr. Avat Shekoofa Guest Lecture, supplemental video, Chapter 3	Stomatal biology/transpiration
12	Mar. 2	Dr. Michael Ross Guest Lecture	Plant physiology considerations in landscape design
13	Mar. 4		**Exam 2**
Section 3: Mineral nutrition			
14	Mar. 9	Video, Chapter 4 **Step 1 Podcast Due**	Mineral nutrition macro & micro nutrients (uses)
15	Mar. 11	Video, Chapter 4, Chapter 6	Uptake and movement (solute transport)
16	Mar. 16	Dr. Garrett Owen Guest Lecture **Step 2 Podcast Due**	Deficiencies, symptoms, antagonisms
17	Mar. 18	Dr. Renata Nave Guest Lecture, Chapter 5 **Paper review 1 Due at midnight**	Assimilation of inorganic nutrients
18	Mar. 23		**Exam 3**
Section 4: Growth and Development			
19	Mar. 25		Growth vs. Development
20	Mar. 30		Plant Hormones
21	Apr. 1		Flowering
22	Apr. 6	**Paper review 2 Due at midnight**	Dormancy
23	Apr. 8		**Exam 4**

Section 5: Stress physiology			
24	Apr. 13		Stress overview - Abiotic vs. biotic stress
25	Apr. 15	**Step 3 Podcast Due**	Temperature: low
26	Apr. 20		Temperature: high
27	Apr. 22		Secondary metabolites
28	Apr. 27	**Step 4 Podcast Due**	Light
Final Exam Wednesday, May 5 3:30 – 6:00 pm			

The instructor reserves the right to revise, alter or amend this syllabus and the course schedule as necessary. Students will be notified in writing/email of any such changes.

Part IV. University and Course Policies

Academic Integrity:

Each student is responsible for their personal integrity in academic life and for adhering to UT's Honor Statement. The Honor Statement reads: "An essential feature of the University of Tennessee, Knoxville is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. *As a student of the university, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity*."

University Civility Statement:

"Civility is genuine respect and regard for others: politeness, consideration, tact, good manners, graciousness, cordiality, affability, amiability and courteousness. Civility enhances academic freedom and integrity, and is a prerequisite to the free exchange of ideas and knowledge in the learning community. Our community consists of students, faculty, staff, alumni, and campus visitors. Community members affect each other's well-being and have a shared interest in creating and sustaining an environment where all community members and their points of view are valued and respected. Affirming the value of each member of the university community, the campus asks that all its members adhere to the principles of civility and community adopted by the campus." http://civility.utk.edu/

Emergency Alert System

The University of Tennessee is committed to providing a safe environment to learn and work. When you are alerted to an emergency, please take appropriate action. Learn more about what to do in an emergency and sign up for UT Alerts. Check the emergency posters near exits and elevators for building specific information. In the event of an emergency, the course schedule and assignments may be subject to change. If changes to graded activities are required, reasonable adjustments will be made, and you will be responsible for meeting revised deadlines.

Disability Services:
Any student who feels s/he may need an accommodation based on the impact of a disability should contact Student Disability Services in Dunford Hall, at 865-974-6087, or by video relay at 865-622-6566, to coordinate reasonable academic accommodations.

Your Role in Improving Teaching and Learning Through Course Assessment:
At UT, it is our collective responsibility to improve the state of teaching and learning. During the semester, you may be requested to assess aspects of this course either during class or at the completion of the class. You are encouraged to respond to these various forms of assessment as a means of continuing to improve the quality of the UT learning experience.

Wellness
The Student Counseling Center is the university's primary facility for personal counseling, psychotherapy, and psychological outreach and consultation services. The Center for Health Education and Wellness manages 974-HELP, the distressed student protocol, case management, the Sexual Assault Response Team, and the Threat Assessment Task Force.

Social Distancing and COVID 19 Procedures
Students are required to wear face masks at all times and maintain social distancing (6 feet between individuals in traditional classrooms, or, in instructional laboratories and similar settings, only a few minutes in closer proximity when absolutely necessary to achieve learning objectives). Students who are feeling ill or experiencing symptoms such as sneezing, coughing, or a higher than normal temperature will be excused from class and should stay at home.

Instructors have the right to ask those who are not complying with these requirements to leave class in the interest of everyone's health and safety. In the event that a student refuses to comply with these requirements, the instructor has the right to cancel class.
Additionally, following other simple practices will promote good health in and out of the classroom, such as frequent and thorough hand washing, wiping down desks and seats with disinfectant wipes whenever possible, not sharing personal items such as pens and cell phones, and avoiding crowded hallways and other enclosed spaces.

The Volunteer Creed reminds us that we bear the torch in order to give light to others. As Volunteers, we commit to caring for one another and for the members of the communities in which we live, work, and learn. This semester, the University asks that we all demonstrate the Volunteer spirit by following these and other health guidelines and requirements.

Commercialized Lecture Notes

Commercialization of lecture notes and university-provided course materials is not permitted in this course.

Key Campus Resources for Students:

- Center for Career Development (Career counseling and resources; HIRE-A-VOL job search system)
- Course Catalogs (Listing of academic programs, courses, and policies)
- Hilltopics (Campus and academic policies, procedures and standards of conduct)
- OIT HelpDesk (865) 974-9900
- Schedule of Classes/Timetable
- Student Health Center (visit the site for a list of services)
- Student Success Center (Academic support resources)
- Undergraduate Academic Advising (Advising resources, course requirements, and major guides)
- University Libraries (Access to library resources, databases, course reserves, and services)