HRT 361: Applied Plant Physiology , 3 Credits
Fall 2024 Syllabus

Format: In-person Lectures
Time: M,W,F 9:10-10:00 AM
Room: A155, Plant and Soil Sciences Building
Instructor: Dr. Courtney Hollender (she/her)
How to address me: Dr. Hollender, Professor Hollender, or Professor
Email: chollend@msu.edu ; Office: PSSB Room A342-C
Office hours: Weds 10:20 – 11:20 AM and by appointment
Office Phone number: 517-353-0446

Prerequisite:
PLB 105, BS 161, or BS 171 ; Recommended: HRT 203 and HRT 204

Suggested Text
Fundamentals of Plant Physiology by Taiz, Zeiger, Moller, and *Murphy,* 1st Edition**.** Copyright 2018 by Sinauer Associates, Inc. (ISBN: 9781605357904) or 2nd edition (ISBN: 9780197614167).

If you purchase the text, read through the corresponding chapters after the lecture as opposed to reading ahead of time. You are not expected to know everything in each chapter.

Technology Requirements :
Ability to access the internet and use the MSU Desire2Learn (D2L) software is required (http://d2l.msu.edu). D2L is used for frequent course announcements, homework (assigned as D2L quizzes), and to access lecture slides, grades, and other resources. If you need D2L technical assistance contact the MSU IT Service Desk at 517-432-6200.

Course Description :
Applied Plant Physiology (HRT 361) covers fundamental aspects of whole plant physiology such as plant anatomy, connections between tissue and cell structures and functions, water and solute movement, mineral nutrition, photosynthesis, the translocation of sugar, respiration, development, responses to the environment, and the roles of plant hormones. Connections between the content and horticultural applications are highlighted throughout the course. The material presented provides foundational knowledge for further studies and careers in horticulture and other areas of plant science.

Instructor Teaching philosophy and commitment:
My role as an educator is to provide my students with a challenging, fair, and respectful environment that enables them to learn foundational knowledge needed for the future mastery of course material. I will do my best to set clear expectations, present content clearly, make myself available outside of class, and grade assignments and respond to emails in a reasonable amount of time. I will also always respond positively to constructive feedback and use it to adjust my teaching methods, content, and assessments when possible and appropriate.

Course Learning Objectives:

After the successful completion of this course, students should be able to:

1. Use knowledge of plant anatomy and plant cell organization to identify plant tissue and cell types in diagrams, photographs, and micrographs.

2. Understand relationships between plant tissue and cell structures and their functions.

3. Understand and be able explain how water, solutes, and "photosynthate" (sugars) move through plants.

4. Understand and recall fundamental knowledge of mineral nutrition and nutrient assimilation including deficiencies symptoms and the roles of symbiotic organisms.

5. Understand and be able to explain the basic processes associated with photosynthesis in C3, C4, and CAM plants.

6. Understand and be able to explain the basic processes of cellular respiration.

7. Recall well-known functions of the different plant hormones along with some agricultural uses of plant hormones and hormone inhibitors.

8. Understand and be able to explain how external environments can influence plant anatomy, plant physiology, plant biochemistry, and plant development.

9. Understand how certain physiological processes can be measured and the importance of these measurements for informing crop management or research.

Course Overview

Lectures: Traditional lectures will be given. Lecture slides will be posted on D2L a few minutes before the start of each class. On rare occasions, a recorded lecture may substitute for an in-person lecture, but you will know about this ahead of time. When requested in advance, in-person lectures may be recorded for use by students with accommodations that include recording requests and for students absent for MSU sanctioned reasons.

Assessments (i.e. assignments that test your knowledge)

1. **Four Exams: E**xam only asks questions related to material from lectures given after the previous exam. Exams contain a mix of short-answer and multiple-choice questions as well as written response questions.

2. **Optional Final Exam:** Offered to replace your lowest exam grade. The Final covers all topics taught in this course. If you're happy with your grades, you don't need to take the Final.

3. **Homework Assignments:** Each homework (HW) is an untimed open-book D2L quiz worth 20 points. Questions are similar to exam questions. LATE ASSIGNMENTS ARE NOT ACCEPTED.

4. **Teaching Conservatory Project:** This easy assignment involves a visit to the *MSU Plant Biology Teaching Conservatory* on campus and connecting aspects of a plant's external appearance with a presumed function. Details to come later in the semester.

5. **In-class assignments**: Short and easy 1 to 3 question assignments will be given in class throughout the semester. The purpose is to check comprehension of a concept, allow you to ask questions, and serve as a method of attendance. Credit is given for completion. Points are not deducted for wrong answers. Extra credit will be given for assignments after you complete 20.

Assessment Point Values and Final Grade Breakdown

Learning Assessments (Assignments)	Points for each	% of each assignment out of total points	Total Points	% Assessment Type out of total points
Exam 1	100	14.7	400	58.8
Exam 2	100	14.7		
Exam 3	100	14.7		
Exam 4	100	14.7		
10 Homeworks on D2L (20 points each)	20	2.9	200	29.4
Conservatory Project	40	5.9	40	5.9
20 In-class Assignments (1-2 per week)	2	0.3	40	5.9
		Total Points	680	

Course Grade	Grade as a percetange (based on 680 points)	Minimum Points needed
4.0	93	632
3.5	85	578
3.0	80	544
2.5	75	510
2.0	70	476
1.5	65	442
1.0	60	408

Academic Honesty and Integrity

This course adheres to all university policies on academic honesty and integrity (https://ombud.msu.edu/resources-self-help/academic-integrity).Unless authorized, you are expected to complete all course assignments without assistance from any source, including AI. Students who violate MSU academic integrity rules will receive penalty grades, including a failing grade on an assignment or in the course. I expect all of you to uphold the Spartan Code of Honor Academic Pledge.

The Spartan Code of Honor Academic Pledge is:

As a Spartan, I will strive to uphold values of the highest ethical standard. I will practice honesty in my work, foster honesty in my peers, and take pride in knowing that honor in ownership is

worth more than grades. I will carry these values beyond my time as a student at Michigan State University, continuing the endeavor to build personal integrity in all that I do.

Accommodations

Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-7273 or at https://www.rcpd.msu.edu/get-started/student-accommodations

Additional Support

There are many mental health resources available to students. You can find a list at https://caps.msu.edu/resources/index.html . CAPS crisis services are also available 24/7 by calling (517) 355-8270 and press "1" at the prompt to speak with a crisis counselor. To learn how to better help friends, visit https://caps.msu.edu/resources/HelpingFriends.html

General College and University Policies

All general college and university policies are applicable to this course. They are available at https://ombud.msu.edu/university-policies-guidelines

2024 Fall Semester HRT 361 Tentative Schedule

Date	Day	Lect. #	Tentative topic	Text Chapter	Assignment posting	Assignment Due
8/26	Mon	1	Class Introduction; Plant Anatomy Trivia			
8/28	Wed	2	Module 1: Plant Anatomy & Cell Organization	1		
8/30	Fri	3	Module 1 Guest Presentation by Dr. Alicia Withrow, from the MSU Center for Advanced Microscopy			
9/2	Mon		NO CLASS (LABOR DAY)			
9/4	Wed	4	Module 1		HW 1	
9/6	Fri	5	Module 1 wrap up; Start Module 2 (Water)			
9/9	Mon	6	Module 2:The movement of water in plants	2		
9/11	Wed	7	Module 2		HW 2	HW 1
9/13	Fri	8	Module 2 Video and @Home Study Time NO IN-PERSON LECTURE			
9/16	Mon	9	Module 2 wrap up; Exam 1 content Q&A			
9/18	Wed		**Exam 1 (Anatomy, Cell Organization, Water)** **NOTE: LAST DAY TO DROP W/ REFUND**			HW 2
9/20	Fri	10	Module 3: Mineral Nutrition, Solute Transport, Nutrient Assimilation	4, 5		
9/23	Mon	11	Module 3			
9/25	Wed	12	Module 3		HW 3	
9/27	Fri	13	Module 4: Photosynthesis	7, 9		
9/30	Mon	14	Module 4			
10/2	Wed	15	Module 4		HW 4	HW 3
10/4	Fri		NO CLASS (No videos or assignments)			
10/7	Mon	17	Module 4			
10/9	Wed	18	Module 4		HW 5	HW 4
10/11	Fri	19	Module 4 - Guest Research Presentation and Demonstration by Dr. Josh Vander Weide			
10/14	Mon	20	Module 4 Wrap up; Short Exam Q & A			
			LAST DAY TO DROP WITH NO GRADE REPORTED			
10/16	Wed		**Exam 2 (Mineral Nutrition & Photosynthesis)**			HW 5

Date	Day	Lect. #	Tentative topic	Text Chapter	Assignment posting	Assignment Due
10/18	Fri	21	Module 5: Translocation in the Phloem	10		
10/21	Mon		NO CLASS (FALL BREAK)			
10/23	Wed	22	Module 5 wrap up; Start Module 6 (Respiration)		HW 6	
10/25	Fri	23	Module 6: Respiration	11		
10/28	Mon	24	Module 6: Guest Research Presentation from Dr. Randy Beaudry			
10/30	Wed	25	Module 6 Wrap up; Grad Student Research Talk (Michael Gasdick: Respiration and Blueberries)		HW 7; Project	HW 6
11/1	Fri	26	Module 7: Light Perception & Responses	13, 7		
11/4	Mon	27	Module 7			
11/6	Wed	28	Module 7;		HW 8	HW 7
11/8	Fri	30	Grad Student Research Talk (Jiyong Shin, Utilization of far-red light); Exam Review Q&A			
11/11	Mon		**Exam 3 (Translocation, Respiration, Light)**			
11/13	Wed	31	Module 8: Plant Hormones, Development, PGRS	12, 14-19	HW 9	HW 8
11/15	Fri	32	Module 8			
11/18	Mon	33	Module 8			
11/20	Wed	34	Module 8		HW 10	HW 9
11/22	Fri	35	Module 8			
11/25	Mon	36	Module 8			
11/27	Wed		NO CLASS - Enjoy a longer Thanksgiving break!			HW 10
11/29	Fri		NO CLASS (THANKSGIVING)			
12/2	Mon	37	Module 8			Conservatory Project
12/4	Wed		Q&A for Exam 4 and Final			
12/6	Fri		**Exam 4**			

12/12 Thursday **FINAL Exam 7:45 AM - 9:45 AM, PSSB A155**
Optional !
Grade replaces your lowest Exam <u>if</u> it is higher.