

Course Title/Number	BSC 420: PLANT PHYSIOLOGY
Semester/Year	Spring 2017
Instructor	Marcia Harrison-Pitaniello
Days/Time	Lecture: TR 9:30 am - 10:45 pm; Laboratory: Monday 1:00 p.m. - 3:50 p.m.
Location	Lecture and Lab: Science 108
Office	Office: Science 200A; Lab: Science 107
Phone	(304) 696-4867
E-Mail	harrison@marshall.edu
Office/Hours	Wednesdays from 2:00.- 4:00 p.m.; Tuesdays and Thursday from 11:00 am- 12:00 p.m., or by appointment
University Policies	By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to www.marshall.edu/academic-affairs and clicking on "Marshall University Policies." Or, you can access the policies directly by going to http://www.marshall.edu/academic-affairs/?page_id=802 for Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment.

Course Description: From Catalog

<p>Plant Physiology. 4 hrs. Experimental study of plant life processes to include applicable biophysical and biochemical principles, water relations, molecular biology, stress physiology, and growth and development. 3 lec-3 lab. (PR: BSC 302 or 320 or 322 or 324) <i>Writing Intensive.</i></p>
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Course Student Learning Outcomes	How students will practice each outcome in this Course?	How student achievement of each outcome will be assessed in this Course?
Students will analyze problems that integrate basic processes involved in plant physiology at the whole plant, biochemical, and molecular levels.	Students will receive assigned textbook readings and lecture preparation assignments. In-class exercises will review chapter content.	Student discussion during lectures will be a component of the participation grade. Exam questions will include problems associated with basic plant physiology processes.
Students will read, interpret, and evaluate current research papers on plant physiology.	Students will read and discuss articles as part of the lecture work.	Exam questions will include problems associated with the publications reviewed in class. Background reading will be a component of the independent projects.
Students will evaluate current online and laboratory resources through weekly laboratory exercises.	Laboratory exercises will provide an overview of basic skills and hands-on use of equipment used in plant physiology research.	Graded lab work will include laboratory preparation, data analysis, and summary in a graded laboratory notebook.
Students will design, conduct, analyze, and present independent experiments in plant physiology.	Students will use the laboratory skills to design laboratory experiments, including an independent project.	Graded project proposal, data analysis, and presentation will be components of the lab grade.
Students will use plant biology concepts to develop educational materials for effective teaching of plant biology principles.	Students will develop display materials, games, activities, videos, or web-based materials as part of the laboratory work.	The final educational materials will be assessed as a component of the student's independent research project as a component of the lab grade.
Students will enhance their writing skills and strategies, especially as they apply to scientific writing.	Writing is included in the laboratory notebook entries, exams, and project outreach and research presentations.	Writing will be assessed in every aspect of the course. The final projects will have a draft and revision process. Written assignments, laboratory work, and written portions of the exams will comprise over 50% of the graded course material.

Required Texts, Additional Reading, and Other Materials

1. Plant Physiology, 2015, Taiz and Zeiger, 6th edition [required]
2. Bound notebook and 3-ring binder [for protocols and references]
3. Additional material will be available on MUOnline and at <http://science.marshall.edu/harrison/bsc420.htm>

Course Requirements / Due Dates

Lecture exams (300 pts; 100 pts each): Exams will consist of a combination of short essays, short answers questions, problems, and take-home problems. Coverage will include the lecture and lab material for the dates prior to the exam and after the previous exam (for exams 2 and 3). A study guide will be posted on MUOnline at least one week prior to the exam. ***Make-up exams will be given for excused absences reported before the scheduled exam.***

Exam 1: Thursday, Feb. 9

Exam 2: Thursday, March 16

Exam 3: Tuesday 5/3 at 8:00 am (according to the Spring 2017 exam schedule)

Laboratory evaluation (110 pts; 10 points per lab entry and 20 pts for independent project data): Lab work grade will be based on lab work presented in your laboratory notebook entries and short writing assignments. The contents for the lab entries and writing will be provided for each lab as an assignment on MUOnline. Make-up labs are possible beyond the week the lab is normally scheduled as long as you inform the instructor ahead of time. Otherwise, absences will result in loss of credit for that lab.

Wikipedia article (40 pts): This exercise is to learn how to contribute and correct Wikipedia entries. The exercise will also serve to select appropriate scientific references, learn how to convey scientific principles to a general audience, and to add content to a plant physiology-related article. **The final deadline is March 31.** Deadlines for individual assignments are provided in the Wikipedia dashboard and in the schedule (https://dashboard.wikiedu.org/courses/Marshall_University/Plant_Physiology_%28Spring_2017%29/overview.)

Independent project (110 pts): Each student will design and perform an independent project. ***Written guidelines for all aspects of the project will be distributed on MUOnline.*** Drafts of the materials will be peer-reviewed and reviewed by the instructor prior to the submission of the final document. The presentation and report will require submission of at least one draft each prior to the deadlines listed below.

Proposal [10 pts], to MUOnline by midnight on March 13

Project presentation [20 pts] during lab the last week of class

Outreach project [30 pts] to MUOnline by midnight on May 2

Research project report [50 pts] to MUOnline by midnight on May 2

Class participation (40 points): Attendance and participation are important to this course! Class time is will include discussion, activities, on-going greenhouse and lab work. Students are expected to contribute to the class discussion and work during each lecture and lab session. The participation grade will be updated periodically on MUOnline. The grade will be based on lecture and lab attendance and overall class contribution according to the following system: 40 pts: 1 unexcused absences; 30 pts: 2 to 3 unexcused absences; 20 pts: -4 to 5 points per unexcused absence; 10 pts: 6 unexcused absences; and 0 pts: >6 unexcused lecture absences

Grading Policy

Grading scale (out of a total of 600 points):

A = 100–90% (500-450 points); B = 89–80% (449-400 points); C = 79–70% (399-350 points); D = 69–60% (349-300 points); F = <60% (less than 299 points)

Attendance Policy

Attendance in lectures and laboratory exercises is integrated into your grade. You are responsible for any material missed by being absent. Absences due to illness, death in the family, or institutional activities will be excused with notification of the instructor within one week of the absence. Class and/or lab will be cancelled due to inclement weather, according to the policy described at http://www.marshall.edu/academic-affairs/?page_id=802. **For a 2-hour delay, classes that begin at 9:30 a.m. meet at 10:00 a.m. and continue for the remaining period of that class.** If the university is open, but the student feels that the conditions are too dangerous for them to attend, they will not be penalized for missing class; please do not exploit this policy. For cancelled classes, class information and materials will be posted on MUOnline.

BSC 420: Dr. Harrison Office: Science 200A; Lab: Science 107; (304) 696-4867; harrison@marshall.edu
 Office Hours: M/W/F 10:00-11:00 am; T/R 10:50-11:50 am; by appointment. *Lecture preparation and coverage will usually be posted on the preceding Friday by 5:00 pm on MUOnline.*

Week	Dates	Laboratory Schedule	Tentative Lecture Topics; Exams; Due Dates
1	1/9-1/13	Lab 1. Lab notebooks; Lab safety; Seed viability testing; Marshall Greenhouse management; Image capture tutorial. <i>Writing: Methods</i>	Chapter 1: Plant tissue structures and adaptations Chapter 2: Ploidy; Tools for Studying Gene Function; Genetic Modifications of Crop Plants Chapters 3: Water and Plant Cells Chapter 4: Water Balance in Plants Chapter 5: Mineral Nutrition [<i>Plant MD</i>] <i>Research article: Wikipedia topic</i>
2	1/16-1/20	Lab 2: Collect time-lapse images of plant growth <i>Writing: Methods.</i>	
3	1/23-1/27	Lab 3: ImageJ - Working with image series, making movies, measuring plant growth and movement. Review plant physiology-related YouTube videos; Video outreach design ideas. <i>Writing: Graphs and results.</i> Bring your laptop to lab.	
4	1/30-2/3	Lab 4: <i>Arabidopsis</i> growth protocol; <i>Arabidopsis</i> mutants and their analysis; Introduction to transgenic plants and reporter genes. <i>Writing: Methods.</i>	Jan. 30: Critique a Wikipedia article Feb. 6: Add to a Wikipedia article Feb. 9: Thursday – Exam 1
5	2/6-2/10	Lab 5: Confocal/fluorescence microscopy (plant trichomes; <i>Arabidopsis</i> reporter genes); Continue <i>Arabidopsis</i> analysis. <i>Writing: Images and results.</i>	
6	2/13-2/17	Lab 6: Experiments with plant hormones; Research proposal brainstorming session. <i>Writing: Graphing and results.</i>	
7	2/20-2/24	Lab 7: DNA barcoding and bioinformatics: DNA extraction and PCR; Ongoing experiments. <i>Writing: Methods</i>	Chapters 7-9: Topics in photosynthesis: Succulents and CAM plants Chapter 13: Secondary Metabolism and Plant Defense Chapters 19-24: Plant Hormones - Overview <i>Research article: Plant hormones</i>
8	2/27-3/3	Lab 8: DNA barcoding and bioinformatics: Run gel; SDS-PAGE analysis of plant proteins. <i>Writing: Gel images and results.</i>	
9	3/6-3/10	Lab 9: DNA barcoding and bioinformatics: Analysis and plant bioinformatics. MU Visualization Center. <i>Writing: Project introduction.</i>	
10	3/13-3/17	Lab 10: Begin independent projects 3/17: Last Day to Drop an Individual Course	Feb. 27: Finish the first draft of your Wikipedia article March 6: Peer review and copy edit a classmate's Wikipedia article March 13: Project Proposals March 16: Thursday - Exam 2
	3/20-3/24	Spring Break-no class	
10	3/27-3/31	Lab 11: Begin independent projects	March 31: Wikipedia: article- final
11	4/3-4/7	Lab 12: Independent projects	Chapters 19-24: Plant Hormones - Continued Chapters 17 and 18: Light Responses Chapter 25: The Control of Flowering Chapter 26: Abiotic Stress Responses <i>Research/Wikipedia articles</i> 5/2: Exam 3 8:00 a.m.; Outreach project; Research report
12	4/10-4/14	Lab 13: Independent projects	
13	4/17-4/21	Lab 14: Independent projects	
14	4/24-4/28	April 24: Independent project presentations	
	5/2	Exam 3: 8:00 a.m.	