

Botany 2104 - Plant Form and Function - Spring 2016

Prerequisites: none

Lecture/Lab: MWF 8:30- 10:20

Instructor: Dr. S. Harley **Office:** SL409M, 626-7434; **Office hours:** MTuWF 12:30-1:20 or by appointment; **e-mail:** sharley@weber.edu

Course URL: <http://faculty.weber.edu/sharley/2104/2104.htm>

Plant Form and Function is one of the two core courses required for all Botany majors and minors. The other course is Botany 2114, Evolutionary Survey of Plants. The two courses are independent of each other in that one is not a prerequisite for the other. If you will be taking upper division Botany courses, you should be aware that some have both 2000-level courses as prerequisites and that others only require a specific one of the two.

Plant Form and Function is a 4 credit hour course which meets in three 2-hour blocks per week. Lab activities are integrated with lecture information. On average, you will spend approximately 2-3 hours per week in lecture time and 3-4 hours per week in activities. The first part of the course will cover plant anatomy, including subcellular structures. The second part of the course material will cover plant metabolism (respiration, photosynthesis, mineral nutrition) and plant reproduction.

Required texts and materials

R.F. Evert and S. E. Eichhorn. 2013. *Biology of Plants*, 8th ed. W. H. Freeman and Company.

Lab Manual: Download the individual labs at WSU Online/Canvas.

Safety glasses (available at the WSU Bookstore and Chemistry stores on the 5th floor of the Science Lab Building)

Recommended texts and materials

Writing Papers in the Biological Sciences, any edition, by V. E. McMillan. This text is required for Botany 2121.

A Photographic Atlas for the Botany Laboratory by Van de Graff et al. This text is also recommended for Botany 2114.

30 cm ruler

colored pencils

calculator or similar device

Students With Disabilities

Any student requiring accommodations or services due to a disability must contact Services for Students with Disabilities (SSD) in room 181 of the Student Services Center. SSD can arrange to provide course materials in alternative formats, if necessary.

Student Behavior

This class meets in a laboratory room. Therefore, food and drink (including water) are prohibited. Feet must be in enclosed shoes. Your clothing must cover your lap when you are seated. Safety glasses are required for lab activities in which you handle chemicals. Additional safety information will be covered on the second day of class.

You are expected to comply with the Botany Department Statement of Expectations of Students. The text of this statement can be found at http://www.weber.edu/botany/Student_Resources.html.

WSU subscribes to TurnItIn.com, an electronic service that verifies the originality of student

work. Enrollment in this course may require you to submit some or all of your assignments to it this semester, and documents submitted to TurnItIn.com are retained, anonymously, in their databases. Continued enrollment in this course constitutes an understanding of and agreement with this policy.

BTNY 2104 Learning Outcomes

Each unit in the lab manual includes a list of learning objectives. Each objective contributes to one or more of the following overall learning outcomes for the course.

1. Students will be able to demonstrate knowledge of the levels of organization (molecules, organelles, cells, tissues, organs, whole plant) in flowering plants and be able to relate functional aspects at one level to function at a higher or lower level of organization.
2. Students will be able to demonstrate understanding of the adaptive significance of modifications of the three organs of the vascular plants: roots, stems, and leaves.
3. Students will be able to demonstrate knowledge of the two most basic metabolic pathways of plants: respiration and photosynthesis. In addition, students will demonstrate understanding of the adaptive significance of the CO₂ concentrating mechanisms found in C₄ and CAM plants.
4. Students will be able to demonstrate knowledge of which chemical elements are required for plant life and examples of the specific aspects of plant life that utilize those elements.
5. Students will be able to demonstrate understanding of the interactions between plants and microorganisms in the context of plant mineral nutrition, especially with regard to the nitrogen cycle.
6. Students will be able to distinguish between asexual and sexual reproduction in flowering plants and be able to demonstrate understanding of the significance of a cloning reproductive system versus one which allows for genetic recombination.
7. Students will be able to use a compound light microscope to investigate plant structure and function.
8. Students will be able to make accurate records of visual information via annotated scale drawings.
9. Students will be able to use a basic spreadsheet program (e.g., Excel) to analyze data and draw conclusions supported by statistical analysis (chi-squared test, t-test, ANOVA).
10. Students will be able to present summaries of data in appropriate graphs and tables and be able to interpret information provided in the form of graphs or tables.
11. Students will be able to demonstrate familiarity with and proper use of botanical terminology.
12. Students will demonstrate the ability to find and synthesize information on plant form and function from a variety of appropriate literature sources.
13. Students will demonstrate good citizenship in the laboratory, including following laboratory safety guidelines and working cooperatively and collaboratively with other students.

Your course grade will be based on the following:

Exams: There will be three 100 point exams and one 200 point cumulative final (~100 points old material, ~100 points new material). Of the 500 points available, only 400 will go towards the calculation of your grade. Either your lowest score on a 100 point exam will be dropped or your final exam score will be halved; whichever calculation gives you the higher grade will be used. Your exams will be a mixed format of multiple choice, short answer, essay, diagrams, and lab practical.

Activities: You will turn in all of the labs. Only selected questions, drawings, graphs, etc. will be graded. The points per lab will be variable, depending on the length of the lab. Due dates for labs will be announced in class when the labs are being conducted and can include the announcement day. You must be present in order to get credit. There will be four in-class case studies based on published research; you must be present in order to get credit. Each case study is worth 10 points. You will also turn in a 20 point library assignment and a 10 point graphing assignment.

Essay: One of the goals of this course is to provide support to the development of the Botany Student Portfolio. As part of the portfolio, students write a lengthy essay which addresses the core concepts in Plant Biology. For BTNY 2104, you are to write an essay that focuses specifically on the adaptations of flowering plants that enable them to cope with a variety of challenges. Instructions for the essay will be covered in class during the fifth week of classes and are available at WSU Online/Canvas.

Calculation of Final Grade:

Exams	65%
Lab activities	25%
Essay	10%
TOTAL	100%

Percentages to achieve a specific grade are as follows:

A \geq 93%	B = 83-86.9%	C = 73-76.9%	D = 63-66.9%
A- = 90-92.9%	B- = 80-82.9%	C- = 70-72.9%	D- = 60-62.9%
B+ = 87-89.9%	C+ = 77-79.9%	D+ = 67-69.9%	E \leq 59.9%

Awarding of a UW grade: miss more than one regular exam OR miss the final exam OR not turn in the Essay OR turn in fewer than 18 activities. **Any** plagiarism in the Essay will result in a grade of zero and reporting of the student to the Dean of Students.

NO MAKE UP EXAMS!! NO MAKE UP ACTIVITIES!! NO EXTRA CREDIT!!

Extra Credit: There is no extra credit in this class. (1) If you do not have time to master the content material and complete the given assignments, you certainly do not have time to do extra work. (2) It is not to fair to your classmates for you to have different criteria for your grade.

Important Dates:

Jan 18	Martin Luther King, Jr. Day - no classes
Feb 5	Exam 1
Feb 12	Library assignment due
Feb 15	Presidents' Day - no classes
Feb 17	Graphing assignment due
Mar 4	Exam 2
Mar 7-11	Spring Break - no classes
Mar 16	Completed draft of essay due Any essay turned in after Mar 16 will be treated as the final version.
Apr 4	Exam 3
Apr 20	Final version of Essay due. Turn in the marked draft, too. (scored on a 0-4 point grade scale)
Apr 25	Annual Botany Department Field Trip to Antelope Island State Park http://faculty.weber.edu/sharley/AIFT/home.htm class does not meet
Apr 27 (Wednesday)	Final Exam, 9:00-10:50

Labs

Seed Germination and Root Growth	Research Design	Photosynthesis
Storage Polymers of Seeds	Roots	Mineral Nutrition
Diffusion and Osmosis	Stems	Nuclear Division Processes
Microscopy	Leaves	The Flower
Plant Cell	Secondary Growth	Pollination and Fertilization
Cells and Tissues	Respiration	Fruits
Constructing Phylogenetic Trees		

For additional information and support materials, visit the Botany 2104 Home Page:
<http://faculty.weber.edu/sharley/2104/2104.htm>