

# BIOL 4410: PLANT STRUCTURE

INSTRUCTOR: Richard Mueller; ESLC 245L

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OFFICE HOURS: Fri 10:30-11:30 or by appointment

LECTURE: MW @ 9:30; Geol 308 LAB: W @ 2:30-5:00; Geol 301

RECOMMENDED TEXTBOOK: Mauseth, James D: Plant Anatomy

REQUIRED LAB MANUAL: Mueller, Richard; Laboratory Manual Biol 4410: Plant Structure

CANVAS: Limited use for this course: Syllabus; Slides; Exam Keys and Announcements

RESERVE MATERIALS:

- Lecture Slide Masters: These are on Canvas organized in units for each exam. I highly recommend that you print out copies for note taking or download to your laptop or tablet
- Reference books: Beck: An Introduction to Plant Structure and Development; Mauseth: Plant Anatomy; Bowes and Mauseth: Plant Structure: A Color Guide

LAB FEES: Lab fees are used to purchase and maintain equipment and supplies for use in the lab exercises (e.g. slides, razor blades, microscopes, greenhouse material)

GRADING: Exams will be a combination of definitions and short answer questions.

- Exams I, II, III are 50 points each, five lab quizzes will be 10 points each and the final is 100 points for a total of 300 points. You may drop one quiz which would make the point total 290.
- Note: the final will include the material from the final lectures and labs but is also comprehensive for the entire course.
- No make up exams or quizzes will be given unless prior arrangements are made. No extra credit assignments will be offered.

Percent score	Grade range
100-93	A
92-90	A-
89-87	B+
86-83	B
82-80	B-
79-77	C+
76-73	C
72-70	C-
69-67	D+
66-60	D
< 59	F

COURSE OBJECTIVES:

- Learn the terms necessary to describe vascular plant structure.
- Be able to describe and identify structural features of plant cells, tissues & organs.
- Understand the developmental processes that generate the form of the primary and secondary plant body.
- Know the functional role of the plant structures that are studied.
- Become proficient in the use of the microscope and basic microtechnique used to study plant structure.

## COURSE POLICIES:

- Last day to add this class is Jan. 17; USU no longer allows late adds
- Last day to drop **this class without a "W" notation** on the transcript is Jan. 17
- Last day to change to P/D+/D/F is Feb 7

## USU Policies

Academic Freedom and Professional Responsibilities: Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. Faculty Code Policy #403 further defines academic freedom and professional responsibilities: USU Policies Section 403

Academic Integrity - "The Honor System": Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to establish the higher level of conduct expected and required of all Utah State University students. The Honor Pledge: To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge: "I pledge, on my honor, to conduct myself with the foremost level of academic integrity." A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution; and
- Is a welcomed and valued member of Utah State University.

Grievance Process: Students who feel they have been unfairly treated [in matters other than (i) discipline or (ii) admission, residency, employment, traffic, and parking - which are addressed by procedures separate and independent from the Student Code] may file a grievance through the channels and procedures described in the Student Code: Article VII Grievances

Plagiarism: Plagiarism includes knowingly "representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials." The penalties for plagiarism are severe. They include warning or reprimand, grade adjustment, probation, suspension, expulsion, withholding of transcripts, denial or revocation of degrees, and referral to psychological counseling.

Sexual Harassment: Sexual harassment is defined by the Affirmative Action/Equal Employment Opportunity Commission as any "unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature." If you feel you are a victim of sexual harassment, you may talk to or file a complaint with the Affirmative Action/Equal Employment Opportunity Office located in Old Main, Room 161, or call the AA/EEO Office at 797-1266.

Students with Disabilities: The Americans with Disabilities Act states: "Reasonable accommodation will be provided for all persons with disabilities in order to ensure equal participation within the program. If a student has a disability that will likely require some accommodation by the instructor, the student must contact the instructor and document the disability through the Disability Resource Center (797-2444), preferably during the first week of the

course. Any request for special consideration relating to attendance, pedagogy, taking of examinations, etc., must be discussed with and approved by the instructor. In cooperation with the Disability Resource Center, course materials can be provided in alternative format, large print, audio, diskette, or Braille."

Withdrawal Policy and "I" Grade Policy: Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term 'extenuating' circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor.

## Class Schedule

WK.	DAY	TOPIC AND READING
1	M 1/8	INTRODUCTION/ORGANOGRAPHY/DIVERSITY (Mauseth: Preface and Ch. 1)
	W 1/10	ORGAN TISSUE PATTERNS (Mauseth: Ch. 1)
		LAB 1: USE OF THE MICROSCOPE/INTRO. TO PLANT STRUCTURE
2	M 1/15	No Class
	W 1/17	APICAL AND LATERAL MERISTEMS/ DIFFERENTIATION (Mauseth: pp. 79-86)
		LAB 2: TISSUE PATTERNS/FRESH MOUNTS
3	M 1/22	CELL STRUCTURE (Mauseth: pp.13-18; 39-40)
	W 1/24	CELL ULTRASTRUCTURE (Mauseth: pp. 18-34)
		LAB 3: MERISTEMS AND CELLS
4	M 1/29	CELL WALL (Mauseth: pp. 35-40)
	W/ 1/31	PARENCHYMA/COLLENCHYMA/SCLERENCHYMA (Mauseth: Ch. 3, 4, and 5))
		LAB 4: LAB QUIZ AND REVIEW SESSION
5	M 2/5	EXAM I
	W 2/7	EPIDERMIS/TRICHOMES (Mauseth: Ch 10)
		LAB 5: CELLS/EPIDERMIS/TRICHOMES
WK.	DAY	TOPIC

6	M 2/12	SECRETORY STRUCTURES: (Mauseth: Ch. 9)
	W 2/14	PHLOEM (Mauseth: Ch 8)
		LAB 6: SECRETORY STRUCTURES/PHLOEM LAB
7	T 2/20	XYLEM <b>CLASS MEETS ON TUES!!!</b> (Mauseth: Ch. 7)
	W 2/21	WOOD STRUCTURE (Mauseth: Ch 15)
		LAB 7: <b>LAB QUIZ</b> AND XYLEM/WOOD STRUCTURE LAB
8	M 2/26	SAM/RAM/PRIMARY MERISTEMS (Mauseth: pp. 86-107)
	W 2/28	PRIMARY VASC. DEVELOPMENT/PHYLLOTAXIS (Mauseth: pp. 114-116; 211-224)
		LAB 8: SHOOT APEX/PROCAMBIUM/VASCULAR DEVELOPMENT LAB

### **SPRING BREAK**

9	M 3/12	<b>EXAM II</b>
	W 3/14	STEM SECONDARY GROWTH AND PERIDERM (Mauseth: Ch 14 and 17; skim Ch 15 and 16)
		LAB 9: STEM LAB
10	M 3/19	LEAF STRUCTURE (Mauseth: pp. 231-247)
	W 3/21	LEAF MODIFICATIONS AND SPECIALIZATIONS (VISIT GREENHOUSE) (Mauseth: pp. 247-261)
		LAB 10: <b>LAB QUIZ</b> AND LEAF LAB

WK.	DAY	TOPIC
11	M 3/26	MORPHOLOGY OF GRASSES & FOOD PLANTS (No reading)
	W 3/28	LEAF/BUD INITIATION AND DEVELOPMENT

(Mauseth: pp. 96; 261-265)

LAB 11: PLASTOCHRON/LEAF AND BUD DEVELOPMENT LAB

- 12 M 4/2 ROOT ANATOMY  
(Mauseth: Ch 13)
- W 4/4 LATERAL ROOTS/SECONDARY GROWTH/SYMBIONTS  
(Mauseth: Ch. 13)
- LAB 12: LAB QUIZ AND ROOT LAB
- 13 M 4/9 EXAM III
- W 4/11 FLOWER STRUCTURE  
(Mauseth: Ch. 19)
- LAB 13: WOODY AND GREENHOUSE PLANT TOUR
- 14 M 4/16 REPRODUCTIVE CYCLE  
(Mauseth: Ch. 19)
- W 4/18 FERTILIZATION/EMBRYO/SEED  
(Mauseth: Ch. 20)
- LAB 14: FLOWERS AND REPRODUCTION
- 15 M 4/23 FRUIT/SEEDLINGS  
(Mauseth: pp. 428-431; Ch. 21)
- W 4/25 ASEXUAL REPRODUCTION AND REVIEW/SUMMARY  
(No reading)
- LAB 15: LAB QUIZ AND FRUIT\* AND SEED  
\* featuring anatomically correct Banana Splits!!!

**FINAL EXAM: MONday, APRIL 30, 9:30-11:20 am**

## Lab Safety for Biol 4410 Plant Structure

- Report any safety concerns or accidents immediately to Dr. Mueller
- A First Aid kit is available in the prep room adjacent to the lab
- Be careful with the razor blades, using a cutting block when appropriate. Dispose of them in the sharps container not the trash
- Protective lab gloves are available
- The stains are not dangerous but avoid skin contact.
- Be careful with the 20% Hydrochloric Acid solution. Rinse of slides and watch glasses carefully in the sink after use avoiding splashing.

Eye Contact: Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.