

**Instructors**

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Office hours: T 9-11 am and by

appointment

**BOT4935/BOT5225C Plant Anatomy**

Fall, 2022

Blended lecture/lab: MT periods 6 – 9 (12:45 – 4:50)

Rolfs Hall (ROL) 0114

***Why is learning plant anatomy important?*** Plant anatomy is situated between the study of plant morphology and cell biology. Studying plant anatomy allows a student to conceptually integrate organismal structure and function. Further, it helps to reveal the relationships between structure, function, taxonomy, ecology, and developmental genetics.

***Our course aims to help students understand***

- 1) The arrangement of tissue and cells types within the dermal, ground, and vascular tissue systems in vascular plants;
- 2) The characteristics of specialized cells and their components;
- 3) The relationship between internal structure, physiology, and ecology;
- 4) Evolutionary history and taxonomic variation of vascular plant anatomy.

***Further, our course will help you develop skills in***

- 1) Experimental design and hypothesis testing;
- 2) Microscopy and staining techniques;
- 3) Oral and written presentation of your own research.

***Specific learning outcomes***

After you have completed this class, you will be able to:

- 1) Discuss the structural components of plant cell walls and membranes;
- 2) Compare and contrast the characteristics of plastid types;
- 3) List and describe the anatomy and ecological significance of epidermal and secretory structures;
- 4) Compare, contrast, draw, and describe the taxonomic and evolutionary variation in xylem and phloem components;
- 5) Outline and describe current understanding of the components of shoot, root, and floral development, including gene expression, tissue differentiation, and growth;
- 6) Outline and describe the process of woody secondary growth in stems;
- 7) Draw, identify, and describe stelar patterns in stems and roots of vascular plants with and without secondary growth;
- 8) Draw, identify, and describe leaf anatomy and leaf adaptations associated with specific habitats;
- 9) Describe and give examples of the practical use of plant anatomy in wood technology, archaeology, forensics, and paleontology;
- 10) Present a research study in plant anatomy.

***Recommended preparatory courses***

Although this course has no explicit prerequisites, it is intended for upper-level undergraduate students in botany and plant science. It will be assumed that students have a basic understanding of plant morphology, diversity, phylogeny, ecology, and physiology.

***Texts***

Esau, Katherine. *Anatomy of Seed Plants*. 2<sup>n</sup> d edition. John Wiley and Sons.

Allen, Sarah et al. Fall 2020. *Plant Anatomy Lab Manual*. (We will provide copies.)

***Course grades will be determined as follows:***

4 exams @ 100 pts each	= 400 pts	~57%	<u>Grading scale:</u> 90 – 100% = A
10 lab quizzes @ 20 pts each	= 200 pts	~29%	80 – <90% = B
1 research project	= 100 pts	~14%	70 – <80% = C
Total course points	= 700		60 – <70% = D below 60% = E

***Exams***

Four exams will be given according to the schedule at the end of the syllabus. The exams will require drawing, labeling, and short and long written answers. The exams are not cumulative.

***Laboratory***

Your laboratory grade will be based upon 10 lab quizzes and your lab project and its presentation in a course symposium. Twelve lab quizzes will be given, but only the 10 top scores will be counted toward your grade. Please see your lab instructor for details concerning preparation for the lab quizzes. Details regarding the lab project and symposium will be provided as the time approaches.

***Course attendance, curves, and make up policy***

Attendance is required and essential for success in this course. I understand that absences happen, but if you make this a habit, you are guaranteed to perform poorly. There will be NO curve applied to grades. If you have a valid documented excuse and notify us in advance, you may be able to make up missed quizzes or exams. We will determine this on an as-needed basis.

***Policy on electronic devices***

While in the classroom, use them if you want, but if they become distracting to your classmates, you will be asked to leave. Please note that the use of devices for socializing during class is very obvious to your classmates and your instructors. We'll make a mental note of it as disrespectful, and it leaves a negative impression.

***UF counseling services***

Resources are available on campus for students having personal problems or lacking clear career and academic goals. The resources include:

U Matter We Care, <https://umatter.ufl.edu/>, P: 352.294.CARE(2273) | E: [UMatter@ufl.edu](mailto:UMatter@ufl.edu), resources and programs focused on health, safety, and holistic well-being.

UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.

Career Resource Center, Reitz Union, 392-1601, career and job search services.

Many students experience test anxiety and other stress – related problems. “A Self Help Guide for Students” is available through the Counseling Center (301 Peabody Hall; 392-1575) and at their web site:

<http://www.counsel.ufl.edu/>.

***Academic Honesty Policy***

All students registered at the University of Florida have agreed to comply with the following statement:

“I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University.”

In addition, on all work submitted for credit the following pledge is either required or implied:

“On my honor I have neither given nor received unauthorized aid in doing this assignment.”

If you witness any instances of academic dishonesty in this class, please notify the instructor or contact the Student Honor Court (392-1631) or Cheating Hotline (392-6999). For additional information on Academic Honesty, please refer to the University of Florida Academic Honesty Guidelines at:

<https://catalog.ufl.edu/ugrad/current/advising/info/student-honor-code.aspx#honesty>.

### ***Important – Plagiarism***

Plagiarism is a serious violation of the Student Honor Code. It includes:

- Submitting all or part of someone else's work as if it is your own
- "Borrowing" without crediting the source
- Submitting duplicate assignments
- Collaborating or receiving substantive help in writing your assignment unless we require such collaboration as part of the work
- Failing to cite sources, or citing them improperly

Consequences of plagiarism:

- Failing grade on assignment AND
- Course grade penalty of one letter grade AND
- Report to the Office of the Dean of Students.

Please review plagiarism and how to avoid it: <http://web.uflib.ufl.edu/msl/07b/studentplagiarism.html>

### ***Accommodations for students with disabilities***

Students who will require a classroom accommodation for a disability must contact the Dean of Students Office of Disability Resources, in Peabody 202 (phone: 352-392-1261). Please see the University of Florida Disability Resources website for more information at: <http://www.dso.ufl.edu/drc/>. Note that the student should provide documentation of a requirement for accommodation by the second week of classes. No accommodations are available to students who lack this documentation. It is the policy of the University of Florida that the student, not the instructor, is responsible for arranging accommodations when needed. Once notification is complete, the Dean of Students Office of Disability Resources will work with the instructor to accommodate the student.

### ***Special COVID-19 Related practices***

In response to COVID-19, the following recommendations are in place to maintain your learning environment, to enhance the safety of our in-classroom interactions, and to further the health and safety of ourselves, our neighbors, and our loved ones.

- If you are not vaccinated, get vaccinated. Vaccines are readily available and have been demonstrated to be safe and effective against the COVID-19 virus. Visit [one.ufl.edu](http://one.ufl.edu) for screening / testing and vaccination opportunities.
- If you are sick, stay home. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 to be evaluated.
- Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work.

### Tentative course schedule - subject to change

		<b>Lecture topic</b>	<b>Lab topic</b>	<b>Notes</b>
Mon	29-Aug	Intro	1. Intro, Safety, Microscopes	Review plant morphology handout on your own
Tue	31-Aug	Plant cells, plastids	2. Hand sectioning and staining, microtome demo	
Mon	5-Sep	No Class- Labor Day	No Class- Labor Day	
Tue	6-Sep	Cell walls	3. Cells	<b>Lab Quiz 1</b>
Mon	12-Sep	Primary simple tissues	4. Simple Tissues	<b>Lab Quiz 2</b>
Tue	13-Sep	Complex primary tissues	5. Complex Tissues: xylem and phloem	
Mon	19-Sep	Primary growth /development of the shoot – VIDEO LECTURE	6. Apical meristems	<b>Lab Quiz 3; Dr. John out</b>
Tues	20-Sep	<b>Exam 1</b>	Project introduction and brainstorming session	
Mon	26-Sep	Secondary vascular tissue/growth of shoot	7. Secondary growth and vascular cambium	<b>Lab Quiz 4</b>
Tue	27-Sep	Stem, vascular bundle types, stelar patterns	8. Stems, stelar patterns, and vascular bundles of the stem	
Mon	3-Oct	Secondary protective tissue/growth	Stems/project time	<b>Project proposal with references due</b>
Tue	4-Oct	Anomalous secondary growth	9. Wood and pits	<b>Lab Quiz 5</b>
Mon	10-Oct	Secretory structures of the stem	Wood/project time	
Tue	11-Oct	Ecological specializations of stem/wood	Project updates	<b>Lab Quiz 6</b>
Mon	17-Oct	<b>Exam 2</b>	Project time	
Tue	18-Oct	Leaf anatomy	10. Leaf Anatomy	
Mon	24-Oct	Leaf specialization and secretion	Leaf Anatomy	<b>Lab Quiz 7</b>
Tue	25-Oct	Root anatomy, cell elongation, primary growth	11. Root anatomy, secondary meristems, and stelar patterns	
Mon	31-Oct	Root anatomy, primary/secondary growth	Root anatomy and meristem	<b>Lab Quiz 8</b>
Tue	1-Nov	Root specialization	Project time	<b>Lab Quiz 9</b>
Mon	7-Nov	<b>Exam 3</b>	Project time	
Tue	8-Nov	Reproductive and floral anatomy	12. Flower Anatomy	
Mon	14-Nov	Flower anatomy	Flower Anatomy/project time	
Tue	15-Nov	Pollen anatomy	13. Pollen, spores, and gametogenesis	<b>Lab Quiz 10</b>
Mon	21-Nov	Seed anatomy	14. Seed Anatomy and embryogenesis	
Tue	22-Nov	Fruit anatomy	15. Fruit Anatomy	<b>Lab Quiz 11</b>
Mon	28-Nov	Fertilization	Project time	<b>Lab Quiz 12</b>
Tue	29-Nov	<b>Exam 4</b>	Project time	
Mon	5-Dec	Plants in 3D	16. Plants in 3D!	
Tue	6-Dec	Project presentations	Virtual symposium	