

Biology 4354/5354 – Plant Anatomy & Lab

Syllabus Cover Sheet



Professor: Dr. James (Jim) Enderby Bidlack

Office: HOH 301B Lab: HOH 255

Office Phone: (405) 974-5927

Office Hours: TR 10:00-11:50 AM, F 3:00-3:50 PM

Website: <https://bidlack.net/> or <https://bidlack.org/>

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BIO 4354/5354 – Plant Anatomy & Lab

This course includes a study of external and internal structures of vascular plants with attention to correlating structure with function. Students will be required to complete an individual research project as part of the course. It consists of three hours of lecture and three hours of laboratory per week. Prerequisite(s): BIO 1204, 1224, and at least three credit hours in any 3000 or 4000 level biology courses. A minimum grade of “C” in all prerequisites.

BIO 4354/5354 - Objectives of the Course

- To understand detailed anatomy of plant roots, stems, leaves, and flowers.
- To study epidermis, parenchyma, collenchyma, sclerenchyma, xylem, and phloem in excruciating detail.
- To evaluate differences among tissues in a wide array of plant species and how they are affected by maturity.
- To explain how structure and function of plant parts and tissues are intimately related.
- To provide information on how plant parts and tissues can be used for food, clothing, medicine, wood, and other purposes.

Plant Anatomy (BIO 4354/5354) - Student Learning Outcomes (SLOs)

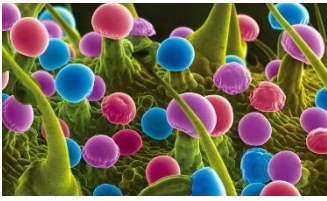
- Draw a plant and label all parts, their function, and major tissues.
- Explain how plant parts and their tissues vary among species.
- Define epidermis, parenchyma, collenchyma, sclerenchyma, xylem, and phloem; and where these tissues are found in roots, stems, leaves, and flowers.
- Explain how specific plant tissues are used for food, clothing, medicine, wood, and other purposes.

BIO 4354/5354 - Foundational Knowledge

- Excitement for plant biology both as a science and a profession.
- Understanding plant structure and function.
- Sampling and preparation of plant tissues for microscopic studies.
- Advanced use of microscope for locating and studying plant tissues.
- Identification of plant tissues by structural comparison.
- Use of microscope camera for photomicrographs.

BIO 4354/5354 - Transformative Learning (Central Six)

1. Discipline Knowledge: Plant Anatomy provides you with an introduction to the Plant Kingdom and other related organisms, as well as a detailed analysis of plant structure and function.
2. Leadership: Plant Anatomy encourages you to work as guided by the core values of character, civility, and community in a cooperative manner in class and small group settings to learn about stewardship of natural resources and yourself.
3. Research, Scholarly and Creative Activities: Plant Anatomy contributes to this theme by helping you learn what scientists do and the scientific method.
4. Service Learning and Civic Engagement: In Plant Anatomy, you learn biological concepts related to the world and you will be encouraged to collaborate with other students as well as your respective communities to help make this a better and sustainable world.
5. Global and Cultural Competencies: During lectures and labs you will gain insight into the diversity of life in the world around you as well as some of the major conservation crises facing all of us.
6. Health and Wellness: Plant Anatomy introduces students to biomedical applications of plants and plant parts used in medicine and why plants are essential for life on earth.



BIOLOGY 4354/5354 Fall 2024

CRN 14113/14114 Tentative Syllabus

PLANT ANATOMY (LECTURE)*

All Sections: MW 9:00 - 11:50 AM
 Howell Hall: Room 154
<https://bidlack.net/> or <https://bidlack.org/>
<https://www3.uco.edu/centraldirectory/profiles/2120>

Dr. Jim Bidlack

301B Howell Hall; Phone: (405) 974-5927
 E-mail: jbidlack@uco.edu
 Office Hours: TR 10:00-11:50 AM
 F 3:00-3:50 PM

PLANT ANATOMY: This course includes a study of external and internal structures of vascular plants with attention to correlating structure with function. Students will be required to complete an individual research project as part of the course. It consists of three hours of lecture and three hours of laboratory per week. Prerequisites: BIO 1204, 1224, and at least three credit hours in any 3000 or 4000 level biology courses. A minimum grade of "C" in all prerequisites.

*All students must attend PLANT ANATOMY LAB. It meets on Monday and Wednesdays from 9:00 to 11:50 AM in Room 154 of Howell Hall.

Lecture Textbook: Evert, R.F. 2006. *Esau's Plant Anatomy*. Third Edition. John Wiley & Sons, Inc., New York, NY.

| <u>Date</u> | <u>Lecture topic</u> | <u>Chapter</u> | <u>Pages</u> |
|------------------|---|----------------|----------------------------------|
| August | | | |
| 19 M | Introduction, general plant morphology | 1,5 | 1-12,108-110 |
| 21 W | Roots and stems | 1,6 | 1-12,138-164 |
| 26 M | Leaves and flowers | 1,9,16 | 1-12,218-243,456-462 |
| 28 W | Generalized cell structure & organelles | 2,3 | 15-37,45-58 |
| September | | | |
| 2 M | Happy Labor Day! | | |
| 4 W | Cell wall and epidermis | 4,9 | 65-91,211-243 |
| 9 M | EXAM I | | |
| 11 W | General cell and tissue types | 1 | 1-12 |
| 16 M | General cell and tissue types | 1 | 1-12 |
| 18 W | Parenchyma, collenchyma, & sclerenchyma | 7,8 | 175-187,191-207 |
| 23 M | Xylem | 10 | 255-283 |
| 25 W | Phloem | 13,14 | 357-398,407-424 |
| 30 M | Absorption & transport | 10,13 | 263-266,379-382, lecture notes |
| October | | | |
| 2 W | Stele types, nodal patterns, and bundles | 14,16,18 | 217-225,233-242, 261-271,323-328 |
| 7 M | EXAM II | | |
| | Stele types, nodal patterns, and bundles | 1,5,13 | 1-12,106-110, 357-359,393-398 |
| 9 W | Root structure, development, & specialization | 6,9 | 152-164,234-235 |

| <u>Date</u> | <u>Lecture topic</u> | <u>Chapter</u> | <u>Pages</u> |
|----------------------------|--|--|--------------------------|
| October (continued) | | | |
| 14 M | Work on Individual Research Projects | See Instructions on Website at https://bidlack.net/ | |
| 16 W | Fall Break | | |
| 21 M | Secondary root | 11,14 | 291-316,407-424 |
| 23 W | Primary stem structure & development | 6 | 133-152 |
| 28 M | Secondary stem development | 11,14 | 291-316,407-424 |
| 30 W | Wood anatomy: secondary xylem & phloem | 11,14 | 291-316,407-424 |
| November | | | |
| 4 M | Other aspects of woody growth | lecture notes | |
| 6 W | Leaf venation and development | 6,9,13 | 147-149,211-243, 382-386 |
| 11 M | Leaf structure | 6 | 147-149,211-243 |
| 13 W | Variations in leaf structure | lecture notes | |
| 18 M | EXAM III | | |
| 20 W | Secretory structures | 16,17 | 447-466,473-495 |
| 25 M | Angiosperm life cycle | 1 | 1-13, lecture notes |
| 27 W | Happy Thanksgiving! | | |
| December | | | |
| 2 M | Seeds and seedlings | 8 | 201-202, lecture notes |
| 4 W | Fruits | 8 | 201, lecture notes |
| 9-13 | FINAL EXAMINATIONS | | |

Final exam is scheduled for Wednesday, 11 December 2024 at 9:00 to 10:50 AM.

Additional Course Information

Students are encouraged to read the book before coming to class. Review what pages will be discussed in lecture by looking at the pictures, figures, and illustrations. Read the text to acquaint yourself with the learning material. If you prefer computer, Internet, and multimedia presentations, try using the Multimedia Educational Resource for Learning and Online Teaching (MERLOT) at <https://www.merlot.org/> and search the term, "plant anatomy." Lecture notes and other materials are also available in MS-WORD and Adobe Acrobat format at <https://metabolism.net/bidlack/>

The Central Six

At the University of Central Oklahoma, we are guided by the mission of helping students learn by providing transformative experiences so that they may become productive, creative, ethical and engaged citizens and leaders contributing to the intellectual, cultural, economic and social advancement of the communities they serve. Transformative learning is a holistic process that places students at the center of their own active and reflective learning experiences. A student's major field is central to the learning experience and is a vital part of the "[Central Six](#)." All students will be transformed with Discipline Knowledge, Leadership, Problem Solving (Research, Scholarly and Creative Activities), Service Learning and Civic Engagement, Global and Cultural Competencies, and Health and Wellness.

BIOLOGY 4354/5354

PLANT ANATOMY AND PLANT ANATOMY LAB

Fall 2024 - CRN 14113/14114

Instructor: Dr. Jim Bidlack

Office Phone: (405) 974-5927 UCO Weather Line: (405) 974-2002

E-Mail: jbidlack@uco.edu

Internet: <https://bidlack.net/> or <https://bidlack.org/> or <https://www3.uco.edu/centraldirectory/profiles/2120>

Office: TR 10:00-11:50 AM and F 3:00-3:50 PM or by appointment, 301B Howell Hall

Avoid Scheduling Office Visits Just Before Class

Lecture Textbook: Evert, R.F. 2006. *Esau's Plant Anatomy*. Third Edition. John Wiley & Sons, Inc., New York, NY.

Lab Textbook: Amiet, C.F., and J.E. Bidlack. 2024. *Laboratory Guide to Plant Anatomy*. Twentieth Edition. Available in class.

Attendance: Students are expected to attend, learn, and take notes in all classes. At least three hours of study time should be devoted to each hour of class before and/or after lecture.

Grading: An approximate breakdown of points for the course is as follows:

| | |
|-----------------------------------|------|
| 3 lecture exams @ 100 points each | 300 |
| 1 final exam @ 100 points | 100 |
| Lab Reports and Article Summaries | 200 |
| Microscope Technology Project | 100* |

| | |
|-----------------------|-----|
| TOTAL POSSIBLE POINTS | 700 |
|-----------------------|-----|

| Grading scale | Grade | Points needed |
|------------------------------------|-------|---------------|
| 90 -100% of total possible points | A | 630 |
| 80 - 89% of total possible points | B | 560 |
| 70 - 79% of total possible points | C | 490 |
| 60 - 69% of total possible points | D | 420 |
| Below 60% of total possible points | F | - |

Exam material: A majority of exam material will come directly from lecture. For best performance, read the assigned text before attending lecture and review lecture notes after each class. Study your notes carefully and review the major topics provided in the text prior to each exam.

Exams: Semester exams, quizzes, and the final exam will consist of multiple choice, matching, true-false, drawing, short answer, and essay questions. All exams count in determining the final grade. Make-up exams will be given only in extenuating circumstances and will usually consist of long essay questions.

Cheating: All work should be that of the student alone. No communication, notes, or wireless devices are permitted during any exam. If the instructor determines that a student has cheated on an exam or any assignment, the student will receive no credit for that exam or assignment and the student's name will be reported to the proper authorities.

*Graduate students (BIO 5354) will be required to perform a potentially publishable research project in addition to the microscope technology project.

For additional student information that accompanies this syllabus, go to the link on the Internet at:

<https://www.uco.edu/academic-affairs/files/aa-forms/StudentInfoSheet.pdf>