

BIO 231 Botany Fall 2021 Course Syllabus

Class Meetings

Lecture: Tuesdays and Thursdays 12:30PM-1:45PM

Lab: Fridays 12:30PM-3:20PM

Class Locations

Lecture: Payson Smith 209, Portland Campus

Lab: Science 160, Portland Campus

Course Modality: Face-to-Face

Books and Websites (Required)

- *Botany: An Introduction to Plant Biology*, by James D. Mauseth, 6th edition or newer
- *Forest Trees of Maine: CENTENNIAL EDITION* by Maine Forest Service, 14th edition
- *GoBotany Website*, version 3.3: <https://gobotany.nativeplanttrust.org/>
- *Angiosperm Phylogeny Website*, version 14: <http://www.mobot.org/MOBOT/research/APweb/>

Course Description

Botany is the scientific study of plants: how they evolved, how they are constructed, and how they function. At USM, Botany meets the whole organism (Area 1) requirement for the General Biology B.S. degree. It also serves as an elective for both the Ecology minor and the Casco Bay Region thematic cluster (core curriculum). To meet these various goals, we cover the long-term evolutionary history of plants, their current diversity and classification, and the vast morphological diversity within the plant kingdom. These concepts are illustrated using familiar species that are native to Maine, found in Maine gardens, or common houseplants. The course has a both a lecture and field lab component. In order to

gain an in-depth understanding of concepts, each student will focus on one specific branch (clade) of flowering plants.

Learning Outcomes

Students will:

1. appreciate the pivotal role that plants have played and continue to play for life on Earth;
2. develop a deep understanding of plants as whole organisms, from an evolutionary, comparative morphology, and human perspective;
3. develop skills used by field botanists to identify, collect, and preserve wild plants;
4. gain a botanical perspective on familiar foods, medicines, and materials, with a focus on species native to Maine;
5. create and deliver a presentation on one important group of flowering plants.

Structure & Format of the Course

Lecture Periods

Each week students will attend two face-to-face lectures and one field lab. Lectures will often include a group activity component. Activities will vary, but can include worksheets, drawings or sculpting plant structures, and “dissections” of common botanical structures. Some activities may need to be completed as homework. Groups will be informal and members will rotate throughout the semester. Group size should never exceed three students. I will be available for consultation during these activities.

Lab Periods

The lab exercises will take place at various field sites throughout the greater Portland area. Addresses and driving directions will be posted before each lab period. Most field sites are easily accessed by bicycle or public transportation. If you do not have transportation, please let me know. I can fit three students in my car.

Most labs will take place outdoors and will involve some light hiking. You will need to dress appropriately for the weather (hiking boots, rain jacket, hat, etc.) and come prepared with supplies needed for field work (e.g., field book, hand lens, plant identification guide, water, snacks). All students will be given a **field kit** the first week of lab. The kit contains a field book for record keeping, a hand lens, a plant press, and additional supplies botanizing. Additional information is provided in the **Lab Appendix** to the syllabus.

Lab periods will include informal “field botany” experiences to give you hands-on exposure to the native Maine flora. You will learn important field characteristics important for identification. You will also learn to identify and name forest trees of Maine. Your knowledge of lab content will periodically be assessed with lab homework assignments.

The field labs will also give you an opportunity to collect specimens for your plant collection. I will assist you during lab excursions, but you may need to collect specimens outside of the formal lab periods. You are ultimately responsible for **collecting, identifying, pressing, mounting, and labeling** your own plant specimens. Detailed information on my expectations for plant collections are provided in the **Lab Appendix** to the syllabus.

Tests, Assignments, and other Assessments

In-class activities

During class periods I will spend some time lecturing, clarifying the reading, and answering questions. However, a bit of time every week will be devoted to in-class activities. These activities will give you opportunities to grapple with difficult material in informal, low-stakes situations. I will periodically collect completed in-class activities, and the mean of graded activities (minus your lowest activity grade) will figure into your final grade.

Tests

To reinforce your understanding of whole-organism plant biology, you will be given three tests over the course of the semester. Test format will be a mixture of multiple choice, matching, drawings, and short answer. Each test will cover approximately one third of the semester's content (see **Course Schedule**, below). Test material will come from the Mauseth textbook readings and associated content covered in lectures and activities. The final exam (Test 3) will *not* be cumulative.

Lab homework

Each student will complete lab homework assignments independently. Lab homework will be assigned periodically, but never in two consecutive weeks. Your mean grade for all lab homework assignments (minus your lowest grade) will figure into your final grade.

Angiosperm clade presentation

Each student or pair of students will deliver a formal slide presentation on their angiosperm clade. The 15- to 20-minute presentation will cover the clade's evolutionary history, common Maine representatives, and the importance of the group to human society.

Angiosperm clade collection

You will compose a plant collection that includes Maine representatives of your angiosperm clade. The collection should include **at least 20 species**, most of which should be native to or naturalized in Maine. Detailed information on how to identify, collect, document, preserve and mount plant specimens are included in the **Lab Appendix** and discussed during the first lab period. The final collection of mounted and labeled plant specimens will be due the last week of classes (exam week).

Grading and Assessment Criteria

Grade Calculations

The value of each assessment relative to the final grade value (out of 700 points) is given below:

Assessment	Points
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Lecture Activities (mean)	100 points
Tests (100 points each)	300 points
Lab Homework (mean)	100 points
Clade Presentation	100 points
Plant Collection	100 points
Total	700 points

Your **final grade** will be calculated as a percentage of total points possible. For example, if you received a total of 600 points, your grade will be calculated as $600/700 = 0.86$ or 86 %. You would therefore receive a final grade of B in the course

Grading scale

100-93%	=	A	79-77%	=	C+
92-90%	=	A-	76-73%	=	C
89-87%	=	B+	72-70%	=	C-
86-83%	=	B	69-60%	=	D
82-80%	=	B-	60% or lower	=	F

Assessment Criteria

For assignments, test questions, and lecture activities with a simple format (e.g., multiple choice, matching, short answer) grades will be calculated as the number of correct answers as a percentage of points possible. For those responses with a written or spoken component, the grading criteria are below:

Assignment / Assessment	Value
You have mastered the information and understand it at a deep, interconnected level. You can express that understanding eloquently, apply your knowledge to new situations and synthesize the material seamlessly with other ideas to arrive at your own conclusions. You can competently evaluate alternative representations of the concepts and back up your analyses and evaluations with evidence and logic. You can identify and correct common misconceptions.	A 90-100
You have a thorough knowledge of the material and can relay this information in a clear way. Your ability to extrapolate or apply this knowledge to new situations is adequate. You are aware of some of the common misconceptions and can avoid them.	B 80-89
Your knowledge and/or presentation of that knowledge is at a basic level or is in parts incomplete. You may have trouble elaborating on your knowledge or applying it in a new context, suggesting you learned the material in a perfunctory way (i.e., memorization, last minute studying). You fall prey to common misconceptions, but it appears that you could easily improve if you took more time to study effectively.	C 70-79
Your knowledge is rudimentary and/or your performance is barely acceptable for college-level work. However, there are hints that you understand certain concepts or parts of concepts well. Although poorly executed, your work shows potential. It appears that you could do a better job if you put in more time or improved your study techniques.	D 60-69
Below college-level expectations. You did not answer questions or the number of correct answers is no better than chance. You need to drop the class or change your approach if you wish to pass the course.	F <60

BIO 231 Course Policies

Attendance and late work

Work submitted after an assignment due date, will be penalized. Assignments submitted more than 5 days after their due date without prior contact with me will not be accepted.

Class cancellation

I will email you (using email given in your MaineStreet account) if I need to cancel class.

Academic integrity / plagiarism

Everyone associated with the University of Southern Maine is expected to adhere to the principles of academic integrity central to the academic function of the university. Any breach of academic integrity represents a serious offense. Each student has a responsibility to know the standards of conduct and expectations of academic integrity that apply to academic tasks. Violations of student academic integrity include any actions that attempt to promote or enhance the academic standing of any student by dishonest means. Cheating on an examination, stealing the words or ideas of another (i.e., plagiarism), making statements known to be false or misleading, falsifying the results of one's research, improperly using library materials or computer files, or altering or forging academic records are examples of violations of this policy which are contrary to the academic purposes for which the University exists. Evidence of a violation of the academic integrity policy will normally result in disciplinary action. A copy of the complete policy may be obtained from the [Dean of Students Office website](#)¹ or by calling and requesting a copy at (207) 780-5242.

Face Coverings

Per USM and the University of Maine System, all students, faculty, and staff members are required to wear a face covering, including during all face-to-face classes regardless of vaccination status. [Full information on Covid restrictions and guidelines](#) can be found on the University of Maine System website².

Face-to-Face Modality

This course is only offered face-to face. There is no option to go remote unless the entire university does so. If a

¹ <https://usm.maine.edu/community-standards-mediation/academic-integrity>

² <https://www.maine.edu/together/community-guidance/everyone/>

student becomes ill or must quarantine, I will work with that student to help them make up missed work. Remember, if you miss a class for COVID, it is your responsibility to notify me and to do your best to make up work missed.

University-level Policies & Support Resources

ADA & electronic accessibility notification & accommodations

The university is committed to providing students with documented disabilities equal access to all university programs and services. If you think you have a disability and would like to request accommodations, you must register with the Disability Services Center. Timely notification is essential. The Disability Services Center can be reached by calling **(207) 780-4706** or by email at **dsc-usm@maine.edu**. If you have already received a faculty accommodation letter from the Disability Services Center, please provide me with that information as soon as possible. Please make a private appointment so that we can review your accommodations.

Tutoring & writing assistance

Tutoring at USM is for all students, not just those who are struggling. Tutoring provides active feedback and practice, and is available for writing, math, and many more subjects. Walk-in tutoring is available at the Glickman Library in Portland, the Gorham Library, and the LAC Writing Center.

- For best service, we recommend making an appointment at the Learning Commons scheduling website.³
- Questions about tutoring should be directed to **Naamah Jarnot** at **(207) 780-4554**.
- Interested in becoming a more effective, efficient learner? Check out the AGILE website!⁴

Technology Support Center (Help Desk)

If you need technical support at any time during the course, please contact the Technology Support Center:

Phone: (207) 780-4029 or 1-800-696-4357

Email: help@maine.edu

- You need a maine.edu account to access most of our online resources. If you can't remember your account information, visit the UMS User Account Management website⁵ or contact IT at **1-800-696-4357** and ask them to help you access your maine.edu account.
- The USM Portal⁶ can be used to reach your student email, MaineStreet and most other university online tools through a single website.⁷

Counseling

Counseling is available for USM students. The best way to schedule an appointment is by phone at **(207) 780-5411**. More information is available on the University Health and Counseling Services

³ <https://usm.maine.edu/learningcommons/schedule-tutoring-appointment>

⁴ <https://usm.maine.edu/agile>

⁵ <http://accounts.maine.edu/>

⁶ <https://my.usm.maine.edu/>

⁷ <https://courses.maine.edu/d2l/le/discovery/view/course/86822>

website⁸.

Recovery Oriented Campus Center (ROCC)

A peer support community for students in recovery from substance abuse and other mental health conditions is available at USM. More information may be found online at the Recovery Oriented Campus Center website⁹ or by contacting ROCC at **(207) 228-8141**.

Non-discrimination Policy & Bias Reporting

The University of Southern Maine is an EEO/AA employer, and does not discriminate on the grounds of race, color, religion, sex, sexual orientation, transgender status, gender expression, national origin, citizenship status, age, disability, genetic information or veteran's status in employment, education, and all other programs and activities. The following person has been designated to handle inquiries regarding non-discrimination policies:

Amie Parker, Interim Director of Equal Opportunity

The Farmhouse, University of Maine Augusta
Augusta, ME 04333,
(207) 581-1226, TTY 711 (Maine Relay System).

Incidents of discrimination or bias at USM should be reported to Associate Vice President for Student Affairs **David Rousel** at **(207) 780-5242**.

Statement of Religious Observance for Students

Absence for religious holy days

The University of Southern Maine respects the religious beliefs of all members of the community, affirms their rights to observe significant religious holy days, and will make reasonable accommodations, upon request, for such observances. If a student's religious observance is in conflict with the academic experience, they should inform their instructor(s) of the class or other school functions that will be affected. It is the student's responsibility to make the necessary arrangements mutually agreed upon with the instructor(s).

Title IX Statement

The University of Southern Maine is committed to making our campuses safer places for students. Because of this commitment, and our federal obligations, faculty and other employees are considered mandated reporters when it comes to experiences of interpersonal violence (sexual assault, sexual harassment, dating or domestic violence, and stalking). Disclosures of interpersonal violence must be

⁸ <https://usm.maine.edu/uhrs>

⁹ <https://usm.maine.edu/recovery>

passed along to the University's Deputy Title IX Coordinator who can help provide support and academic remedies for students who have been impacted. More information can be found at the [Campus Safety website](#)¹⁰ or by contacting Sarah E. Holmes at usm.titleix@maine.edu or (207) 780-5767.

If students want to speak with someone confidentially, the following resources are available on and off campus:

- **University Counseling Services:** (207) 780-4050
- **24 Hour Sexual Assault Hotline:** 1-800-871-7741
- **24 Hour Domestic Violence Hotline:** 1-866-834-4357

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Course Schedule (subject to alteration without notice!)

PART 1: ANGIOSPERM STRUCTURE, REPRODUCTION, AND EVOLUTIONARY HISTORY

Week and Topic	Day Date	Chapter and Sections within (from Mauseth, <i>Botany</i>)	Page numbers Mauseth, 6 th Ed	Friday's Date & Lab Activities
<i>Week 1</i>				
Introduction & Overview of Plant Life	Tues 8/31	Chapter 1 Introduction to Plants and Botany Origins and Evolution of Plants Chapter 2 Overview of Plant Life <i>Intro</i> Concepts Overview of Plant Structure	Tues Pages 3-5 Pages 10-12 Page 20 Pages 20-28	9/3 Campus tree walk How to collect, document, and press plant specimens
Angiosperm Vegetative Morphology	Thurs 9/2	Chapter 5 Stems <i>Intro</i> Concepts External Organization of Stems <i>Box 5-2 Organs: Replace or Reuse Them?</i> <i>Box 5-4 Plants and People Grow Differently</i> Chapter 6 Leaves <i>Intro</i> Concepts External Structure of Foliage Leaves	Thurs Pages 108-110 Pages 115-120 <i>Page 121</i> <i>Page 137</i> Page 144 Pages 144-150	

¹⁰ <https://usm.maine.edu/campus-safety-project>

¹¹ <https://usm.maine.edu/community-standards-mediation/conduct-process>

<i>Week 2</i> Angiosperm Reproductive Morphology Pollination & Seed Dispersal	Tues 9/7 Thurs 9/9	Chapter 9 Flowers and Reproduction <i>Intro</i> Concepts Sexual Reproduction: Flower Structure Flower Structure & Cross-Pollination Chapter 9 Flowers and Reproduction Inflorescences and Pollination Sexual Reproduction: Fruit Development Fruit Types and Seed Dispersal	Tues Pages 222-224 Pages 225-230 Pages 238-241 Thurs Pages 241-244 Pages 237-238 Pages 244-247	9/10 Friday Field Botany: Reproductive Characters of Angiosperms
<i>Week 3</i> Overview of Plant Evolution & Diversity Evolution of Angiosperms	Tues 9/14 Thurs 9/16	Chapter 2 Overview of Plant Life Overview of Plant Diversity & Evolution Overview of Plant Ecology <i>Box 2-1 Familiar Plants & Confusing Look-Alikes</i> Chapter 23 Angiosperms <i>Intro</i> Concepts Classification of Flowering Plants Basal Angiosperms	Tues Pages 34-39 Pages 41-44 <i>Page 22</i> Thurs Pages 610-613 Pages 613-615 Pages 617-618	9/17 Friday Field Botany: Angiosperm Diversity
<i>Week 4</i> Angiosperm Diversity	Tues 9/21 Thurs 9/23	Chapter 23 Angiosperms Monocots Chapter 23 Angiosperms Eudicots: Basal Eudicots Eudicots: Rosids	Tues Pages 618-622 Thurs Pages 624-628 Pages 628-630	9/24 Friday Field Botany: Angiosperm Diversity
<i>Week 5</i> Angiosperm Diversity Test Week!	Tues 9/28 Thurs 9/30	Chapter 23 Angiosperms Eudicots: Asterids Test 1	Tues Pages 630-634	10/1 Friday Field Botany: Angiosperm diversity

PART 2: EVOLUTIONARY HISTORY OF LAND PLANTS

Week and Topic	Day Date	Chapters and Sections within (from Mauseth, <i>Botany</i>)	Page numbers Mauseth, 6 th Ed	Friday's Date & Lab Activities
<i>Week 6</i> Ancestors of Land Plants: Green Algae The Plant Life Cycle	Tues 10/5 Thurs 10/7	Chapter 19 Algae <i>Intro</i> Concepts Green Algae <i>Box 14.1 Simple Bodies, Simple Development</i> Chapter 9 Reproduction The Plant Life Cycle <i>Box 16-3 Genetics of Haploid Plants</i>	Tues Page 512 Pages 518-526 <i>Page 380</i> Thurs Page 224 <i>Page 548</i>	10/8 Friday Field Botany: Angiosperm Diversity
<i>Week 7</i> Plants Colonize Land Nonvascular Plant Diversity	Tues 10/12 Thurs 10/14	Chapter 20 Nonvascular Plants <i>Intro</i> Concepts Characteristics of Nonvascular Plants Classification of Nonvascular Plants Chapter 20 Nonvascular Plants Mosses <i>Box 5-3 Simple plants</i>	Tues Pages 540-543 Pages 543-544 Page 544 Thurs Pages 544-550 <i>Page 125</i>	10/15 Friday Field Botany: Mosses and Liverworts

<i>Week 8</i> Evolution and Diversification of Vascular Plants	Tues 10/19 Thurs 10/21	Chapter 21 Vascular Plants without Seeds <i>Intro Concepts</i> Early Vascular Plants (Extinct) Chapter 21 Vascular Plants without Seeds The Microphyll Line: Lycophytes	Tues Page 562 Pages 563-567 Thurs Pages 567-572	10/22 Friday Field Botany: Lycophytes
<i>Week 9</i> Seedless Vascular Plants Plant Cells	Tues 10/26 Thurs 10/28	Chapter 21 Vascular Plants without Seeds The Megaphyll Line: Euphyllophytes <i>Box 21-1 Molecular Studies of Early Land Plants</i> Chapter 3 Cell Structure Plant Cells (Unique Characteristics)	Tues Pages 572-581 <i>Page 574</i> Thurs Pages 158-174	10/29 Friday Field Botany: Ferns and Horsetails
<i>Week 10</i> Vascular Tissues Test Week!	Tues 11/2 Thurs 11/4	Chapter 5 Internal structure of stems Xylem and Phloem Test 2	Tues Pages 120-131	11/5 Friday Field Botany

PART 3: TREES, WOODY GROWTH, AND SECRETS of ANGIOSPERM SUCCESS

Week and Topic	Day Date	Chapter and Sections within (from Mauseth, <i>Botany</i>)	Page numbers Mauseth, 6 th Ed	Friday's Date & Lab Activities
<i>Week 11</i> Seed Plants: Gymnosperms Break!	Tues 11/9 Thurs 11/11	Chapter 22 Gymnosperms <i>Intro Concepts</i> Progymnosperms Seed Ferns Coniferophyta Veteran's Day No Class!	Tues Pages 588-589 Pages 590-593 Pages 593-594 Pages 594-601	11/12 Friday Field Botany: Conifers
<i>Week 12</i> Secondary Growth: Vascular Cambium Secondary Growth	Tues 11/16 Thurs 11/18	Chapter 22 Gymnosperms Cycadophyta Ginkgophyta Gnetophyta Chapter 8 Structure of Woody Plants <i>Review Concepts</i> Vascular Cambium <i>Box 8-2 Having Multiple Bodies in One Lifetime</i>	Tues Pages 601-603 Pages 603-604 Pages 604-606 Thurs Pages 190-191 Pages 191-195 <i>Page 202</i>	11/19 Friday Lab Botany: Herbaceous tissues Student Clade Presentations

<p><i>Week 13</i></p> <p>Secondary Growth: Wood</p> <p>Break!</p>	<p>Tues 11/23</p> <p>Thurs 11/25</p>	<p>Chapter 8 Structure of Woody Plants Secondary Xylem <i>Box 8-3 Dendrochronology: Tree Ring Analysis</i></p> <p>Forest Trees of Maine Read “Tree Parts & Functions”, pp. 20-21</p> <p>Thanksgiving Break No Class!!</p>	<p>Tues Pages 195-204 <i>Pages 208-209</i></p>	<p>11/26 Friday</p> <p>Thanksgiving Break No Lab!</p>
<p><i>Week 14</i></p> <p>Secondary Growth: Bark</p> <p>Secrets to Angiosperm Success</p>	<p>Tues 11/30</p> <p>Thurs 12/2</p>	<p>Chapter 8 Structure of Woody Plants Bark: Secondary Phloem and Cork</p> <p>Chapter 23 Angiosperms <i>Review Concepts</i></p> <p>Chapter 9 Flowers and Reproduction <i>Review The Plant Life Cycle</i> Double Fertilization</p>	<p>Tues Pages 204--210</p> <p>Thurs Pages 610-613</p> <p>Page 224 Pages 230-234</p>	<p>12/3 Friday</p> <p>Lab Botany: Wood and Bark</p> <p>Student Clade Presentations</p>
<p><i>Week 15</i></p> <p>Secrets to Angiosperm Success</p>	<p>Tues 12/7</p> <p>Thurs 12/9</p>	<p>Chapter 9 Flowers and Reproduction Angiosperm seeds <i>Box 9-1 Flowers, fruits, seeds, & civilization</i></p> <p>Michael Pollan Handout: <i>Sneaky Orchids</i> <i>Box 2-3 Toxic Plants</i></p>	<p>Tues Pages 235-237 <i>Pages 232-233</i></p> <p>Thurs <i>Handout provided</i> Page 32</p>	<p>12/10 Friday</p> <p>Lab Botany: Mount Specimens</p>
<p><i>Week 16</i></p> <p>Exam Week</p>		<p>Test 3 Time and Date TBA</p>		<p>12/17 Friday</p> <p>2:00 PM Plant Collections Due</p>