BIOL26a: Plant Biology

Contact Details

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Communication

Email is the best form of communication with the course instructor. You can expect a 24-hour turn around on all email requests. Please email the course staff only using your Brandeis account.

Continuity

This course is a 10-week, asynchronous course. You are expected to work at your own pace, adhering to all deadlines. If you encounter power/web outages or are planning to be away for an extended time, please email the course professor immediately.

Meeting Times/Locations

Classes

This course will take place completely online using Moodle (Brandeis' learning management system) available at *http://moodle.brandeis.edu*. The site contains all course materials and mechanisms for discussion, assignment submission and review of grades and feedback.

Accommodations

Brandeis seeks to create a learning environment that is welcoming and inclusive of all students, and I want to support you in your learning. If you think you may require disability accommodations, you will need to work with Student Accessibility Support (SAS) (781-736-3470, access@brandeis.edu). You can find helpful student FAQs and other resources on the SAS website, including guidance on how to know whether you might be eligible for support from SAS. If you already have an accommodation letter from SAS, please provide me with a copy as soon as you can so that I can ensure effective implementation of accommodations for this class. In order to coordinate assignment accommodations, ideally you should provide the accommodation letter at least 48 hours before the course begins.

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Course Description

Course Prerequisite(s):

Biol14 and/or Biol15 or permission of the instructor

Supplemental information for each module will be posted on Moodle. Please contact the instructor immediately if you feel you need extra background information.

Learning Goals:

After completion of this course students should be able to:

- Articulate the main biochemical and cellular features that characterize plants.
- Describe the general metabolic processes inherent to plant cells.
- Describe the basic steps of reproduction/development and demonstrate conceptual understanding of plant heredity as it relates to evolution
- Classify and identify plant structures.
- Describe several advances in plant biotechnology and agricultural practices and their impact on society.

Credit Hours:

This course will consist of 10, one-week modules. The class will consist of mini-lectures, readings, forums, hands-on activities/virtual labs, case studies, and discussions. The course is designed to require an average of 16 hours of non-synchronous course-work hours per week. You may work ahead, but to maintain a cohort among the class, you are required to participate in the forum and peer review process at the same time as your peers.

Course Requirements

Assignment Late Policy

While it is understood that as working adults with professional, academic, and personal responsibilities that you may encounter an unexpected interruption requiring you to be temporarily delayed in meeting a deadline as outlined in this syllabus, we ask that you make every attempt to meet all due dates as this course is only ten weeks in duration. Late assignments will not be accepted as they disrupt the progression of the course. Your full, timely participation not only ensures that you reap the full benefits of this experience, but that your peers benefit from your engagement and feedback as well.

Participation, Assignments and Expectations

To facilitate consistency throughout the course, we will adhere to the same weekly set-up for assignment due dates. All assignments are due at 11:59 pm EST. Our course week will start on Monday and end on Sunday of the following week.

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Suggested work	• Watch Week's introductory lecture • Course content	• Course content • Reading • Assignment for final project	• Course content • Complete Reading • Assignment for final project	• Complete Assignment for final project • Course content	• Course content	• Course content	• Complete course content
Assignment Due			• Post to forum	• Final project exercise due	• Respond to forum posts from at least two other students		• Final lab, assignment, or case study due

Each week, you are expected to:

- Watch weekly introductory course video (~15 minutes, not graded)
- Watch, read and explore the background course content (~3 hours, not graded)
- Complete a lab report or case study based on course content (~4 hours, graded)
- Read a peer-reviewed, scientific paper based on the weekly course content (~2 hours, non-graded)
- Post answers, questions and reflections to the course forum based on the reading (~1 hour, graded)
- Respond to a minimum of 2 forum posts provided by classmates per week (~1 hour, graded)
- Read, research, and complete an exercise relating to your final research project (~5 hours, graded)
- Review another student's final project exercise (~1 hour, graded)

Course Plan

DATE/ Week	Topic	Learning Outcome	Assignment 1. Weekly Lab/Case study/Assignment 2. Reading/Forum post 3. Final Project Assignment
Week 1 June 1-June 7	**Introduction to course and scientific literacy** 1. Digital and informational literacy	• Define criteria to assess the validity of scientific sources • List and evaluate at least 4 different types of information sources accessible from the internet • Articulate and defend an opinion on the use of GMO crops	1. Digital literacy Project 2. Introduction of yourself 3. Policy Selection
Week 2 June 8-June 14	**Introduction to plants** 1. Plant domestication 2. Annual versus perennial plants 3. Taxonomy 4. Plant identification	• Identify potential pitfalls in plant domestication • Describe challenges faced by botanists • Define taxonomy as it relates to plant systems • Classify and categorize local flora using GoBotany	1. Laboratory 1 2. "Wild Plants to the Rescue" 3. Annotated Bibliography

Week 3 June 15-June 21	**Plant Cell Structures** 1. Cell wall 2. Membranes organization 3. Plastids 4. Organelles	• Identify structures found in plant cells • Discuss the differences between plant and animal cells • Define osmosis and describe how it impacts plant cell structures	1. Laboratory 2 2. "The Puzzle of Plastid Evolution" 3. Abstract
Week 4 June 22-June 28	**Plant Metabolism** 1. Respiration 2. Photosynthesis 3. C3 and C4 plants	• Define and describe the different structures and molecules of the cell responsible for photosynthesis. • Compare the process of photosynthesis to the process of respiration at both the cellular and molecular level. • Discuss photosynthesis data collected in a virtual experiment by writing an abstract. • Design an experiment to assess the efficiency of various chlorophylls in producing ATP.	1. Photosynthesis Case Study 2. "Tropical Rainforest Carbon Sink declines during El Nino…" 3. Scientific Context of Policy
Week 5 June 29-July 5	**Plant Cells, Tissues and Organs** 1. Collenchymal 2. Mesenchymal 3. Parenchymal 4. Protective tissue 5. Meristem	• Define and describe the different structures and tissues found in plants. • Hypothesize about the possible controls on plant life span.	1. Lab 3 2. "Single-cell telomere length quantification couples telomere length…" 3. Public Opinion of Policy
Week 6 July 6-July 12	**Vascular Tissue** 1. Xylem 2. Phloem 3. Vascular tissue	• Define and describe the different structures and tissues found in plants. • Compare the function and mechanism of control in xylem and phloem. • Defend the relevance of vascular tissue in disease by researching vascular wilt disease.	1. News and Views on Vascular Wilt 2. "Drought impact phloem transport" 3. Ongoing research of policy
Week 7 July 13-July 19	**Flower, Fruits and Seeds** 1. Flower structures 2. Fruits structures 3. Seed Structures	• Define and describe the different structures and tissues found in flowers, fruits and seeds. • Compare and contrast the reproductive value of flowers, fruits and seeds.	1. Lab 5 2. Looks matter, changes in flower form affect pollination effectiveness…" 3. Policy recommendation
Week 8 July 20- July 26	**Plant Reproduction** 1. Angiosperms 2. Gymnosperms 3. Monocots vs. dicots 4. Spores 5. Gametogenesis	• Define and describe the different structures involved in reproduction and development. • Compare and contrast the reproductive strategies used in angiosperms and gymnosperms.	1. Op/ed fittest evolutionary strategy between gymnosperms and angiosperms 2. "Evolutionary consequences of self-fertilization in plants" 3. Aggregate report
Week 9 July 27-August 2	**Plant Ecology and Symbiosis** 1. Plant domestication 2. Host relationships 3. Parasites and pathogens	• Define and describe how plants are used in modern agricultural practices • Define relationships in plants • Compare and contrast relationships with respect to plant outcome with bacteria, fungus and other organisms	1. Case study on fungus 2. "The plant Microbiome at Work" 3. Critique of classmates' policy
Week 10 August 3-August 7	**Plants Extinction and Policy Critique**	• Define mass extinction and habitat fragmentation • Consider the extinction rate of angiosperms and gymnosperms • Hypothesize on the survival mechanism for endangered species	1. Final reflection assignment 2. "World's largest plant survey"

		This is our last week of class. Please complete your final reflection assignment by 11:59 pm on August 7.	

Evaluation and Grading

Your grade for the course will be determined by your scores on participation in the course forum, a weekly lab or case study assignment, a weekly written assignment leading toward your final project and a final written project which you must present virtually to your classmates.

Final Letter Grade Cut-offs

A+: 99-100
A: 94-98.9
A-: 90-93.9
B+: 86.6-89.9
B: 83.3-86.5
B-: 80-83.2
C+: 76.6-79.9
C: 73.3-76.5
C-: 70-73.2
D+: 66.6-69.9
D: 63.3-66.5
D-: 60-63.2
E: <60

Class Element	Grade Percentage
Weekly assignment, Lab or Case Study	40%
Final Projects	40%
Forum Posts and Responses	20%

1. *Weekly lab, assignment or case study:* Your weekly assignments will constitute 40% of your grade.

   Your weekly assignment will consist of completed pre and post lab assignments or case studies due each Monday of the course. Completed, uploaded PDF answers to these assessments will each be worth 5% constituting a total of 45% of your final grade. You should expect each of these assignments to take you approximately 3-5 hours to complete. The assignments will be graded as:
   "Outstanding" 100%: fully answered, passed in on-time, completed with full effort and to the student's best ability, no AI use
   "Satisfactory" 50%: one or two of the prior criteria not met
   "Unsatisfactory" 0%: three or more of the prior criteria not met or submitted more than 24 hours late

2. *Final Project:* Your final project will be 40% of your grade.

   Your final project is broken into several smaller assignments. You will receive feedback from the course instructor on each of these seven assignments and each will be worth 2% for a total of 14% of your final grade.

   Your final project will have both a written component and oral presentation component. The oral presentation is worth 10% while the written document is worth 10% of your score.

3. *Forum Posts and Responses*: The forum posts and responses will be worth 20% of your final grade.

   Because part of your grade is based on participation, you are required to watch and participate in all lectures, labs and discussions. Failure to complete labs, case study, paper discussions, etc. on time will result in a loss of credit for that assignment.

Important Policies

Academic Integrity

Every member of the University community is expected to maintain the highest standards of academic integrity. A student shall not submit work that is falsified or is not the result of the student's own effort. Infringement of academic integrity by a student subjects that student to serious penalties, which may include failure on the assignment, failure in the course, suspension from the University or other sanctions. Please consult Brandeis University Rights and Responsibilities for all policies and procedures related to academic integrity. Students may be required to submit work via TurnItIn.com or similar software to verify originality. A student who is in doubt regarding standards of academic integrity as they apply to a specific course or assignment should consult the faculty member responsible for that course or assignment before submitting the work. Allegations of alleged academic dishonesty will be forwarded to the Department of Student Rights and Community Standards. Citation and research assistance can be found at Brandeis Library Guides - Citing Sources.

An important aspect of scientific research and discovery is providing sources for ideas and scholarly works. If you consult with other students on an assignment, please indicate this on your work. Do not generate new content with prompt-based AI tools like ChatGPT or CodePilot without written permission of your instructor unless specifically allowed by an assignment. Using Grammarly as a language aid is acceptable, but be aware that altering language with AI assistance often causes significant errors and mistakes in content. Instructors reserve the right to request an oral explanation of all answers or written works.

Confidentiality Statement

We can draw on the wealth of examples from our professional and/or teaching experiences during weekly discussions and in our written work. However, it is imperative that we not share information that is confidential, personal, sensitive, privileged, or proprietary in nature. In addition, we should respect our peers and work under the assumption that what is discussed here stays within the confines of the online classroom.

For your awareness, members of the University's technical staff have access to all course sites to aid in course setup and technical troubleshooting. Rabb School administrative staff have access to all courses for oversight purposes. Participants enrolled in these training courses can expect that individuals other than their fellow classmates and the facilitator(s) may visit their course for various purposes. Their intentions are to aid in technical troubleshooting and to ensure that quality course delivery standards are met. Strict confidentiality of student information is maintained.

Classroom Health and Safety

- Register for the Brandeis Emergency Notification System.

Important Resources

Course Materials/Books/Apps/Equipment

If you are having difficulty purchasing course materials, please make an appointment with your Student Financial Services or Academic Services advisor to discuss possible funding options, including vouchers for purchases made at the Brandeis Bookstore.

Textbook: There is no required textbook for this course. Required course material and reading will be posted on the course website. It may be beneficial to have any introductory biology textbook available as a background reference text if needed. Supplementary reading will be assigned from OpenStax Biology.

Required Software: Google docs and/or Microsoft office, a microscope app for your phone/computer/tablet (i.e. ioLight Microscope), a device capable of taking digital pictures (tablet/phone/camera)

Required Supplies: Periodically, you will be performing laboratories on your own. The following supplies will be required: Week 2: Leaves/cuttings from 3 different plants; Week 7: 10 different fruits; Week 7: 5 different flowers; Week 7 Seeds from 10 different fruits

Recommended supplies: A headset or headphones with microphone

Moodle

Moodle is the Brandeis learning management system. Login using your UNET ID and password. For Moodle help, contact Library@brandeis.edu.

Library

The Brandeis Library collections and staff offer resources and services to support Brandeis students, faculty and staff. Librarians and Specialists from Research & Instructional Services, Public Services, Archives & Special

Collections, Sound & Image Media Studios, MakerLab, AutomationLab, and Digital Scholarship Lab are available to help you through consultations and workshops.

Privacy

To protect your privacy in any case where this course involves online student work outside of Brandeis password-protected spaces, you may choose to use a pseudonym/alias. You must share the pseudonym/ alias with me and any teaching assistants as needed. Alternatively, with prior consultation, you may submit such work directly to me.

Student Support

Brandeis University is committed to supporting all our students so they can thrive. If a student, faculty, or staff member wants to learn more about support resources, the Support at Brandeis webpage offers a comprehensive list that includes these staff colleagues you can consult, along with other support resources:

- The Care Team
- Academic Services (undergraduate)
- Graduate Student Affairs
- Directors of Graduate Studies in each department, School of Arts & Sciences
- Program Administrators for the Heller School and International Business School
- University Ombuds
- Office of Equal Opportunity.