

# Plant and Microbial Biology

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## Overview

The Department of Plant and Microbial Biology consists of the Division of Plant Biology and the Division of Microbial Biology. Programs at both the undergraduate and graduate levels have been designed to offer students maximum flexibility in defining their own areas of interest. In addition to departmental resources that are available in Koshland Hall, the facilities of the College of Natural Resources Biological Imaging Facility and the United States Department of Agriculture Plant Gene Expression Center are available for the programs of the department.

## The Division of Plant Biology

The Division of Plant Biology program emphasizes basic research and its application to plants and promotes the design of plant biotechnologies. With an increasing awareness of environmental problems, global changes, and emerging food needs, plants are a focal point for new research initiatives and educational training programs. Understanding the biology of plants, their development, their responses to the environment, and the impact of human activities on the plant biosphere are many of the challenges that will continue to fuel the expansion of plant biology research well into the twenty-first century.

## The Division of Microbial Biology

The Division of Microbial Biology was established within the department to provide a focus for microbial biology at UC Berkeley. There is a growing awareness that microbes and microbial activities are essential to maintaining a high quality of life for all eukaryotes. Moreover, understanding the microbial world is necessary if we are to comprehend the global ecosystem, evolutionary history, and diversity of life on earth. The twenty-first century will bring a new understanding of the workings of the global ecosystem and a wealth of new technologies derived from the microbial world. The new microbial biology research programs are designed to meet this challenge.

## Undergraduate Programs

Genetics and Plant Biology (<https://guide.berkeley.edu/archive/2024-25/undergraduate/degree-programs/genetics-plant-biology/>): BS  
Microbial Biology (<https://guide.berkeley.edu/archive/2024-25/undergraduate/degree-programs/microbial-biology/>): BS

## Graduate Programs

Microbiology (<https://guide.berkeley.edu/archive/2024-25/graduate/degree-programs/microbiology/>): PhD  
Plant Biology (<https://guide.berkeley.edu/archive/2024-25/graduate/degree-programs/plant-biology/>): PhD

## Plant and Microbial Biology

### PLANTBI 10 Plants, Agriculture, and Society 2 Units

Terms offered: Fall 2022, Fall 2021, Fall 2020

Changing patterns of agriculture in relation to population growth, the biology and social impact of plant disease, genetic engineering of plants: a thousand years of crop improvement and modern biotechnology, interactions between plants and the environment, and effects of human industrial and agricultural activity on plant ecosystems. Knowledge of the physical sciences is neither required nor assumed.

#### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

#### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Staskawicz, David Zilberman

### PLANTBI 11 Fungi, History, and Society 3 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018

Fungi have interacted with humans in both positive and negative ways throughout history. These interactions have included production of foods, medicines, fuels, plant and animal diseases, decay, allergies, and mind-altering drugs.

#### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture and 1 hour of discussion per week

#### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Bruns, Taylor

## PLANTBI 13 Genetics for Nonscientists 3 Units

Terms offered: Fall 2022, Spring 2014, Spring 2013

How can genetics help increase the food supply even as farmland conditions degrade? How genetically unique are humans? What do buzzwords like GWAS and epigenetics refer to, and how are they impacting medicine and public health? This introductory course for non-science majors will explore topics like these as students learn the foundations of scientific reasoning, genetics concepts and approaches, and their promise and limits in addressing societal challenges past and present. Objectives include learning fundamentals of biology and their applications; building students' capacity to make informed interpretations of experimental data and policies involving "genetics" in a changing world; and to understand our place in nature.

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture and 1 hour of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Alternate method of final assessment during regularly scheduled final exam group (e.g., presentation, final project, etc.).

## PLANTBI 20 Introduction to the Plant Sciences at Berkeley 1 Unit

Terms offered: Spring 2025, Spring 2024, Fall 2022

This course will include discussions on the academic path (courses) needed for the Genetics and Plant Biology major; an introduction to resources and facilities for studies of the plant sciences at Berkeley, such as the University Herbarium and the Botanical Garden; an exploration of plant science related careers, including presentations from guest speakers who work in organic farming, government, and Cooperative Extension; talks by faculty about their current research, and information about how to do research in a lab.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1 hour of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Alternative to final exam.

**Instructors:** Feldman, Staskawicz

## PLANTBI 22 Microbial Friends and Foes 3 Units

Terms offered: Spring 2023, Spring 2022, Fall 2016

Although often unseen, microbes are everywhere! This course provides an overview of the beneficial and harmful roles played by microbes, including viruses, archaea, bacteria, protists and fungi. We will examine microbes in terrestrial, marine, and extreme environments and discuss their functions in ecosystem health and climate change. In addition, we will explore the profound effects of microbes on the course of history through their effects on agriculture and human health.

### Objectives & Outcomes

**Course Objectives:** Understand similarities and differences between viruses, archaea, bacteria, protists, and fungi.

Understand both beneficial and harmful functions of microbes in daily life.

Evaluate data and claims relating to microbes in real-life situations such as disease risk, probiotic efficacy, and climate change.

Understand how molecular properties and behaviors of microbes determine how they interact with their environment and with other organisms

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture and 1 hour of discussion per week

### Summer:

6 weeks - 6 hours of lecture and 3 hours of discussion per week

8 weeks - 4 hours of lecture and 2 hours of discussion per week

10 weeks - 3 hours of lecture and 1.5 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Glass Ryan Seed

## PLANTBI 24 Freshman Seminar 1 Unit

Terms offered: Fall 2025, Spring 2025, Fall 2024

Reading and discussion with Plant and Microbial Biology faculty on current research and topics in plant and microbial biology. Topics which may be discussed include microbial biology, plant genetics, plant development, plant pathology, agricultural biotechnology, and genetic engineering. Ideal for students who are considering a major in the Department of Plant and Microbial Biology. Enrollment is limited to 20 freshmen.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1 hour of seminar per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final Exam To be decided by the instructor when the class is offered.

## PLANTBI 39E Freshman/Sophomore Seminar 2 - 4 Units

Terms offered: Spring 2012

Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. Enrollment limits are set by the faculty, but the suggested limit is 25.

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 2-4 hours of seminar per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** The grading option will be decided by the instructor when the class is offered. Final exam required.

**Instructor:** Lindow

## PLANTBI 40 The (Secret) Life of Plants 3 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

Covers contemporary topics in plant biology. Examines how plants grow, reproduce, and respond to the environment (e.g., to light) in ways distinct from animals. Presents basic principles of genetics, cell, and molecular biology. Basics of genetic engineering and biotechnology reveal how they are used to modify plants, and these socially relevant issues are assessed. Includes visit to modern plant biology research laboratory, and aspects of plant disease and diversity. Knowledge of the physical sciences neither required nor assumed.

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture and 1 hour of discussion per week

**Summer:** 8 weeks - 4 hours of lecture and 2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Zambryski

## PLANTBI 84 Sophomore Seminar 1 or 2 Units

Terms offered: Spring 2011, Spring 2010, Spring 2009

Sophomore seminars are small interactive courses offered by faculty members in departments all across the campus. Sophomore seminars offer opportunity for close, regular intellectual contact between faculty members and students in the crucial second year. The topics vary from department to department and semester to semester. Enrollment limited to 15 sophomores.

### Rules & Requirements

**Prerequisites:** At discretion of instructor

**Repeat rules:** Course may be repeated for credit when topic changes.

### Hours & Format

#### Fall and/or spring:

5 weeks - 3-6 hours of seminar per week

10 weeks - 1.5-3 hours of seminar per week

15 weeks - 1-2 hours of seminar per week

#### Summer:

6 weeks - 2.5-5 hours of seminar per week

8 weeks - 1.5-3.5 hours of seminar and 2-4 hours of seminar per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** The grading option will be decided by the instructor when the class is offered. Final exam required.

## PLANTBI C96 Studying the Biological Sciences 1 Unit

Terms offered: Fall 2025, Fall 2024, Fall 2023

Students will be introduced to the "culture" of the biological sciences, along with an in-depth orientation to the academic life and the culture of the university as they relate to majoring in biology. Students will learn concepts, skills, and information that they can use in their major courses, and as future science professionals.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam required.

**Instructor:** Matsui

**Also listed as:** INTEGBI C96/MCELLBI C96

## PLANTBI 98 Directed Group Study 1 - 3 Units

Terms offered: Spring 2025, Fall 2024, Fall 2023

Lectures and small group discussions focusing on topics of interest, varying from semester to semester.

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-3 hours of directed group study per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

## PLANTBI 99 Supervised Independent Study and Research 1 - 4 Units

Terms offered: Spring 2016, Fall 2015, Spring 2015

Lower division independent study and research intended for the academically superior student. Enrollment only with prior approval of faculty advisor directing the research.

### Rules & Requirements

**Prerequisites:** GPA of 3.4 or higher; lower division status

**Credit Restrictions:** Enrollment is restricted; see the section on Academic Policies-Course Number Guide in the Berkeley Guide.

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-3 hours of independent study per week

### Summer:

6 weeks - 2.5-8 hours of independent study per week

8 weeks - 1.5-6 hours of independent study per week

10 weeks - 1.5-4.5 hours of independent study per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

## PLANTBI 101L Experimental Plant Biology Laboratory 3 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

Students will perform state-of-the-art research to address an important question in modern plant biology. The experimental progression exposes students to a variety of modern molecular approaches and techniques. Experimental design, data acquisition, and analysis of the student's real experimental data is emphasized. Research results will be presented in written and oral formats similar to those used in research laboratories.

### Rules & Requirements

**Prerequisites:** Biology 1A-1B; Plant and Microbial Biology 135, 150, and 160 (may be taken concurrently)

### Hours & Format

**Fall and/or spring:** 15 weeks - 6 hours of laboratory and 1 hour of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Wildermuth

## PLANTBI C103 Bacterial Pathogenesis 3 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

This course for upper division and graduate students will explore the molecular and cellular basis of microbial pathogenesis. The course will focus on model microbial systems which illustrate mechanisms of pathogenesis. Most of the emphasis will be on bacterial pathogens of mammals, but there will be some discussion of viral and protozoan pathogens. There will be an emphasis on experimental approaches. The course will also include some aspects of bacterial genetics and physiology, immune response to infection, and the cell biology of host-parasite interactions.

### Rules & Requirements

**Prerequisites:** BIOLOGY 1A and CHEM 3B

**Credit Restrictions:** Students will receive no credit for MCELLBI C103 after completing PB HLTH 262.

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Portnoy

**Also listed as:** MCELLBI C103

## PLANTBI 104L Discovery-Based Research in Microbiology 2 Units

Terms offered: Summer 2019 First 6 Week Session, Summer 2018 First 6 Week Session, Summer 2010 10 Week Session

An introduction to microbiology research in which students generate gene knockouts in *Caulobacter* and analyze the mutant phenotypes. Each student will disrupt one gene of known function and one gene of unknown function. Students will attend lectures focusing on the techniques to be employed and perform experiments under supervision. This course may be taken by students with no prior laboratory experience to expose them to discovery-oriented research.

### Hours & Format

#### Summer:

6 weeks - 3 hours of lecture and 7.5 hours of laboratory per week  
10 weeks - 1.5 hours of lecture and 4.5 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Ryan

## PLANTBI C107L Principles of Plant Morphology with Laboratory 4 Units

Terms offered: Spring 2019, Fall 2017, Fall 2016

An analysis of the structural diversity of land plants with emphasis on the developmental mechanisms responsible for this variation in morphology and the significance of this diversity in relation to adaptation and evolution.

### Rules & Requirements

**Prerequisites:** Biology 1A-1B

### Hours & Format

**Fall and/or spring:** 15 weeks - 1 hour of lecture, 1 hour of discussion, and 4 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Specht

**Also listed as:** INTEGBI C107L

## PLANTBI C109 Evolution and Ecology of Development 3 Units

Terms offered: Fall 2019, Fall 2018, Fall 2016

From the seahorse's body to the venus flytrap's jaws to the human brain, nature abounds with amazing adaptations. This interdisciplinary course explores how and why such biodiversity evolves as well as what limits diversity. Lectures and case studies will focus on core concepts, recent advances, and integrative approaches, placing special emphasis on the interplay between gene regulatory networks, the environment, and population genetics.

### Objectives & Outcomes

**Student Learning Outcomes:**

- Explain how an interdisciplinary approach involving genetics, development, evolutionary biology, and ecology can be used to understand the processes that generate patterns of biodiversity.

- List and describe major questions, findings, and experimental approaches in the field of ecological and evolutionary developmental biology.
- Discuss biological research using specialized terminology and defend your opinions.
- Critically evaluate and interpret the primary scientific literature.
- Combine factual material with deductive reasoning to propose hypotheses and future research directions

### Rules & Requirements

**Prerequisites:** BIOLOGY 1A and 1B

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

**Instructor:** Blackman

**Also listed as:** INTEGBI C109

## PLANTBI C110L Biology of Fungi with Laboratory 3 Units

Terms offered: Fall 2025, Fall 2024, Fall 2022, Fall 2021

Selected aspects of fungi: their structure, reproduction, physiology, ecology, genetics and evolution; their role in plant disease, human welfare, and industry. Offered even fall semesters.

### Rules & Requirements

**Prerequisites:** Biology 1B

### Hours & Format

**Fall and/or spring:** 15 weeks - 1 hour of lecture and 3 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Bruns, Taylor

**Also listed as:** INTEGBI C110L

## PLANTBI C112 General Microbiology 4 Units

Terms offered: Fall 2025, Summer 2025 10 Week Session, Fall 2024

This course will explore the molecular bases for physiological and biochemical diversity among members of the two major domains, Bacteria and Archaea. The ecological significance and evolutionary origins of this diversity will be discussed. Molecular, genetic, and structure-function analyses of microbial cell cycles, adaptive responses, metabolic capability, and macromolecular syntheses will be emphasized.

### Rules & Requirements

**Prerequisites:** Biology 1A and 1B

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 10 weeks - 5 hours of lecture and 1.5 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Ryan

**Also listed as:** MCELLBI C112

## PLANTBI C112L General Microbiology Laboratory 3 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024

Students will become proficient in basic microbiology research methods and experimental design. The course covers fundamental principles and techniques of the microbiology lab including sterile technique, culturing, and microscopy. Students will learn these methods in the context of two structured, discovery-based research projects: predicting and analyzing the phenotypes of *E. coli* metabolic mutants, and isolating and characterizing bacteria with novel properties from environmental samples. Student will synthesize their results in the format of a Journal of Bacteriology research article and a scientific poster presentation.

### Rules & Requirements

**Prerequisites:** C112 (may be taken concurrently)

### Hours & Format

**Fall and/or spring:** 15 weeks - 4 hours of laboratory and 1 hour of discussion per week

**Summer:** 10 weeks - 6 hours of laboratory and 2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

**Instructors:** Komeili, Traxler

**Also listed as:** MCELLBI C112L

## PLANTBI 113 California Mushrooms 3 Units

Terms offered: Fall 2019, Fall 2017, Fall 2015

This is a hands-on class in identification of macro fungi. Emphasis will be on laboratory work with fresh and dried fungi. Short lectures at the beginning of labs focus on mushroom systematic, collection techniques, and identification. Three weekend field trips are required in addition to the weekly laboratory. Previous course experience with fungi is recommended, but not required. Grades are based on tests and a collection.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of laboratory and 1 hour of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Bruns

## PLANTBI C114 Introduction to Comparative Virology 4 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

This course will provide a comparative overview of virus life cycles and strategies viruses use to infect and replicate in hosts. We will discuss virus structure and classification and the molecular basis of viral reproduction, evolution, assembly, and virus-host interactions. Common features used during virus replication and host cellular responses to infection will be covered. Topics also included are common and emerging virus diseases, their control, and factors affecting their spread.

### Rules & Requirements

**Prerequisites:** Introductory chemistry (Chemistry 1A or 3A-3B or equivalent) and introductory biology (Biology 1A, 1AL, and 1B or equivalent) and general biochemistry (Molecular and Cell Biology C100A or equivalent--preferably completed but may be taken concurrently)

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1.5 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Glaunsinger

**Also listed as:** ESPM C138/MCELLBI C114

## PLANTBI C116 Microbial Diversity 3 Units

Terms offered: Fall 2025, Fall 2024, Fall 2022

This course for upper-division and graduate students will broadly survey myriad types of microbial organisms, both prokaryote and eukaryote, using a phylogenetic framework to organize the concept of "biodiversity." Emphasis will be on the evolutionary development of the many biochemical themes, how they mold our biosphere, and the organisms that affect the global biochemistry. Molecular mechanisms that occur in different lineages will be compared and contrasted to illustrate fundamental biological strategies. Graduate students additionally should enroll in C216, Microbial Diversity Workshop.

### Rules & Requirements

**Prerequisites:** Upper-division standing. C112 or consent of instructor and organic chemistry (may be taken concurrently)

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Coates

**Formerly known as:** 116

**Also listed as:** MCELLBI C116

## PLANTBI 120 Biology of Algae 2 Units

Terms offered: Spring 2024, Spring 2022, Spring 2020

General biology of freshwater and marine algae, highlighting current research and integrating phylogeny, ecology, physiology, genetics, and molecular biology.

### Rules & Requirements

**Prerequisites:** Biology 1A-1B. Concurrent registration in 120L recommended

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Niyogi

## PLANTBI 120L Laboratory for Biology of Algae 2 Units

Terms offered: Spring 2025, Spring 2024, Spring 2022

Laboratories include study of representative types, identification of specimens collected during several field trips, and experiments on development, physiology, and molecular genetics.

### Rules & Requirements

**Prerequisites:** Biology 1A-1B. Must be taken concurrently with 120

### Hours & Format

**Fall and/or spring:** 15 weeks - 4 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

**Instructor:** Niyogi

## PLANTBI 122 Bioenergy and Bioproduction 2 Units

Terms offered: Spring 2024, Spring 2023, Spring 2021

Offers an assessment of global energy supply and demand, addresses the chemistry of climate change, examines the response of plants and microbes to changes in the environment, and emphasizes the role of biology and photosynthesis in offering solutions to related energy and societal problems. Bioenergy is examined from the point-of-view of potential biofuels, including aspects of the biological generation of hydrogen, hydrocarbons, fatty acids, lipids, and bio-oils, polymers and related materials.

### Rules & Requirements

**Prerequisites:** Biology 1A and 1B; Chemistry 3B

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Melis

## PLANTBI C124 The Berkeley Lectures on Energy: Energy from Biomass 3 Units

Terms offered: Fall 2015, Fall 2014, Fall 2013

After an introduction to the different aspects of our global energy consumption, the course will focus on the role of biomass. The course will illustrate how the global scale of energy guides the biomass research. Emphasis will be placed on the integration of the biological aspects (crop selection, harvesting, storage and distribution, and chemical composition of biomass) with the chemical aspects to convert biomass to energy. The course aims to engage students in state-of-the-art research.

### Rules & Requirements

**Prerequisites:** Chemistry 1B or Chemistry 4B, Mathematics 1B, Biology 1A

**Repeat rules:** Course may be repeated for credit under special circumstances: Repeatable when topic changes with consent of instructor.

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Bell, Blanch, Clark, Smit, C. Somerville

**Also listed as:** BIO ENG C181/CHEM C138/CHM ENG C195A

## PLANTBI C134 Genome Organization and Nuclear Dynamics 3 Units

Terms offered: Spring 2025, Spring 2024, Fall 2022

This course focuses on the structure, functions, and dynamics of eukaryotic chromosomes and their organization within cell nuclei. All life on earth relies on genetic information, which is encoded within nucleic acids (DNA and RNA). Most organisms have DNA-based genomes; bacterial and archaeal genomes typically comprise a single circular DNA molecule, while the genomes of most eukaryotes are divided into a variable number of linear DNA molecules. These contiguous DNA strands, along with the associated proteins and other components that contribute to their organization and function, are known as "chromosomes."

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture and 1 hour of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Dernburg, Karpen

**Also listed as:** MCELLBI C134

## PLANTBI 135 Physiology and Biochemistry of Plants 3 Units

Terms offered: Fall 2025, Fall 2024, Fall 2023

A study of physiological and biochemical processes in higher plants, including water relations, ion transport, and hormone physiology; photosynthesis (light utilization and carbon assimilation), nitrogen and sulfur metabolism, and plant-specific biosynthetic pathways.

### Rules & Requirements

**Prerequisites:** Biology 1A-1B

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Melis, Terry

## PLANTBI C136 Advanced Plant Biochemistry 4 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

Students will build on the central metabolic pathways to learn about plant-specific metabolism from a more mechanistic perspective, including photosynthesis, regulation of sugar and starch metabolism, chloroplast-based pathways of inorganic nutrient (nitrogen, sulfur) processing, N<sub>2</sub> fixing in free-living and symbiotic bacteria, polyunsaturated fatty acid and oil biosynthesis and accumulation, secondary metabolism, cell-wall structure and biosynthesis. Instruction will focus on a research-based approach, including retrieving and researching the primary literature, and understanding experimental design in modern plant biochemistry.

### Rules & Requirements

**Prerequisites:** A minimum grade of C- in MCELLBI C100A/CHEM C130, MCELLBI 102, MCELLBI 104, MCELLBI 140, PLANTBI 135, or equivalent

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 1 hour of discussion, and 1 hour of tutorial per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Merchant

**Also listed as:** MCELLBI C117

## PLANTBI C146 Data Science for Biology 3 Units

Terms offered: Spring 2025, Spring 2024, Fall 2022

Biology has become a data science! This lab course aims for student curiosity to drive hands-on case studies and coding projects about biological applications of data science. The course design supports students' development of fundamental and transferable computational and statistical skills for critically thinking about and using data in biology. Ethical considerations are interwoven throughout. This course offers projects with multiple levels of sophistication and complexity, enabling participation for students with varying levels of experience.

**PREREQUISITES:** Biology 1A; Biology 1B (can be taken concurrently); Data C8 or equivalent statistics and programming experience

### Objectives & Outcomes

**Course Objectives:** Students will become empowered to use basic coding approaches to access, work with, and analyze biological data

Students will learn how to appropriately apply statistical tests to biological data

Students will learn how to select and evaluate methods and tools for data analysis

Students will understand how to grapple with the ethical considerations of biological data

### Rules & Requirements

**Prerequisites:** Biology 1A; Biology 1B (can be taken concurrently); Data C8 or equivalent statistics and programming experience

### Hours & Format

**Fall and/or spring:** 15 weeks - 4 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Alternate method of final assessment during regularly scheduled final exam group (e.g., presentation, final project, etc.).

**Instructors:** Brenner, Eisen

**Also listed as:** BIO ENG C146/CMPBIO C146/MCELLBI C146

## PLANTBI C148 Microbial Genomics and Genetics 4 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

Course emphasizes bacterial and archaeal genetics and comparative genomics. Genetics and genomic methods used to dissect metabolic and development processes in bacteria, archaea, and selected microbial eukaryotes. Genetic mechanisms integrated with genomic information to address integration and diversity of microbial processes. Introduction to the use of computational tools for a comparative analysis of microbial genomes and determining relationships among bacteria, archaea, and microbial eukaryotes.

### Rules & Requirements

**Prerequisites:** Molecular and Cell Biology C100A/Chemistry C130 or Molecular and Cell Biology 102

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

### Summer:

8 weeks - 6 hours of lecture and 2 hours of discussion per week  
10 weeks - 5 hours of lecture and 1.5 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Brenner, Taga

**Also listed as:** MCELLBI C148

## PLANTBI 150 Plant Cell Biology 3 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

An introduction to the structure, dynamics, and function of plant cells: organelle structure and development; intracellular trafficking of small and macromolecules; cellular signaling; cell division and specialization.

### Rules & Requirements

**Prerequisites:** Biology 1A-1B

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Luan, Quail

## PLANTBI 160 Plant Molecular Genetics 3 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

A consideration of plant genetics and molecular biology. Topics include principles of genomics and gene functional analysis; regulation of gene expression in response to environmental and developmental stimuli; intercellular and intracellular signaling pathways; and the molecular and genetic basis for the exceptional cellular and developmental strategies adopted by plants.

### Rules & Requirements

**Prerequisites:** Biology 1A-1B

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Fletcher, Daniel Zilberman

## PLANTBI 165 Plant-Microbe Interactions 3 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

This course will cover topics in molecular plant-microbe interactions ranging from how microbes cause disease to how plants defend themselves. A second goal of the course is to engage students in state-of-the-art research in the area of plant-microbe interactions.

### Rules & Requirements

**Prerequisites:** Biology 1A-1B, Statistics 2 or 20 or 131A or Public Health 142. Completion of an upper division plant biology and an upper division microbiology course is recommended

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

**Instructors:** Somerville, Baker, Lewis

## PLANTBI 170 Modern Applications of Plant Biotechnology 2 Units

Terms offered: Spring 2013, Spring 2012, Spring 2010

This course is designed to introduce students to the principles and applications of modern plant biotechnology. Basic concepts of modern agriculture will be reviewed in light of emerging biotechnology applications. Emphasis will be placed on understanding the tools and strategies involved in optimizing plant productivity.

### Rules & Requirements

**Prerequisites:** Biology 1A-1B

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Baker, Somerville

## PLANTBI 177 Communicating Quantitative Information 2 Units

Terms offered: Prior to 2007

This course will cover several aspects of communicating quantitative information, with a primary focus on visualizations for publications, presentations, and posters. Other topics include sharing of data and analyses, such as new publication models and interactive notebooks, as well as lifecycle data management and publication. Primary discussion will be on conceptual issues, and students will be expected to use various systems and resources as self-directed homestudy.

### Rules & Requirements

**Prerequisites:** Instructor Approval

### Hours & Format

**Fall and/or spring:** 15 weeks - 1.5 hours of seminar and 1.5 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

**Instructor:** Brenner

## PLANTBI 180 Environmental Plant Biology 2 Units

Terms offered: Fall 2019, Fall 2017, Fall 2015

An integrated and multidisciplinary approach to the study of interactions between plants and the environment. Introduces physical parameters in the global and micro-environment that affect plant function; and molecular, cellular, and developmental aspects of plant response to suboptimal/adverse conditions. Underlying biochemistry, physiology, and molecular biology of plant adaptation and acclimation mechanisms. Examines consequences of industrial activity on plant growth and productivity.

### Rules & Requirements

**Prerequisites:** Biology 1A-1B

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Terry

## PLANTBI 185 Techniques in Light Microscopy 3 Units

Terms offered: Fall 2023, Fall 2022, Fall 2021

The course will be a detailed overview of the practice of light microscopy as applied to scientific investigation. The emphasis of the course will be on the correct and appropriate use of the light microscope for biological scientists; however students of other disciplines are welcome. The course will cover optical microscope theory, microscope components and mechanics, and optical techniques including detailed descriptions, demonstrations, and use of all the modern light microscope contrast methods. Students will receive hands-on experience in all microscope and digital imaging techniques via direct instruction and use of instrumentation in the College of Natural Resources Biological Imaging Facility.

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 3 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Ruzin

## PLANTBI 190 Special Topics in Plant and Microbial Biology 1 - 4 Units

Terms offered: Summer 2014 Second 6 Week Session, Spring 2012, Spring 2011

This class is designed to develop skills in critical analysis of specific plant and/or microbial biology issues. Topics may vary from semester to semester.

### Rules & Requirements

**Prerequisites:** Upper division standing or consent of instructor

**Repeat rules:** Course may be repeated for credit when topic changes.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture per week

### Summer:

6 weeks - 3-10 hours of lecture per week

8 weeks - 2-8 hours of lecture per week

10 weeks - 1.5-6 hours of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

## PLANTBI C192 Molecular Approaches to Environmental Problem Solving 2 Units

Terms offered: Fall 2020, Spring 2019, Fall 2018

Seminar in which students consider how modern biotechnological approaches, including recombinant DNA methods, can be used to recognize and solve problems in the area of conservation, habitat and endangered species preservation, agriculture and environmental pollution. Students will also develop and present case studies of environmental problems solving using modern molecular methods.

### Rules & Requirements

**Prerequisites:** Junior or senior standing in the Genetics and Plant Biology or Microbial Biology major, or consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Lindow

**Formerly known as:** Environ Sci, Policy, and Management 192

**Also listed as:** ESPM C192

## PLANTBI H196 Honors Research - Plant and Microbial Biology 4 Units

Terms offered: Fall 2016, Spring 2016, Fall 2015

Supervised independent honors research specific to aspects of the plant and microbial biology major, followed by an oral presentation and a written report. Honors students must complete two semesters of research.

### Rules & Requirements

**Prerequisites:** Upper division standing and minimum GPA. See College of Natural Resources Honors website for current minimum GPA. [http://nature.berkeley.edu/site/honors\\_program.php](http://nature.berkeley.edu/site/honors_program.php)

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-4 hours of independent study per week

**Summer:** 8 weeks - 1.5-7.5 hours of independent study per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

## PLANTBI 198 Directed Group Studies in Plant Biology 1 - 3 Units

Terms offered: Spring 2025, Fall 2024, Spring 2024

Group studies of selected topics.

### Rules & Requirements

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-3 hours of directed group study per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

## PLANTBI 199 Supervised Independent Study and Research 1 - 4 Units

Terms offered: Spring 2023, Fall 2021, Fall 2020

Enrollment restrictions apply; see the Introduction to Courses and Curricula section of this catalog.

### Rules & Requirements

**Prerequisites:** Consent of instructor; overall GPA of 3.0

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 0 hours of independent study per week

### Summer:

6 weeks - 1-3 hours of independent study per week

8 weeks - 1-3 hours of independent study per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

## PLANTBI 199S Sponsored Projects for Undergraduate Research (SPUR) 1 - 4 Units

Terms offered: Prior to 2007

The Sponsored Projects for Undergraduate Research (SPUR) program helps students get involved in research projects with world renowned faculty and staff researchers in the Rausser College of Natural Resource

### Hours & Format

**Fall and/or spring:** 15 weeks - 3-12 hours of laboratory per week

**Summer:** 12 weeks - 5-18 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Alternative to final exam.

## PLANTBI 200A Plant Developmental Genetics 1.5 Unit

Terms offered: Fall 2025, Fall 2024, Fall 2023

The students will be provided with both the basic framework and current topics of plant developmental genetics.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 5 weeks - 4 hours of lecture and 2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** Hake

## PLANTBI 200B Genomics and Computational Biology 1.5 Unit

Terms offered: Fall 2025, Fall 2024, Fall 2023

Principles of computational and genomic biology. Covers evolutionary, algorithmic, and statistical foundations of sequence analysis, allowing students to understand concepts underlying modern computational methods. Practical applications will be pursued in student-coordinated sessions. Combined lecture with 220B.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 5 weeks - 4 hours of lecture and 2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** Freeling

## PLANTBI 200C Plant Diversity and Evolution 1.5 Unit

Terms offered: Fall 2025, Fall 2024, Fall 2023

This course will introduce the students to the diversity of plant form and function and provide them with a basic understanding of the tools and techniques used to study plant diversification and evolution. Molecular and morphological data will be discussed and plant diversity will be introduced at molecular, population, organismal, and ecological levels.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 5 weeks - 4 hours of lecture and 2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** Blackman

## PLANTBI 200D Plant Cell Biology 1.5 Unit

Terms offered: Spring 2025, Spring 2024, Spring 2023

The course will describe the conceptual framework of plant cell biology followed by in-depth discussion of several active areas of research including cell wall biology, membrane transport, cellular trafficking, and cell signaling.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 5 weeks - 4 hours of lecture and 2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** Luan

## PLANTBI 200E Plant Biochemistry 1.5 Unit

Terms offered: Spring 2025, Spring 2024, Fall 2021

The aim of this course is to augment the student's knowledge of key plant-specific (or particularly relevant) biochemical processes focusing on the underlying experiments used to deduce key cycles coupled with current areas of exploration and debate surrounding a given topic area. In addition, this section will broaden and deepen the student's knowledge of biochemistry in general including basic enzyme kinetics, assessment of enzymatic (biochemical) function, and modes of regulation.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 5 weeks - 4 hours of lecture and 2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** Scheller

## PLANTBI 200F Plant-Environment Interactions 1.5 Unit

Terms offered: Spring 2025, Spring 2024, Spring 2023

Students will be provided with both the historical framework and current topics in the molecular mechanisms underlying plant dynamic responses to external signals and stresses.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 5 weeks - 4 hours of lecture and 2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** Harmon

## PLANTBI 201 Faculty Research Review 2 Units

Terms offered: Fall 2025, Fall 2024, Fall 2023

Presentation and discussion of faculty research in the areas of plant and microbial biology. Faculty speakers review recent advances in their area of expertise and present an outlook of current research activities in their laboratories. The format of the class is designed to stimulate a dialogue between instructor and students in the course of each presentation.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

## PLANTBI 202 Faculty Research Review 2 Units

Terms offered: Fall 2025, Fall 2024, Fall 2023

Presentation and discussion of faculty research in the area of microbial biology. Faculty speakers review recent advances in their area of expertise and present an outlook of current research activities in their laboratories. The format of the class is designed to stimulate a dialogue between instructor and students in the course of each presentation.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

## PLANTBI 205A Introduction to Research 2 - 12 Units

Terms offered: Fall 2025, Fall 2024, Fall 2023

Closely supervised experimental work under the direction of an individual faculty member; an introduction to experimental methods and research approaches in particular areas of plant and microbial biology.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 2-12 hours of independent study per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade. This is part one of a year long series course. A provisional grade of IP (in progress) will be applied and later replaced with the final grade after completing part two of the series.

## PLANTBI 205B Introduction to Research 2 - 12 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

Closely supervised experimental work under the direction of an individual faculty member; an introduction to experimental methods and research approaches in particular areas of plant and microbial biology.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 2-12 hours of independent study per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade. This is part two of a year long series course. Upon completion, the final grade will be applied to both parts of the series.

## PLANTBI 210 Scientific Reasoning and Logic 1 Unit

Terms offered: Spring 2025, Spring 2024, Spring 2023

The objectives of this class are to teach students to critically read and interpret scientific papers. Students will read and discuss strongly and poorly reasoned papers. At the end of the class the student should understand the logic and reasoning which make a paper strong, often classic, contribution.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1 hour of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** Quail

## PLANTBI C216 Microbial Diversity Workshop 1 Unit

Terms offered: Fall 2025, Fall 2024, Fall 2022

This workshop for graduate students will parallel C116, Microbial Diversity, which should be taken concurrently. Emphasis in the workshop will be on review of research literature and formulation of paper pertinent to research in microbial diversity.

### Rules & Requirements

**Prerequisites:** Graduate standing; C112 or consent of instructor and organic chemistry (may be taken concurrently)

### Hours & Format

**Fall and/or spring:** 15 weeks - 1 hour of workshop and 1 hour of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** Coates

**Formerly known as:** Molecular and Cell Biology C216, Plant and Microbial Biology C216

**Also listed as:** MCELLBI C216

## PLANTBI 220A Microbial Genetics 1.5 Unit

Terms offered: Fall 2025, Fall 2024, Fall 2023

The students will learn fundamental principles and advanced techniques in microbial genetics. The use of genetics in deducing biochemical pathways, protein interactions, and signal transduction pathways will be explored through reading and discussion of current and classic papers from the primary literature. Experimental design and interpretation will be the focus of problem sets solved in student-coordinated sessions.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 5 weeks - 4 hours of lecture and 2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** Taga

## PLANTBI 220B Genomics and Computational Biology 1.5 Unit

Terms offered: Fall 2025, Fall 2024, Fall 2023

Principles of computational and genomic biology. Covers evolutionary, algorithmic, and statistical foundations of sequence analysis, allowing students to understand concepts underlying modern computational methods. Practical applications will be pursued in student-coordinated sessions. Combined lecture with 200B.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 5 weeks - 4 hours of lecture and 2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** Grigoriev

## PLANTBI 220C Microbial Diversity and Evolution 1.5 Unit

Terms offered: Fall 2025, Spring 2025, Fall 2024

The students will be provided with both the basic framework and current topics of microbial diversity and evolution.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 5 weeks - 4 hours of lecture and 2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** Brem

## PLANTBI 220D Cell Structure and Function 1.5 Unit

Terms offered: Fall 2025, Spring 2025, Fall 2024

The students will be provided with both the basic framework and current topics of cell structure and function.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 5 weeks - 4 hours of lecture and 2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** Komeili

## PLANTBI 220E Microbial Physiology 1.5 Unit

Terms offered: Spring 2025, Spring 2024, Spring 2023

The students will be provided with both the basic framework and current topics of microbial physiology.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 5 weeks - 4 hours of lecture and 2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** Coates

## PLANTBI 220F Microbial Ecology 1.5 Unit

Terms offered: Spring 2025, Spring 2024, Spring 2023

The students will be provided with both the basic framework and current topics of microbial ecology.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 5 weeks - 4 hours of lecture and 2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** Lindow

## PLANTBI 222 Biochemistry of Biofuels: Concepts and Foundations 1 Unit

Terms offered: Spring 2015, Spring 2014, Spring 2013

This course offers a consideration of genes, enzymes, metabolic pathways and biochemical processes leading to the generation of hydrogen, bio-oils, ethanol, and other biofuels. Discussion of biochemistry is extended to cover product yields and techno-economic analyses of commercial viability of the various biofuel products. Lectures are based on historical and contemporary papers in plant and microbial biochemistry, integrating structure, function and evolution of the molecular, cellular, and organismal levels, and discussing how this knowledge can be applied in the generation of renewable biofuels.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 1 hour of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** Melis

## PLANTBI C224 The Berkeley Lectures on Energy: Energy from Biomass 3 Units

Terms offered: Fall 2015, Fall 2014, Fall 2013

After an introduction to the different aspects of our global energy consumption, the course will focus on the role of biomass. The course will illustrate how the global scale of energy guides the biomass research. Emphasis will be places on the integration of the biological aspects (crop selection, harvesting, storage, and distribution, and chemical composition of biomass) with the chemical aspects to convert biomass to energy. The course aims to engage students in state-of-art research.

### Rules & Requirements

**Prerequisites:** Biology 1A; Chemistry 1B or 4B, Mathematics 1B

**Repeat rules:** Course may be repeated for credit under special circumstances: Repeatable when topic changes with consent of instructor.

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructors:** Bell, Blanch, Clark, Smit, C. Somerville

**Also listed as:** BIO ENG C281/CHEM C238/CHM ENG C295A

## PLANTBI 238 Readings in Environmental Microbiology 1 Unit

Terms offered: Fall 2014, Spring 2014, Fall 2013

Special Topics and Advanced Seminars in Plant Pathology. Seminar/discussion by graduate students of current research in the field of plant pathogenic bacteria.

### Rules & Requirements

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1 hour of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

**Instructor:** Lindow

**Formerly known as:** Environmental Science, Policy, and Management 238A

## PLANTBI C277 Communicating Quantitative Information 2 Units

Terms offered: Fall 2021, Spring 2020, Spring 2019

This course will cover several aspects of communicating quantitative information, with a primary focus on visualizations for publications, presentations, and posters. Other topics include sharing of data and analyses, such as new publication models and interactive notebooks, as well as lifecycle data management and publication. Primary discussion will be on conceptual issues, and students will be expected to use various systems and resources as self-directed homestudy.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1.5 hours of seminar and 1.5 hours of discussion per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** Brenner

**Also listed as:** MCELLBI C277

## PLANTBI 290 Seminar 1 - 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024

Advanced study in various fields of plant biology and microbial biology. Topics will be announced in advance of each semester. Enrollment in more than one section permitted.

### Rules & Requirements

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

#### Fall and/or spring:

8 weeks - 2-4 hours of seminar per week

15 weeks - 1-2 hours of seminar per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

## PLANTBI 292 Research Review in Plant and Microbial Biology 1 Unit

Terms offered: Fall 2025, Spring 2025, Fall 2024

Lectures, reports, and discussions on current research in plant and microbial biology. Sections are operated independently and directed toward different topics.

### Rules & Requirements

**Prerequisites:** Open to properly qualified graduate students with consent of instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of seminar per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

## PLANTBI 296 Graduate Supervised Independent Study 1 - 12 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024

Graduate student independent study under the supervision of a faculty member. Sections are operated independently and directed toward different topics.

### Rules & Requirements

**Prerequisites:** Graduate standing

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-12 hours of independent study per week

### Summer:

6 weeks - 2.5-30 hours of independent study per week

8 weeks - 1.5-22.5 hours of independent study per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

## PLANTBI 297 Grant Writing and Research Presentations 2 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022

Each student will write a grant proposal in three steps: a one page outline, a three-page pre-proposal, and a complete 10-page grant proposal. There will be feedback at each step in the process -- each participant will review the other grant proposals. Some of the scheduled classes will include discussion of the outlines and pre-proposals, and the last class will be organized as a grant panel, with students assigned as primary and secondary reviewers.

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

**Instructor:** McCormick

## PLANTBI 298 Plant Biology Group Studies 1 - 6 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024

Advanced study of research topics which will vary semester to semester. Enrollment in more than one section permitted.

### Rules & Requirements

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-6 hours of colloquium per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** The grading option will be decided by the instructor when the class is offered.

## PLANTBI 299 Graduate Research 1 - 12 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024

Graduate student research.

### Rules & Requirements

**Prerequisites:** Graduate standing

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 0 hours of independent study per week

### Summer:

6 weeks - 1-12 hours of independent study per week

8 weeks - 1-12 hours of independent study per week

### Additional Details

**Subject/Course Level:** Plant and Microbial Biology/Graduate

**Grading:** Letter grade.

## **PLANTBI 375 Workshop on Teaching 2 Units**

Terms offered: Fall 2020, Fall 2019, Fall 2018

Designed for all graduate students. This course has two goals: discussion of questions and problems relating to the GSI's teaching, and learning how to design and execute a whole course. Effective teaching methods will be introduced by experienced GSIs and faculty. Students will participate in reciprocal classroom visits, visitation and critique of faculty lectures, course design, lecture preparation, sample lecture presentation, and discussion of current literature on teaching.

### **Rules & Requirements**

**Prerequisites:** Graduate student status

**Repeat rules:** Course may be repeated for credit up to a total of 4 units.

### **Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

### **Additional Details**

**Subject/Course Level:** Plant and Microbial Biology/Professional course for teachers or prospective teachers

**Grading:** Offered for satisfactory/unsatisfactory grade only.

**Instructors:** Fischer, Kerfeld

## **PLANTBI 602 Individual Study for Graduate Students 1 - 2 Units**

Terms offered: Fall 2025, Spring 2025, Fall 2024

Individual study in consultation with the major field advisor, intended to provide an opportunity for qualified students to prepare for examinations required of Ph.D. candidates

### **Rules & Requirements**

**Prerequisites:** Graduate standing and instructor consent

**Credit Restrictions:** Course does not satisfy unit or residence requirements for doctoral degree.

**Repeat rules:** Course may be repeated for credit with instructor consent.

### **Hours & Format**

**Fall and/or spring:** 15 weeks - 1-2 hours of independent study per week

### **Summer:**

6 weeks - 1-2 hours of independent study per week

8 weeks - 1-2 hours of independent study per week

### **Additional Details**

**Subject/Course Level:** Plant and Microbial Biology/Graduate examination preparation

**Grading:** Offered for satisfactory/unsatisfactory grade only.