

Plant and Microbial Biology

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 21st 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 21st 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 (<http://guide.berkeley.edu/archive/2014-15/undergraduate/degree-programs/genetics-plant-biology>) : BS
Microbial Biology (<http://guide.berkeley.edu/archive/2014-15/undergraduate/degree-programs/microbial-biology>) : BS

Graduate Programs

The department does not offer graduate degrees; however, the following related graduate degrees are administered by graduate groups affiliated with the department:

Microbiology (<http://guide.berkeley.edu/archive/2014-15/graduate/degree-programs/microbiology>) : PhD
Plant Biology (<http://guide.berkeley.edu/archive/2014-15/graduate/degree-programs/plant-biology>) : PhD

Plant and Microbial Biology

PLANTBI 10 Plants, Agriculture, and Society 2 Units

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

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 20 Introduction to the Plant Sciences at Berkeley 1 Unit

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 and 0 hours 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. Alternative to final exam.

Instructor: Feldman

PLANTBI 22 Microbes Make the World Go Around 2 Units

Although often unseen, microbes are everywhere! This course covers the role that microbes, including archaea, bacteria, protists and fungi, play in terrestrial, marine and extreme environments and their effect on the geochemistry of the earth. In addition, we will explore the profound effects of microbes on human and plant health and how microbes have changed the course of human history.

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: Glass

PLANTBI 24 Freshman Seminar 1 Unit

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 required.

PLANTBI 39E Freshman/Sophomore Seminar 2 - 4 Units

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 when topic changes.

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: 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

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

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

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 as topic varies. 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

Freshmen 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 course, and as future science professionals. Restricted to freshmen in the biology scholars program.

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

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. Course may be repeated for credit when topic changes.

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

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

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

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

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

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: 100, 102 or 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.

Instructor: Portnoy

Also listed as: MCELLBI C103/PB HLTH C102

PLANTBI C107L Principles of Plant Morphology with Laboratory 4 Units

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 C110L Biology of Fungi with Laboratory 4 Units

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 - 2 hours of lecture and 6 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

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 - 4.5 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 2 Units

Experimental techniques of microbiology designed to accompany the lecture in C112 and C148. The primary emphasis in the laboratory will be on the cultivation and physiological and genetic characterization of bacteria. Laboratory exercises will include the observation, enrichment, and isolation of bacteria from selected environments.

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 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 not required.

Instructors: Komeili, Taga

Also listed as: MCELLBI C112L

PLANTBI 113 California Mushrooms 3 Units

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

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 per week

Additional Details

Subject/Course Level: Plant and Microbial Biology/Undergraduate

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

Instructors: Glaunsinger, Jackson

Also listed as: ESPM C138/MCELLBI C114

PLANTBI C116 Microbial Diversity 3 Units

This course for upper-division and graduate students will broadly survey myriad types of microbial organisms, both procaryote and eucaryote, 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

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; Integrative Biology 101 recommended. Must be taken concurrently with 120L

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

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; Integrative Biology 101 recommended. 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 2 Units

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.

Instructors: Melis, Pauly

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

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: 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 Chromosome Biology/Cytogenetics 3 Units

Survey of behavior, structure, and function of chromosomes with emphasis on behavior in model organisms. Topics include mitosis, meiosis, chromosome aberrations, genome function, dosage compensation, transposons, repetitive DNA, and modern cytological imaging.

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: Cande, Karpen

Also listed as: MCELLBI C134

PLANTBI 135 Physiology and Biochemistry of Plants 3 Units

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 142 Plant Genomics and Bioinformatics 2 Units

This course is designed as a companion course to Plant and Microbial Biology C144L and will equip students with the minimal skills required to use the main bioinformatics web servers and databases. Each lecture will present one or more web servers or databases and explain how to use that web server as part of a protein function or structure prediction/analysis.

Rules & Requirements

Prerequisites: Any lower division biology class. Genetics and Plant Biology majors in the Plant Genetics, Genomics, and Bioinformatics concentration must take this course concurrently with Plant and Microbial Biology C144L in order to receive credit toward the major

Hours & Format

Fall and/or spring: 15 weeks - 1 hour 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: Sjolander

PLANTBI C144 Introduction to Protein Informatics 4 Units

This course will introduce students to the fundamentals of molecular biology, and to the bioinformatics tools and databases used for the prediction of protein function and structure. It is designed to impart both a theoretical understanding of popular computational methods, as well as some experience with protein sequence analysis methods applied to real data. This class includes no programming, and no programming background is required.

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: Sjolander

Also listed as: BIO ENG C144

PLANTBI C144L Protein Informatics Laboratory 3 Units

This course is intended to introduce students to a variety of bioinformatics techniques that are used to predict protein function and structure. It is designed to be taken concurrently with C144 (which provides the theoretical foundations for the methods used in the laboratory class), although students can petition to take this laboratory course separately. No programming is performed in this class, and no prior programming experience is required.

Rules & Requirements

Prerequisites: Bioengineering C144/Plant and Microbial Biology C144

Hours & Format

Fall and/or spring: 15 weeks - 9 hours of laboratory and 1 hour of lecture per week

Additional Details

Subject/Course Level: Plant and Microbial Biology/Undergraduate

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

Instructor: Sjolander

Also listed as: BIO ENG C144L

PLANTBI C148 Microbial Genomics and Genetics 4 Units

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

Additional Details

Subject/Course Level: Plant and Microbial Biology/Undergraduate

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

Instructors: Brenner, Glass

Formerly known as: Plant and Microbial Biology 118

Also listed as: MCELLBI C148

PLANTBI 150 Plant Cell Biology 3 Units

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, Sung

PLANTBI 160 Plant Molecular Genetics 3 Units

A consideration of plant genetics and molecular biology. Principles of nuclear and organellar genome structure and function: regulation of gene expression in response to environmental and developmental stimuli; clonal analysis; investigation of the molecular and genetic bases 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 per week

Additional Details

Subject/Course Level: Plant and Microbial Biology/Undergraduate

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

Instructors: Fischer, Fletcher

PLANTBI 165 Plant-Microbe Interactions 3 Units

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 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

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 180 Environmental Plant Biology 2 Units

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

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

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 as topic varies. 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 - 2.5-10 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

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
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

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

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
Group studies of selected topics.

Rules & Requirements

Prerequisites: Consent of instructor

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

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
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. Course may be repeated for credit when topic changes.

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 200A Plant Developmental Genetics 1.5 Unit

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

Additional Details

Subject/Course Level: Plant and Microbial Biology/Graduate

Grading: Letter grade.

Instructor: Brenner

PLANTBI 200C Plant Diversity and Evolution 1.5 Unit

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

Additional Details

Subject/Course Level: Plant and Microbial Biology/Graduate

Grading: Letter grade.

Instructor: Specht

PLANTBI 200D Plant Cell Biology 1.5 Unit

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 - 3 hours of lecture and 1.5 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

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

Additional Details

Subject/Course Level: Plant and Microbial Biology/Graduate

Grading: Letter grade.

Instructor: Scheller

PLANTBI 200F Plant Systems Biology 1.5 Unit

The aim of this course is to highlight the specific hallmarks of systems biology. Students will be informed of the many resources for systems biology available to plant biologists and the recent published work that capitalizes on these resources. Each lecture will focus on fundamental principles followed by discussion of papers that are germane to the topic.

Rules & Requirements

Prerequisites: Consent of instructor

Hours & Format

Fall and/or spring: 5 weeks - 3 hours of lecture and 1.5 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

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

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 210 Scientific Reasoning and Logic 1 Unit

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

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

Also listed as: MCELLBI C216

PLANTBI 220A Microbial Genetics 1.5 Unit

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 - 3 hours of lecture and 1.5 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

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

Additional Details

Subject/Course Level: Plant and Microbial Biology/Graduate

Grading: Letter grade.

Instructor: Brenner

PLANTBI 220C Microbial Diversity and Evolution 1.5 Unit

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

Additional Details

Subject/Course Level: Plant and Microbial Biology/Graduate

Grading: Letter grade.

Instructor: Taylor

PLANTBI 220D Cell Structure and Function 1.5 Unit

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 - 3 hours of lecture and 1.5 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

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 - 3 hours of lecture and 1.5 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

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 - 3 hours of lecture and 1.5 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

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

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: 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
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. Course may be repeated for credit when topic changes.

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 C244 Introduction to Protein Informatics 4 Units
This course will introduce students to the fundamentals of molecular biology, and to the bioinformatics tools and databases used for the prediction of protein function and structure. It is designed to impart both a theoretical understanding of popular computational methods, as well as some experience with protein sequence analysis methods applied to real data. This class includes no programming, and no programming background required.

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/Graduate

Grading: Letter grade.

Instructor: Sjolander

Also listed as: BIO ENG C244

PLANTBI C244L Protein Informatics Laboratory 3 Units

This course is intended to introduce students to a variety of bioinformatics techniques that are used to predict protein function and structure. It is designed to be taken concurrently with C244 (which provides the theoretical foundations for the methods used in the laboratory class), although students can petition to take this laboratory course separately. No programming is performed in this class, and no prior programming experience is required.

Rules & Requirements

Prerequisites: Bioengineering C244/Plant and Microbial Biology C244

Hours & Format

Fall and/or spring: 15 weeks - 9 hours of laboratory and 1 hour of lecture per week

Additional Details

Subject/Course Level: Plant and Microbial Biology/Graduate

Grading: Letter grade.

Instructor: Sjolander

Also listed as: BIO ENG C244L

PLANTBI 290 Seminar 1 - 2 Units
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. Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 15 weeks - 1-2 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
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. Course may be repeated for credit when topic changes.

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
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
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. Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 15 weeks - 1-6 hours of lecture 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
Graduate student research.

Rules & Requirements

Prerequisites: Graduate standing

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

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
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 a maximum of 4 units. Course may be repeated for a maximum 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.

Formerly known as: Plant and Microbial Biology 300

PLANTBI 602 Individual Study for Graduate Students 1 - 8 Units

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

Rules & Requirements

Prerequisites: Graduate standing

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

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

Hours & Format

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

Summer:

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

8 weeks - 1-8 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.

PLANTBI S602 Individual Study for Graduate Students 1 - 6 Units

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

Rules & Requirements

Prerequisites: Graduate standing

Hours & Format

Summer: 8 weeks - 0 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.