Plant & 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 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 wil 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 explores 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.