

# Plant Biology

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The Graduate Program in Plant Biology is designed to train students in modern research areas of plant biology. Students' courses of study are designed individually, in light of their interests and career goals. The graduate program features an introductory seminar (Faculty Research Review), six five-week core course modules, and additional special topic courses and seminars in areas of faculty specialties. The department has research expertise in the following areas: molecular, cellular, genetic, biochemical, physiological, developmental, and structural biology, and plant-microbe interactions. The core courses cover plant developmental genetics, genomics and computational biology, plant diversity and evolution, plant cell biology, plant biochemistry, and plant systems biology.

## Admission to the University

### Minimum Requirements for Admission

The following minimum requirements apply to all graduate programs and will be verified by the Graduate Division:

1. A bachelor's degree or recognized equivalent from an accredited institution;
2. A grade point average of B or better (3.0);
3. If the applicant comes from a country or political entity (e.g., Quebec) where English is not the official language, adequate proficiency in English to do graduate work, as evidenced by a TOEFL score of at least 90 on the iBT test, 570 on the paper-and-pencil test, 230 on the computer-based test, or an IELTS Band score of at least 7 (note that individual programs may set higher levels for any of these); and
4. Sufficient undergraduate training to do graduate work in the given field.

### Applicants Who Already Hold a Graduate Degree

The Graduate Council views academic degrees not as vocational training certificates but as evidence of broad training in research methods, independent study, and articulation of learning. Therefore, applicants who already have academic graduate degrees should be able to pursue new subject matter at an advanced level without need to enroll in a related or similar graduate program.

Programs may consider students for an additional academic master's or professional master's degree only if the additional degree is in a distinctly different field.

Applicants admitted to a doctoral program that requires a master's degree to be earned at Berkeley as a prerequisite (even though the applicant already has a master's degree from another institution in the same or a closely allied field of study) will be permitted to undertake the second master's degree, despite the overlap in field.

The Graduate Division will admit students for a second doctoral degree only if they meet the following guidelines:

1. Applicants with doctoral degrees may be admitted for an additional doctoral degree only if that degree program is in a general area of knowledge distinctly different from the field in which they earned their original degree. For example, a physics PhD could be admitted

to a doctoral degree program in music or history; however, a student with a doctoral degree in mathematics would not be permitted to add a PhD in statistics.

2. Applicants who hold the PhD degree may be admitted to a professional doctorate or professional master's degree program if there is no duplication of training involved.

Applicants may apply only to one single degree program or one concurrent degree program per admission cycle.

Any applicant who was previously registered at Berkeley as a graduate student, no matter how briefly, must apply for readmission, not admission, even if the new application is to a different program.

## Required Documents for Applications

1. **Transcripts:** Applicants may upload *unofficial* transcripts with your application for the departmental initial review. *If the applicant is admitted*, then *official* transcripts of all college-level work will be required. Admitted applicants must request a current transcript from every post-secondary school attended, including community colleges, summer sessions, and extension programs. Official transcripts must be in sealed envelopes as issued by the school(s) attended.

If you have attended Berkeley, upload your unofficial transcript with your application for the departmental initial review. *If you are admitted*, an official transcript with evidence of degree conferral *will not* be required.

2. **Letters of recommendation:** Applicants may request online letters of recommendation through the online application system. Hard copies of recommendation letters must be sent directly to the program, not the Graduate Division.
3. **Evidence of English language proficiency:** All applicants from countries or political entities in which the official language is not English are required to submit official evidence of English language proficiency. This applies to applicants from Bangladesh, Burma, Nepal, India, Pakistan, Latin America, the Middle East, the People's Republic of China, Taiwan, Japan, Korea, Southeast Asia, most European countries, and Quebec (Canada). However, applicants who, at the time of application, have already completed at least one year of full-time academic course work with grades of B or better at a US university may submit an official transcript from the US university to fulfill this requirement. The following courses will not fulfill this requirement: 1) courses in English as a Second Language, 2) courses conducted in a language other than English, 3) courses that will be completed after the application is submitted, and 4) courses of a non-academic nature. If applicants have previously been denied admission to Berkeley on the basis of their English language proficiency, they must submit new test scores that meet the current minimum from one of the standardized tests.

## Where to Apply

Visit the Berkeley Graduate Division application page (<http://grad.berkeley.edu/admissions/apply>).

## Admission to the Program

Prospective students for the graduate program in plant biology are expected to demonstrate academic excellence and potential for independent scientific research. Students are expected to have a basic background in chemistry, physics, mathematics, and biology equivalent to those in the undergraduate program. An admissions

committee composed of nine to ten members of the department will review applications and make recommendations to the full department on admissions matters. Recommendations for admission will be based on a demonstration of academic excellence and potential for independent scientific research as shown by grades in university-level undergraduate and graduate courses, letters of recommendation, written statements of academic and professional goals, and other evidence of academic accomplishment. Scores on standardized tests, such as the Graduate Record Examination (GRE), will be required of all applicants. Students seeking detailed information about matters such as admission, curriculum, and courses of financial support should contact the student affairs adviser or the graduate adviser.

## Normative Time Requirements

### Normative Time to Advancement

Normative time to advancement to PhD candidacy is two years.

#### Year 1

Students perform three laboratory rotations in order to explore areas of research interest and identify a faculty mentor, dissertation project, and laboratory. Students undertake required core classes and attend seminars of interest.

#### Year 2

Students attend seminars, perform their first teaching assignment, and prepare for the PhD qualifying exam which consists of two research proposals and an oral examination. With the successful passing of the qualifying exam, students select a dissertation committee and advance to candidacy for the PhD degree prior to the start of the fifth semester.

### Normative Time in Candidacy

#### Years 3–5/5.5

Students attend seminars of interest and perform their second teaching assignment. Students conduct original laboratory research for the PhD dissertation with the guidance of their faculty mentor and a self-selected 3 to 4 person dissertation committee. Students are required to meet annually with the dissertation committee. Students write the dissertation based on the results of their research. Upon approval of the dissertation by the dissertation committee and Graduate Division, students are awarded the doctorate. There is no formal defense of the completed dissertation; however, students are expected to publicly present a talk about their research in the final year.

### Total Normative Time

Total normative time to degree is 5–5.5 years.

## Time to Advancement

### Curriculum

#### Courses Required

|              |                                    |     |
|--------------|------------------------------------|-----|
| PLANTBI 200A | Plant Developmental Genetics       | 1.5 |
| PLANTBI 200B | Genomics and Computational Biology | 1.5 |
| PLANTBI 200C | Plant Diversity and Evolution      | 1.5 |
| PLANTBI 200D | Plant Cell Biology                 | 1.5 |
| PLANTBI 200E | Plant Biochemistry                 | 1.5 |
| PLANTBI 200F | Plant-Environment Interactions     | 1.5 |
| PLANTBI 201  | Faculty Research Review            | 2   |
| PLANTBI 210  | Scientific Reasoning and Logic     | 1   |

|             |                              |      |
|-------------|------------------------------|------|
| PLANTBI 290 | Seminar (or equivalent)      | 2    |
| PLANTBI 299 | Graduate Research (multiple) | 1-12 |
| PLANTBI 298 | Plant Biology Group Studies  | 1-6  |
| PLANTBI 375 | Workshop on Teaching         | 2    |

## Professional Development

### Research Presentations

All plant biology graduate students attend the Plant and Microbial Biology (PMB) department retreat at least once during their graduate studies. Students are encouraged to attend both the Plant and Microbial Biology department retreat and the Graduate Group in Microbiology retreat and present their research. Students are highly encouraged to present during the PMB department student/post-doc seminar series. They are also encouraged to attend national and international conferences to present research.

### Teaching

Plant biology graduate students are required to teach two semesters. Students are required to teach in two distinctly different classroom settings; specifically, teaching in a large enrollment course (100+) and a small upper division, lab, or low enrollment (< 100) course.

### Grant Writing

Students are encouraged to take PLANTBI 297.

## Plant Biology

PLANTBI 200A Plant Developmental Genetics 1.5 Unit

Terms offered: Fall 2017, Fall 2016, Fall 2015

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: Spring 2017, Spring 2016, Spring 2015

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: Spring 2017, Spring 2016, Spring 2015

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: Fall 2017, Fall 2016, Fall 2015

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: Fall 2017, Fall 2016, Fall 2015

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 2017, Spring 2016, Spring 2015

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 2017, Fall 2016, Fall 2015

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 2017, Fall 2016, Fall 2015

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 2017, Fall 2016

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:** 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 2017

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: Fall 2017, Fall 2016, Fall 2015

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 2017, Fall 2016, Fall 2015

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**

Terms offered: Fall 2017, Fall 2016, Fall 2015

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: Spring 2017, Spring 2016, Spring 2015

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: Spring 2017, Spring 2016, Spring 2015

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 2017, Fall 2016, Fall 2015

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: Fall 2017, Fall 2016, Fall 2015

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 2017, Spring 2016, Spring 2015

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 2016, Spring 2015, Spring 2014

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 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-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**

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. 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 290 Seminar 1 - 2 Units**

Terms offered: Fall 2017, Spring 2017, Fall 2016

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:**

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 2017, Spring 2017, Fall 2016

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 when topic changes.

**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 2014, Spring 2014, Fall 2013

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**

Terms offered: Spring 2017, Spring 2016, Spring 2015

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 2017, Spring 2017, Fall 2016

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 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 2017, Summer 2017 8 Week Session, Spring 2017  
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**

Terms offered: Fall 2017, Fall 2016, Fall 2015

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.

**Instructors:** Fischer, Kerfeld

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

Terms offered: Fall 2017, Spring 2017, Fall 2016

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. Course may be repeated for credit when topic changes.

**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.



**PLANTBI S602 Individual Study for Graduate Students 1 - 6 Units**

Terms offered: Prior to 2007

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.