

Plant Biology

(Interdepartmental Graduate Major)

The Interdepartmental Plant Biology major (IPB) coordinates graduate education and research in the areas of plant biology including but not limited to plant biochemistry, plant cellular and molecular biology and plant physiology. Graduate study in IPB, leading to the M.S. and Ph.D. Degrees, is offered through eight participating departments: Agronomy, Biochemistry, Biophysics & Molecular Biology, Chemical and Biological Engineering, Chemistry, Ecology, Evolution and Organismal Biology, Genetics Development & Cell Biology, Horticulture, and Plant Pathology.

Research conducted by the faculty and students of the major represents both basic and applied aspects of plant physiology, biochemistry and molecular biology. The experimental approaches represented in the major span the range of complexity from molecular studies, to cellular, organismal and the ecological level (crop monocultures and natural populations). Graduates have a broad understanding of basic, functional plant biology with emphases on fundamental biology, biochemistry, and molecular biology. They are able to address complex research and policy problems in agriculture, biotechnology, and basic plant biology.

All M.S. candidates take a core curriculum comprising courses recommended from the following four categories, attend research seminars, research credits (PLBIO 699 Research), annual Loomis Distinguished Lecture in Plant Biology and mini-symposium and retreats. Students will take additional courses of interest as directed by their Program of Study (POS) Committee members.

A total of 36 credits including a minimum of 16 course credits are required for a M.S.

(1) Complete the following core courses:

STAT 401	Statistical Methods for Research Workers	4
BBMB 404	Biochemistry I	3-4
or BBMB 501	Comprehensive Biochemistry I	
GDCB 513	Plant Metabolism	2
Two seminar presentations *		
One of the following		
GDCB 512	Plant Growth and Development	
GDCB 529	Plant Cell Biology	
Take additional courses from the following		
AGRON 516	Crop Physiology	
AGRON 527	Plant Genetics	
AGRON/HORT/ NREM 529	Publishing in Biological Sciences Journals	
AGRON 616	Advanced Topics in Plant Physiology and Biochemistry	
AGRON 625	Genetic Strategies in Plant Breeding	
BBMB 405	Biochemistry II	
BBMB 502	Comprehensive Biochemistry II	
BBMB 607	Plant Biochemistry	
BBMB 645	Molecular Signaling	
BBMB 660	Membrane Biochemistry	
BBMB 675	Nucleic Acid Structure and Function	
BBMB 676	Biochemistry of Gene Expression in Eucaryotes	
BCB 596	Genomic Data Processing	
BIOL 454	Plant Anatomy	
BIOL 474	Plant Ecology	
EEOB 563	Molecular Phylogenetics	
EEOB 566	Molecular Evolution	
GDCB 510	Transmission Genetics	
EEOB 553	Agrostology	
GDCB 511	Molecular Genetics	
GDCB 512	Plant Growth and Development	
GDCB 528	Advances in Molecular Cell Biology	
GDCB 529	Plant Cell Biology	
GDCB 545	Plant Molecular Biology	
GDCB 679	Light Microscopy	

GDCB 680	Scanning Electron Microscopy
GDCB 681	Transmission Electron Microscopy

- * enroll each term in the Interdepartmental Plant Biology seminar PLBIO 696 Research Seminar or its listed equivalent. The first seminar must be during the student's first year and is a 20-minute seminar. The last presentation must be an exit seminar.

All Ph.D. candidates take a core curriculum comprising courses recommended from the following four categories, attend research seminars, research credits (PLBIO 699 Research), annual Loomis Distinguished Lecture in Plant Biology and mini-symposium and retreats. Students will take additional courses of interest as directed by their Program of Study (POS) Committee members.

A total of 72 credits including a minimum of 24 course credits are required for a Ph.D.

STAT 401	Statistical Methods for Research Workers	4
BBMB 404	Biochemistry I	3-4
or BBMB 501	Comprehensive Biochemistry I	
GDCB 513	Plant Metabolism	2

Four seminar presentations *

One of the following

BBMB 405	Biochemistry II
BBMB 502	Comprehensive Biochemistry II
GDCB 511	Molecular Genetics
GDCB 545	Plant Molecular Biology

One of the following

GDCB 512	Plant Growth and Development
GDCB 529	Plant Cell Biology

Take additional courses from the following

AGRON 516	Crop Physiology
AGRON 527	Plant Genetics
AGRON/HORT/ NREM 529	Publishing in Biological Sciences Journals
AGRON 616	Advanced Topics in Plant Physiology and Biochemistry
AGRON 625	Genetic Strategies in Plant Breeding
BBMB 405	Biochemistry II
BBMB 502	Comprehensive Biochemistry II
BBMB 607	Plant Biochemistry
BBMB 645	Molecular Signaling
BBMB 660	Membrane Biochemistry
BBMB 675	Nucleic Acid Structure and Function
BBMB 676	Biochemistry of Gene Expression in Eucaryotes
BCB 596	Genomic Data Processing
BIOL 454	Plant Anatomy
BIOL 474	Plant Ecology
EEOB 563	Molecular Phylogenetics
EEOB 566	Molecular Evolution
GDCB 510	Transmission Genetics
GDCB 511	Molecular Genetics
GDCB 512	Plant Growth and Development
GDCB 528	Advances in Molecular Cell Biology
GDCB 529	Plant Cell Biology
GDCB 545	Plant Molecular Biology
GDCB 679	Light Microscopy
GDCB 680	Scanning Electron Microscopy
GDCB 681	Transmission Electron Microscopy

- * enroll each term in the Interdepartmental Plant Biology seminar PLBIO 696 Research Seminar or its listed equivalent. The first seminar must be during the student's first year and is a 20-minute seminar. The last presentation must be an exit seminar.

Requirements for students seeking Plant Biology as Minor:

STAT 401	Statistical Methods for Research Workers	4
BBMB 404	Biochemistry I	3
BBMB 501	Comprehensive Biochemistry I	4

9 credits from the following

AGRON 516	Crop Physiology
AGRON 527	Plant Genetics
BBMB 607	Plant Biochemistry
GDCB 512	Plant Growth and Development
GDCB 513	Plant Metabolism
GDCB 529	Plant Cell Biology
GDCB 545	Plant Molecular Biology

In addition to the required core courses, a wide selection of courses is available to IPB graduate students for broadening their scientific education. Decisions about which courses are taken and when they are taken are made by the student, initially in consultation with his or her temporary advisor, and then with his or her major advisor and eventually with the POS Committee, which also serves as the Thesis or Dissertation Committee.

Courses primarily for graduate students, open to qualified undergraduates:

PLBIO 512. Plant Growth and Development.

(Cross-listed with MCDB, GDCB). (2-0) Cr. 2. S. *Prereq: BIOL 330 or a course in developmental biology; GDCB 545 or BBMB 404, BBMB 405 or GDCB 520*
Plant growth and development and its molecular genetic regulation. Hormone biosynthesis, metabolism, and action. Signal transduction in plants.

PLBIO 513. Plant Metabolism.

(Cross-listed with GDCB). (2-0) Cr. 2. F. *Prereq: BIOL 330, PHYS 111, CHEM 331; one semester of biochemistry recommended*
Photosynthesis, respiration, and other aspects of plant metabolism.

PLBIO 545. Plant Molecular Biology.

(Cross-listed with MCDB, GDCB). (3-0) Cr. 3. Alt. F., offered 2011. *Prereq: BIOL 314, BIOL 330*
Organization and function of plant nuclear and organelle DNA; regulation of gene expression. Methods of generating novel genetic variation. Impact of plant biotechnology on agriculture.

Courses for graduate students:

PLBIO 696. Research Seminar.

(Cross-listed with AGRON, BBMB, GDCB, HORT, FOR). Cr. 1. Repeatable. F.S.
Research seminars by faculty and graduate students. Offered on a satisfactory-fail basis only.

PLBIO 699. Research.

Cr. arr. Repeatable.