

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.

M.S. Program

A total of 36 credits, which includes a minimum of 16 course credits and at least a B grade or better, are required for an M.S.

All M.S. candidates take a core curriculum comprising courses recommended from the following four categories, attend research seminars (PLBIO 696), take research credits (PLBIO 699 Research), and attend the annual Loomis Distinguished Lecture and mini-symposium and retreats. Students will take additional courses of interest as directed by their Program of Study (POS) Committee members.

Required: Complete the following core courses:

STAT 587	Statistical Methods for Research Workers	4
BBMB 316	Principles of Biochemistry	3-6
or BBMB 404 & BBMB 405	Biochemistry I and Biochemistry II	
or BBMB 504 & BBMB 505	Amino Acids and Proteins and Bioenergetics and Metabolism	
GDCB 513	Plant Metabolism	2
GDCB 545	Plant Molecular, Cell and Developmental Biology	3
GR ST 565	Responsible Conduct of Research in Science and Engineering	1
PLBIO 696	Research Seminar *	1
PLBIO 699	Research	arr †

Optional Courses

AGRON 516	Crop Physiology
AGRON 625	Genetic Strategies in Plant Breeding
BBMB 531	Plant Biochemistry
BBMB 545	Molecular Signaling
BBMB 675	Nucleic Acid Structure and Function
BIOL 454	Plant Anatomy
BIOL 474	Plant Ecology
EEOB 553	Agrostology
EEOB 563	Molecular Phylogenetics
EEOB 566	Molecular Evolution
GDCB 510	Transmission Genetics
GDCB 511	Advanced Molecular Genetics
GDCB 528	Advances in Molecular Cell Biology
STAT 581	Analysis of Gene Expression Data for the Biological Sciences

† Arranged with instructor.

* Required enrollment each semester; must present 2 talks; a maximum of 2 credits of 696 seminars are counted toward MS degree POSC. Make two seminar presentations and enroll each term in the Interdepartmental Plant Biology seminar PLBIO 696 Research Seminar. 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. In addition to the required core courses, a wide selection of courses is available to IPB graduate students for broadening their scientific education, and increasing knowledge in topics related to their research. Decisions about which courses are taken and when they are taken are made by the student, initially in consultation with their temporary advisor, and then with their major advisor and eventually with POS Committee, which also serves as the Thesis or Dissertation Committee.

Ph.D. Program

A total of 72 credits, which includes a minimum of 24 course credits and at least a B grade or higher, are required for a Ph.D.

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.

Required: Complete the following core courses:

STAT 587	Statistical Methods for Research Workers	4
BBMB 316	Principles of Biochemistry	3-6

or BBMB 404 & BBMB 405	Biochemistry I and Biochemistry II	
or BBMB 504 & BBMB 505	Amino Acids and Proteins and Bioenergetics and Metabolism	
GDCB 513	Plant Metabolism	2
GDCB 545	Plant Molecular, Cell and Developmental Biology	3
GR ST 565	Responsible Conduct of Research in Science and Engineering	1
PLBIO 696	Research Seminar *	1
PLBIO 699	Research	arr †

Optional Core Courses: Must take one of the following

GDCB 510	Transmission Genetics
GDCB 511	Advanced Molecular Genetics
EEOB 551	Plant Evolution and Phylogeny
EEOB 566	Molecular Evolution

Optional Courses

AGRON 516	Crop Physiology
AGRON 625	Genetic Strategies in Plant Breeding
BBMB 531	Plant Biochemistry
BBMB 545	Molecular Signaling
BBMB 675	Nucleic Acid Structure and Function
BIOL 454	Plant Anatomy
BIOL 474	Plant Ecology
EEOB 553	Agrostology
EEOB 563	Molecular Phylogenetics
EEOB 566	Molecular Evolution
GDCB 510	Transmission Genetics
GDCB 511	Advanced Molecular Genetics
STAT 581	Analysis of Gene Expression Data for the Biological Sciences

† Arranged with instructor.

* Required enrollment each semester; must present 4 talks; up to 5 credits of 696 seminars are counted toward Ph.D. 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.

In addition to the required core courses, a wide selection of courses is available to IPB graduate students for broadening their scientific education, and increasing knowledge in topics related to their research. Decision about which courses to take and when they are to be taken are made by the student, initially in consultation with their temporary

advisor, and then with their major advisor and eventually with their POS Committee, which also serves as the Thesis or Dissertation Committee.

Requirements for students seeking a Minor in Plant Biology:

Ph.D. and M.S. candidates in other programs who desire a graduate minor in Plant Biology must take the required courses listed below, achieving a grade of B or better. One member of the student's POS committee must have IPB faculty membership.

Prerequisite Courses:

STAT 587	Statistical Methods for Research Workers	4
BBMB 404	Biochemistry I	3

9 credits from the following:

AGRON 516	Crop Physiology
BIOL 454	Plant Anatomy
GDCB 513	Plant Metabolism
GDCB 545	Plant Molecular, Cell and Developmental Biology

Courses primarily for graduate students, open to qualified undergraduates:

PLBIO 513: Plant Metabolism

(Cross-listed with GDCB). (2-0) Cr. 2. Alt. F., offered even-numbered years.

Prereq: BIOL 330, PHYS 131, CHEM 331; one semester of biochemistry recommended

Photosynthesis, respiration, and other aspects of plant metabolism.

PLBIO 545: Plant Molecular, Cell and Developmental Biology

(Cross-listed with GDCB, MCDB). (3-0) Cr. 3. Alt. F., offered odd-numbered years.

Prereq: Biol 313, BIOL 314, BIOL 330 or BBMB 405

Plant nuclear and organelle genomes; regulation of gene expression; hormone signaling; organization, function, and development of plant cells and subcellular structures; regulation of plant growth and development.

Courses for graduate students:

PLBIO 696: Research Seminar

(Cross-listed with AGRON, BBMB, FOR, GDCB, HORT). 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.