

BIOLOGY: PLANT BIOLOGY

Admissions to the Biology: Plant Biology, B.S. named option have been suspended as of fall 2021 and will be discontinued as of fall 2024. If you have any questions, please contact the department.

The **Plant Biology Named Option** allows biology majors to focus their studies on plant science and to have this reflected on their transcript. There are a number of departments at UW–Madison who host plant science–based majors, including agronomy, botany, horticulture, plant pathology, and forest and wildlife ecology. While those specialized majors offer in-depth programs in their disciplines, the Plant Biology Named Option allows students to pursue a course of study within the biology major and explore plant biology at the same time. Students in this option can fulfill their requirements with courses that emphasize various aspects of plant science, including anatomy, physiology, genetics, crop production, disease resistance, and molecular techniques in plant improvement. Students also participate in a one-credit seminar focusing on plant biology.

Who should enroll in this option? Students with broad interest in biological sciences who also want to:

- Prepare for graduate work in a plant science field
- Prepare for advanced study or graduate work in a natural or environmental science field
- Concentrate their studies on the biology of plants

REQUIREMENTS

REQUIREMENTS FOR THE NAMED OPTION

A minimum of 15 credits must be completed in the major that are not used elsewhere. Students must complete a minimum of 31 credits of Biological Science courses within the Introductory Biology, Foundation Course, Upper-Level Breadth in the Major, and Capstone requirements. Unless specifically stated otherwise, courses may not be used to meet multiple requirements of the major.

CORE REQUIREMENTS

Mathematics and Statistics

Code	Title	Credits
Complete one of the following:		5-10
MATH 171 & MATH 217	Calculus with Algebra and Trigonometry I and Calculus with Algebra and Trigonometry II	
MATH 221	Calculus and Analytic Geometry 1	
Complete one of the following:		3-4
MATH 222	Calculus and Analytic Geometry 2	
STAT 301	Introduction to Statistical Methods	

STAT 371	Introductory Applied Statistics for the Life Sciences
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Total Credits 8-14

Chemistry

Code	Title	Credits
General Chemistry (Complete one of the following):		5-10
CHEM 103 & CHEM 104	General Chemistry I and General Chemistry II	
CHEM 109	Advanced General Chemistry	
CHEM 115 & CHEM 116	Chemical Principles I and Chemical Principles II	
Organic Chemistry		
CHEM 343	Organic Chemistry I	3
CHEM 344	Introductory Organic Chemistry Laboratory	2
CHEM 345	Organic Chemistry II	3

Total Credits 13-18

Physics

Code	Title	Credits
First Semester Physics (complete one of the following):		4-5
PHYSICS 103	General Physics	
PHYSICS 201	General Physics	
PHYSICS 207	General Physics	
Second Semester Physics (complete one of the following):		4-5
PHYSICS 104	General Physics	
PHYSICS 202	General Physics	
PHYSICS 208	General Physics	

Total Credits 8-10

Introductory Biology

Code	Title	Credits
Select one of the following options:		10-13
Option A:		
BIOLOGY/ BOTANY/ ZOOLOGY 151	Introductory Biology	
BIOLOGY/ BOTANY/ ZOOLOGY 152	Introductory Biology	
Option B:		
BIOCORE 381	Evolution, Ecology, and Genetics	
BIOCORE 382	Evolution, Ecology, and Genetics Laboratory	
BIOCORE 383	Cellular Biology	
BIOCORE 384	Cellular Biology Laboratory	
BIOCORE 485	Principles of Physiology	
Option C:		
ZOOLOGY/ BIOLOGY 101	Animal Biology	
ZOOLOGY/ BIOLOGY 102	Animal Biology Laboratory	
BOTANY/ BIOLOGY 130	General Botany	

Foundation Course (complete one of the following):

Students may use BIOCORE 381 and BIOCORE 383 toward **both** Introductory Biology **and** Foundation.

Code	Title	Credits
AGRONOMY/ HORT 338	Plant Breeding and Biotechnology	3
BIOCHEM 501	Introduction to Biochemistry	3
BIOCHEM 508	General Biochemistry II	3-4
BIOCORE 381 & BIOCORE 383	Evolution, Ecology, and Genetics and Cellular Biology	6
GENETICS 466	Principles of Genetics	3
GENETICS 468	General Genetics 2	3

UPPER-LEVEL BREADTH IN THE MAJOR

Minimum of 13 credits required and must include **one approved lab course**. Approved lab courses are indicated by footnote. A course taken to meet the Foundation requirement may not also count as an Upper-Level Breadth in the Major course.

- Complete at least two credits from either category A or B.
- Complete at least two credits from either category C or D.
- Complete at least two credits from category E.

A. Cellular and Subcellular Biology

Code	Title	Credits
AGRONOMY/ HORT 338	Plant Breeding and Biotechnology	3
AGRONOMY/ BOTANY/HORT 339	Plant Biotechnology: Principles and Techniques ¹	4
AGRONOMY/ BOTANY/HORT 340	Plant Cell Culture and Genetic Engineering	3
BIOCHEM 501	Introduction to Biochemistry	3
BIOCHEM 507	General Biochemistry I	3
BIOCHEM 508	General Biochemistry II	3-4
BIOCHEM 570	Computational Modeling of Biological Systems	3
BIOCHEM/ BOTANY 621	Plant Biochemistry	3
BOTANY/ENTOM/ PL PATH 505	Plant-Microbe Interactions: Molecular and Ecological Aspects	3
GENETICS 466	Principles of Genetics	3
GENETICS 467	General Genetics 1	3

B. Organismal Biology

Code	Title	Credits
BIOCORE 486	Principles of Physiology Laboratory ¹	2
BOTANY 300	Plant Anatomy ¹	4
BOTANY 305	Plant Morphology and Evolution ¹	4
BOTANY 330	Algae ¹	3
BOTANY/ PL PATH 332	Fungi ¹	4
BOTANY/ PL PATH 333	Biology of the Fungi	2
BOTANY/ F&W ECOL 402	Dendrology ¹	2
BOTANY 500	Plant Physiology ¹	3-4

ENTOM/ ZOOLOGY 302	Introduction to Entomology ¹	4
PL PATH 558	Biology of Plant Pathogens ¹	3

C. Ecology

Code	Title	Credits
AGRONOMY/ BOTANY/ SOIL SCI 370	Grassland Ecology	3
BOTANY/ ZOOLOGY 450	Midwestern Ecological Issues: A Case Study Approach	2
BOTANY/ F&W ECOL 455	The Vegetation of Wisconsin ¹	4
BOTANY/ F&W ECOL/ ZOOLOGY 460	General Ecology ¹	4
BOTANY/ENTOM/ ZOOLOGY 473	Plant-Insect Interactions	3
BOTANY/ENVR ST/ F&W ECOL/ ZOOLOGY 651	Conservation Biology	3
F&W ECOL 550	Forest Ecology	3
F&W ECOL/ LAND ARC/ ZOOLOGY 565	Principles of Landscape Ecology	2
GENETICS 528	Banking Animal Biodiversity: International Field Study in Costa Rica	1
MICROBIO/AN SCI/ BOTANY 335	The Microbiome of Plants, Animals, and Humans	3
PL PATH 300	Introduction to Plant Pathology ¹	4
PL PATH 315	Plant Microbiomes ¹	4
ZOOLOGY 304	Marine Biology	2
ZOOLOGY 320	Field Marine Biology ¹	3

D. Evolution and Systematics

Code	Title	Credits
ANTHRO/BOTANY/ ZOOLOGY 410	Evolutionary Biology	3
BIOLOGY/ GENETICS 522	Communicating Evolutionary Biology	2-3
BOTANY 400	Plant Systematics ¹	4
BOTANY 401	Vascular Flora of Wisconsin ¹	4
BOTANY 422	Plant Geography	3
BOTANY/ PL PATH 563	Phylogenetic Analysis of Molecular Data	3
GENETICS 468	General Genetics 2	3

E. Applied Biology, Agriculture and Natural Resources

Code	Title	Credits
A A E/AGRONOMY/ NUTR SCI 350	World Hunger and Malnutrition	3
AGRONOMY 300	Cropping Systems	3
AGRONOMY 302	Forage Management and Utilization	3
AGRONOMY/ HORT 360	Genetically Modified Crops: Science, Regulation & Controversy	2
AGRONOMY 377	Global Food Production and Health	3

AGRONOMY/ HORT 501	Principles of Plant Breeding	3
AGRONOMY/ ATM OCN/ SOIL SCI 532	Environmental Biophysics	3
AMER IND/ ANTHRO/ BOTANY 474	Ethnobotany	3-4
BIOCORE 587	Biological Interactions	3
BOTANY 403	Field Collections and Identification	1-4
DY SCI/ AGRONOMY 471	Food Production Systems and Sustainability	3
F&W ECOL/ HORT/LAND ARC/ PL PATH 309	Diseases of Trees and Shrubs	3
F&W ECOL 410	Principles of Silviculture	3
F&W ECOL 415	Tree Physiology	3
GENETICS 548	The Genomic Revolution	3
GENETICS/ HORT 550	Molecular Approaches for Potential Crop Improvement	3
HORT/ LAND ARC 263	Landscape Plants I ¹	3
HORT 370	World Vegetable Crops	3
HORT 372	Seminar in Organic Agriculture	1
HORT/ AGRONOMY 376	Tropical Horticultural Systems	2
HORT 378	Tropical Horticultural Systems International Field Study	2
MED PHYS/NTP 651	Methods for Neuroimaging Research	3
PL PATH/ SOIL SCI 323	Soil Biology	3
PL PATH 517	Plant Disease Resistance	2-3
ZOOLOGY 500	Undergraduate Neurobiology Seminar	1

PLANT SCIENCE SEMINAR

Code	Title	Credits
Complete one of the following:		
AGRONOMY 375	Special Topics (Biochemistry and Molecular Biology of Plants Seminar)	1-4
BIOCHEM 375	Special Topics (Biochemistry and Molecular Biology of Plants Seminar)	1-4
PL PATH 375	Special Topics (Frontiers in Plant Biology)	1-4

CAPSTONE REQUIREMENT

Code	Title	Credits
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Two credits minimum required. With advisor approval, directed study or research-based senior thesis in a biological science discipline can also count. The experience must be completed after the first year of an introductory biology sequence above. The capstone experience will normally be completed during the student's final two or three semesters. Also, a subset of laboratory courses has been approved for capstone. The following courses, along with 682s and 692s in biological science departments (taken senior year), can be accepted as fulfilling the capstone experience.

ANAT&PHY 435	Fundamentals of Human Physiology	5
BIOCORE 486	Principles of Physiology Laboratory ²	2
BOTANY/ F&W ECOL 455	The Vegetation of Wisconsin	4
BOTANY/ F&W ECOL/ ZOOLOGY 460	General Ecology	4
BOTANY/ LAND ARC 670	Adaptive Restoration Lab	2
ENVIR ST/ ZOOLOGY 511	Ecology of Fishes Lab	2
F&W ECOL 599	Wildlife Research Capstone (limited access)	3
GENETICS 527	Developmental Genetics for Conservation and Regeneration	3
PL PATH 315	Plant Microbiomes	4
ZOOLOGY 316	Laboratory for Limnology-Conservation of Aquatic Resources	2-3
ZOOLOGY 555	Laboratory in Developmental Biology	3
ZOOLOGY 612	Comparative Physiology Laboratory	2

FOOTNOTES

1

Course also approved for lab credit

2

To count BIOCORE 486 Principles of Physiology Laboratory for capstone, students must also complete BIOCORE 382 Evolution, Ecology, and Genetics Laboratory and BIOCORE 384 Cellular Biology Laboratory.

FOUR-YEAR PLAN

SAMPLE BIOLOGY FOUR-YEAR PLAN—PLANT BIOLOGY OPTION

Freshman

Fall	Credits	Spring	Credits
CHEM 103 or 109	4-5	CHEM 104	5
Math ¹	3-5	Math or Statistics	3-5
Communication A or Breadth	6	Communication A or Breadth	5-6

First Year Seminar ²	1	
	14-17	13-16

Total Credits 27-33**Sophomore**

Fall	Credits	Spring	Credits
CHEM 343		3 CHEM 345	3
Math or Statistics (if needed)		3-5 CHEM 344	2
Intro Biology Course ³		3-5 Intro Biology Course ³	3-5
Breadth Course		3 Breadth Course	4-6
	12-16		12-16

Total Credits 24-32**Junior**

Fall	Credits	Spring	Credits
Physics		4-5 Physics	4-5
Foundation or Biocore		3-5 Biocore or Upper-Level Breadth in the Major ⁴	3-5
Electives		5-6 Plant Science Seminar	1
		Electives	5
	12-16		13-16

Total Credits 25-32**Senior**

Fall	Credits	Spring	Credits
Upper-Level Breadth in the Major ⁴		5 Upper-Level Breadth in the Major ⁴	5
Capstone or Research		2-3 Capstone or Research	2-3
Plant Science Seminar (if needed)		1 Plant Science Seminar (if needed)	1
Electives		5-8 Electives	5-8
	13-17		13-17

Total Credits 26-34

1

Math determined by placement scores. Biology majors must complete MATH 171/MATH 217 or MATH 221 plus one additional math/stats course.

Stats recommended.

2

See CALS requirements (<http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#requirements-text>) for a list of approved First-Year Seminar courses.

3

Students may complete BIOLOGY/BOTANY/ZOOLOGY 151-BIOLOGY/BOTANY/ZOOLOGY 152 & a foundational course or **(recommended)** BIOLOGY/ZOOLOGY 101-BIOLOGY/ZOOLOGY 102, BIOLOGY/BOTANY 130 & a foundational course or BIOCORE (three lectures and two labs required).

4

See Requirements tab for Upper-Level Breadth in the Major course lists.