

# BOTANY, BS

The Department of Botany provides an introduction to the living world: the diversity of its organisms; its historical origins through evolution; its principles of structure, function, and ecology; and its interactions, relationships, and effects on the nonliving world. Botany is the science of plants, algae, fungi, and bacteria—all living organisms except animals. Green plants and algae provide the photosynthetic energy for fueling all other life on earth and drive global water and carbon cycles. Fungi and bacteria are the fundamental recyclers of the earth.

The study of botany provides a broad background in the principles of modern biology and gives a solid foundation for careers in environmental studies, conservation biology, ecology, systematics, evolution, genetics, physiology, biotechnology, agriculture, and horticulture. Jobs requiring such preparation include teaching in secondary schools and colleges, research and development in industry and medicine, stewardship of our natural world through private and governmental programs, and research and teaching in academia.

## HOW TO GET IN

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Prospective Botany majors should consult with the general undergraduate botany advisor by the beginning of the junior year to outline a course of study appropriate to the student's needs. Major Declaration may occur by meeting with the undergraduate advisor in the major.

To be accepted as a major in Botany, a student must have a grade point average of 2.500 for all science courses taken prior to declaration.

## REQUIREMENTS

### UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (<http://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudytext>) section of the *Guide*.

#### General Education

- Breadth—Humanities/Literature/Arts: 6 credits
- Breadth—Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits
- Breadth—Social Studies: 3 credits
- Communication Part A & Part B \*
- Ethnic Studies \*
- Quantitative Reasoning Part A & Part B \*

\* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

## COLLEGE OF LETTERS & SCIENCE DEGREE REQUIREMENTS: BACHELOR OF SCIENCE (BS)

Students pursuing a Bachelor of Science degree in the College of Letters & Science must complete all of the requirements below. The College of Letters & Science allows this major to be paired with either the Bachelor of Arts or the Bachelor of Science degree requirements.

### BACHELOR OF SCIENCE DEGREE REQUIREMENTS

Mathematics	Complete two courses of 3+ credits at the Intermediate or Advanced level in MATH, COMP SCI, or STAT subjects. A maximum of one course in each of COMP SCI and STAT subjects counts toward this requirement.
Language	Complete the third unit of a language other than English.
L&S Breadth	Complete: <ul style="list-style-type: none"> <li>• 12 credits of Humanities, which must include at least 6 credits of Literature; and</li> <li>• 12 credits of Social Science; and</li> <li>• 12 credits of Natural Science, which must include 6 credits of Biological Science and 6 credits of Physical Science.</li> </ul>
Liberal Arts and Science Coursework	Complete at least 108 credits.
Depth of Intermediate/Advanced Coursework	Complete at least 60 credits at the Intermediate or Advanced level.
Major	Declare and complete at least one major.
Total Credits	Complete at least 120 credits.
UW-Madison Experience	Complete both: <ul style="list-style-type: none"> <li>• 30 credits in residence, overall, and</li> <li>• 30 credits in residence after the 86th credit.</li> </ul>
Quality of Work	<ul style="list-style-type: none"> <li>• 2.000 in all coursework at UW–Madison</li> <li>• 2.000 in Intermediate/Advanced level coursework at UW–Madison</li> </ul>

## NON-L&S STUDENTS PURSUING AN L&S MAJOR

Non-L&S students who have permission from their school/college to pursue an additional major within L&S only need to fulfill the major requirements. They do not need to complete the L&S Degree Requirements above.

## REQUIREMENTS FOR THE MAJOR MATH, CHEMISTRY, AND PHYSICS

Code	Title	Credits
<b>Statistics/Mathematics (One course from the following):<sup>1</sup></b>		<b>3</b>
STAT 301	Introduction to Statistical Methods	
STAT 324	Introductory Applied Statistics for Engineers	
STAT 371	Introductory Applied Statistics for the Life Sciences	
<b>General Chemistry (One of the following):<sup>2</sup></b>		<b>5-9</b>
CHEM 103 & CHEM 104	General Chemistry I and General Chemistry II	
CHEM 115 & CHEM 116	Chemical Principles I and Chemical Principles II	
CHEM 109	Advanced General Chemistry	
<b>Organic Chemistry<sup>3</sup></b>		<b>3</b>
CHEM 341 or CHEM 343	Elementary Organic Chemistry Organic Chemistry I	
<b>Physics (One course from the following):<sup>4</sup></b>		<b>3-5</b>
PHYSICS 115	Energy and Climate (preferred)	
PHYSICS 103	General Physics	
PHYSICS 104	General Physics	
PHYSICS 201	General Physics	
PHYSICS 202	General Physics	
PHYSICS 207	General Physics	
PHYSICS 208	General Physics	
PHYSICS 247	A Modern Introduction to Physics	
PHYSICS 248	A Modern Introduction to Physics	
PHYSICS 249	A Modern Introduction to Physics	
<b>Total Credits</b>		<b>14-20</b>

## BIOLOGY AND BOTANY REQUIREMENTS

30 credits from:

Code	Title	Credits
<b>Introductory Biology (Complete one option):</b>		<b>5-10</b>
<i>Option A, Recommended</i>		
BOTANY/ BIOLOGY 130	General Botany <sup>5</sup>	
<i>Option B: Introductory Biology</i>		
BOTANY/ BIOLOGY/ ZOOLOGY 151	Introductory Biology	
BOTANY/ BIOLOGY/ ZOOLOGY 152	Introductory Biology	
<i>Option C: BIOCORE</i>		

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	
<b>Code</b>	<b>Title</b>	<b>Credits</b>
<b>Botany Distribution - Five courses, to include at least one course in these areas:</b>		<b>15</b>
<i>Cell, Molecular, Physiology (1 course required):</i>		
BOTANY 300 or BOTANY 500	Plant Anatomy Plant Physiology	
<i>Ecology (1 course required):</i>		
BOTANY/ F&W ECOL 455 or BOTANY/ F&W ECOL/ ZOOLOGY 460	The Vegetation of Wisconsin General Ecology	
<i>Genetics, Evolution (1 course required):<sup>6</sup></i>		
BOTANY/ ANTHRO/ ZOOLOGY 410	Evolutionary Biology	
AGRONOMY/ HORT 338	Plant Breeding and Biotechnology	
GENETICS 466	Principles of Genetics <sup>2</sup>	
GENETICS 467	General Genetics 1	
GENETICS 468	General Genetics 2	
<i>Diversity</i>		
BOTANY 305	Plant Morphology and Evolution	
BOTANY 330	Algae	
BOTANY/ PL PATH 332	Fungi	
BOTANY 400	Plant Systematics	
BOTANY 401	Vascular Flora of Wisconsin	
<i>Optionally, 1 of the 5 required courses may come from this list, or students may take a second course from any area listed above:</i>		
BOTANY/ GEOG 338	Environmental Biogeography	
BOTANY/ AGRONOMY/ HORT 339	Plant Biotechnology: Principles and Techniques I	
BOTANY/ AGRONOMY/ SOIL SCI 370	Grassland Ecology	
BOTANY/ F&W ECOL 402	Dendrology: Woody Plant Identification and Ecology	
BOTANY 403	Field Collections and Identification	
BOTANY 422	Plant Geography	
BOTANY/ ZOOLOGY 450	Midwestern Ecological Issues: A Case Study Approach	
BOTANY/ ENTOM/ ZOOLOGY 473	Plant-Insect Interactions	

BOTANY/ AMER IND/ ANTHRO 474	Ethnobotany
BOTANY/ ENTOM/ PL PATH 505	Plant-Microbe Interactions: Molecular and Ecological Aspects
BOTANY/ PL PATH 563	Phylogenetic Analysis of Molecular Data
BOTANY/ BIOCHEM 621	Plant Biochemistry
BOTANY/ ENVIR ST/ F&W ECOL/ ZOOLOGY 651	Conservation Biology
BIOCHEM 501	Introduction to Biochemistry
BIOCORE 486	Principles of Physiology Laboratory
BIOCORE 587	Biological Interactions
F&W ECOL 415	Tree Physiology
MICROBIO 303	Biology of Microorganisms
ZOOLOGY 570	Cell Biology

Code	Title	Credits
<b>Independent Research Experience—choose one:<sup>7</sup></b>		<b>3-6</b>
BOTANY 691 & BOTANY 692	Senior Thesis and Senior Thesis	4
BOTANY 681 & BOTANY 682	Senior Honors Thesis and Senior Honors Thesis	6
BOTANY 699	Directed Study	3-4

## RESIDENCE AND QUALITY OF WORK

- 2.000 GPA in all BOTANY and major courses
- 2.000 GPA on 15 upper-level major credits, taken in residence<sup>8</sup>
- 15 credits in BOTANY, taken on the UW–Madison campus

## HONORS IN THE MAJOR

Students may declare Honors in the Botany Major in consultation with the Botany undergraduate advisor.

### HONORS IN THE MAJOR IN BOTANY: REQUIREMENTS

To earn Honors in the Major in Botany, students must satisfy the requirements for the major (above) and the following additional requirements:

- 3.300 University GPA
- 3.400 GPA in all BOTANY and major courses
- Complete 12 Honors credits from coursework listed in the "Botany Distribution" requirements<sup>9</sup> or from Intermediate/Advanced Honors coursework in Biocore
- Conduct Senior Honors Thesis research in BOTANY 681 & BOTANY 682 for a total of 6 credits

## FOOTNOTES

- <sup>1</sup> STAT 371, MATH 211, or MATH 221 are strongly recommended for students preparing for graduate school, as these usually are required for entry into post-undergraduate programs.
- <sup>2</sup> CHEM 109 is the best option for chemistry if only one course is to be taken. However, for students who are preparing for graduate school, and depending on their post graduate goals (CHEM 103 & CHEM 104 OR CHEM 115 & CHEM 116) is strongly recommended as some graduate programs may require a sequence of organic chemistry courses.
- <sup>3</sup> CHEM 341 is the best option for organic chemistry if only one course is to be taken. However, for students who are preparing for graduate school, the three-course organic chemistry sequence (CHEM 343, CHEM 344, & CHEM 345) is strongly recommended instead of CHEM 341, as some graduate programs may require a sequence of organic chemistry courses.
- <sup>4</sup> PHYSICS 115 is the best choice if one course is to be taken. It is recommended that two semesters of PHYSICS be taken (PHYSICS 103-PHYSICS 104 or PHYSICS 201-PHYSICS 202 or PHYSICS 207-PHYSICS 208).
- <sup>5</sup> In addition to BOTANY/BIOLOGY 130, ZOOLOGY/BIOLOGY 101 and/or ZOOLOGY/BIOLOGY 102 will count towards 30 credits of Botany major.
- <sup>6</sup> Completion of the BIOCORE sequence also satisfies the Genetics, Evolution area (BIOCORE 381 & BIOCORE 382 & BIOCORE 383 & BIOCORE 384 & BIOCORE 486).
- <sup>7</sup> Students nearing completion of the major should seek out research opportunities with their advisor or faculty supervisor, and register for their project at the end of the junior year.
- <sup>8</sup> BOTANY 300–BOTANY 699 are considered upper-level in the major.
- <sup>9</sup> Excluding BOTANY 681 and BOTANY 682.

## UNIVERSITY DEGREE REQUIREMENTS

**Total Degree** To receive a bachelor's degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.

**Residency** Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. "In residence" means on the UW–Madison campus with an undergraduate degree classification. "In residence" credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.

**Quality of Work** Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.

## LEARNING OUTCOMES

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1. Acquire and demonstrate foundational understanding of the basic properties of plant life from the subcellular to the ecosystem level of organization.
2. Acquire and demonstrate basic understanding in chemistry, physics, and mathematics to interpret biological phenomena.
3. Acquire and demonstrate detailed knowledge in at least five of these core areas of plant biology: Genetics, Physiology, Structural biology, Ecology, Systematics, Evolution, Cryptogamic biology.
4. Explore these core areas in the context of the laboratory and/or the field.
5. Engage in plant biology research (to include algae, photosynthetic bacteria, and fungi): develop hypotheses, acquire scientific information, and interpret results in the context of the historical scientific literature in one or more specialized botanical subdisciplines.
6. Develop an appreciation of communicating scientific information, especially in written form.

## FOUR-YEAR PLAN

## SAMPLE FOUR-YEAR PLAN

This Sample Four-Year Plan is a tool to assist students and their advisor(s). Students should use it—along with their DARS report, the Degree Planner, and Course Search & Enroll tools—to make their own four-year plan based on their placement scores, credit for transferred courses and approved examinations, and individual interests. As students become involved in athletics, honors, research, student organizations, study abroad, volunteer experiences, and/or work, they might adjust the order of their courses to accommodate these experiences. Students will likely revise their own four-year plan several times during college.

This plan shown focuses on completing major requirements early enough to be able to pursue advanced interests later. It also includes additional research experiences beyond the minimum, since many students find it helpful to begin research earlier than their senior year. Students interested in graduate school would be advised to take additional courses in the biological, physical, and/or data science fields. Students seeking honors in the Major might want to consult the sample 4-year plans provided by the Biocore (<https://guide.wisc.edu/undergraduate/letters-science/biology-core-curriculum/biology-core-curriculum-honors-certificate/>) program

## First Year

Fall	Credits Spring	Credits
General chemistry (choose one) <sup>1</sup>	4-5 CHEM 104 (or Elective)	5
CHEM 103 or 109 <sup>1</sup>	Introductory Biology First Semester (choose one)	5
Communications A (complete during your first year)	3 BOTANY/ BIOLOGY 130 or BIOLOGY 151	
MATH 221 <sup>2</sup>	5 Humanities Breadth	3

Language Requirement Course	3-4 Social Science Breadth	3
	<b>15</b>	<b>16</b>

## Second Year

Fall	Credits Spring	Credits
CHEM 341 <sup>3</sup>	3 PHYSICS 115	3
Introductory Biology First Semester (choose one)	5 STAT 371	3
BIOLOGY/ ZOOLOGY 101 & BIOLOGY/ ZOOLOGY 102	BOTANY/AMER IND/ ANTHRO 474 (or an alternate Ethnic Studies course)	3-4
BIOLOGY/BOTANY/ ZOOLOGY 152	Botany Breadth (I/A)	4
Comm B (if not taking BIOLOGY 152) or Elective	3-4	
Social Science Breadth	3	
	<b>15</b>	<b>14</b>

## Third Year

Fall	Credits Spring	Credits
BOTANY 499 (or Botany Breadth (I/A))	1-3 Botany Breadth (I/A) Course(s) or Elective(s)	9
Botany Breadth (I/A) Courses	6-7 Literature Breadth (I/A)	3
Humanities Breadth	3 I/A COMP SCI/MATH/ STAT Course (not needed if MATH 221 and STAT 371 taken)	3
Social Science Breadth	3	
	<b>15</b>	<b>15</b>

## Fourth Year

Fall	Credits Spring	Credits
BOTANY 691	2-3 BOTANY 692	3
Botany Breadth (I/A) Course(s) or Elective(s)	9 Botany Breadth (I/A) Course(s) or Elective(s)	12
Literature Breadth	3	
	<b>15</b>	<b>15</b>

## Total Credits 120

<sup>1</sup> Chemistry sequence CHEM 103 & CHEM 104 recommended.

<sup>2</sup> Or a different course in mathematics guided by placement testing.

<sup>3</sup> Organic Chemistry full sequence (CHEM 343, CHEM 344, & CHEM 345) recommended, especially for students interested in molecular biology or biochemistry

## ADVISING AND CAREERS

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## ADVISING

Students can find information about declaring the major at declaration and advising (<https://botany.wisc.edu/undergraduate-study/declaration-and-advising/>).

The Department of Botany encourages our majors to begin working on their career exploration and preparation soon after arriving on campus. We partner with SuccessWorks in the College of Letters & Science. L&S graduates are in high demand by employers and graduate programs. It is important to us that our students are career ready at the time of graduation, and we are committed to your success.

## L&S CAREER RESOURCES

Every L&S major opens a world of possibilities. SuccessWorks (<https://successworks.wisc.edu/>) at the College of Letters & Science helps students turn the academic skills learned in their major, certificates, and other coursework into fulfilling lives after graduation, whether that means jobs, public service, graduate school or other career pursuits.

In addition to providing basic support like resume reviews and interview practice, SuccessWorks offers ways to explore interests and build career skills from their very first semester/term at UW all the way through graduation and beyond.

Students can explore careers in one-on-one advising, try out different career paths, complete internships, prepare for the job search and/or graduate school applications, and connect with supportive alumni and even employers in the fields that inspire them.

- SuccessWorks (<https://careers.ls.wisc.edu/>)
- Set up a career advising appointment (<https://successworks.wisc.edu/make-an-appointment/>)
- Enroll in a Career Course (<https://successworks.wisc.edu/career-courses/>) - a great idea for first- and second-year students:
  - INTER-LS 210 L&S Career Development: Taking Initiative (1 credit)
  - INTER-LS 215 Communicating About Careers (3 credits, fulfills Comm B General Education Requirement)
- Learn about internships and internship funding (<https://successworks.wisc.edu/finding-a-job-or-internship/>)
  - INTER-LS 260 Internship in the Liberal Arts and Sciences
- Activate your Handshake account (<https://successworks.wisc.edu/handshake/>) to apply for jobs and internships from 200,000+ employers recruiting UW-Madison students
- Learn about the impact SuccessWorks has on students' lives (<https://successworks.wisc.edu/about/mission/>)

## PEOPLE

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**Faculty:** See Botany (<https://botany.wisc.edu/botany-faculty/>).