BIOLOGY: PLANT BIOLOGY

The Plant Biology 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 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 called Frontiers in Plant Science taught by two faculty from plant science departments.

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

Courses may not double count within the major (unless specifically noted otherwise), but courses counted toward the major requirements may also be used to satisfy a university requirement and/or a college requirement. A minimum of 15 credits must be completed in the major that are not used elsewhere. Students must complete a minimum of 31 credits from Introductory Biology, Foundation, Intermediate/Advanced, Seminar (options only) and additional lab/research courses.

CORE REQUIREMENTS

Mathematics and Statistics

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 171</td>
<td>Calculus with Algebra and Trigonometry I</td>
<td>5-10</td>
</tr>
<tr>
<td>MATH 217 &amp; MATH 217</td>
<td>Calculus with Algebra and Trigonometry II</td>
<td></td>
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<tr>
<td>MATH 221</td>
<td>Calculus and Analytic Geometry I</td>
<td>3-4</td>
</tr>
<tr>
<td>MATH 222</td>
<td>Calculus and Analytic Geometry II</td>
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</tr>
<tr>
<td>STAT 301</td>
<td>Introduction to Statistical Methods</td>
<td></td>
</tr>
<tr>
<td>STAT 371</td>
<td>Introductory Applied Statistics for the Life Sciences</td>
<td></td>
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</table>

**1** Students completing the Evolutionary Biology option are required to complete either STAT 301 Introduction to Statistical Methods or STAT 371 Introductory Applied Statistics for the Life Sciences.

Chemistry

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>General Chemistry</td>
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Physics

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<tbody>
<tr>
<td>PHYSICS 103</td>
<td>General Physics</td>
<td>4-5</td>
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<tr>
<td>PHYSICS 201</td>
<td>General Physics</td>
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<tr>
<td>PHYSICS 207</td>
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2nd semester Physics, select one of the following:

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</thead>
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<tr>
<td>PHYSICS 104</td>
<td>General Physics</td>
<td>4-5</td>
</tr>
<tr>
<td>PHYSICS 202</td>
<td>General Physics</td>
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<tr>
<td>PHYSICS 208</td>
<td>General Physics</td>
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Introductory Biology

<table>
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<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>BIOLOGY/BOTANY/ZOOLOGY 151</td>
<td>Introductory Biology</td>
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</tr>
<tr>
<td>BIOLOGY/BOTANY/ZOOLOGY 152</td>
<td>Introductory Biology</td>
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**Option A:**

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<tr>
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<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOCORE 381</td>
<td>Evolution, Ecology, and Genetics</td>
<td></td>
</tr>
<tr>
<td>BIOCORE 382</td>
<td>Evolution, Ecology, and Genetics Laboratory</td>
<td></td>
</tr>
<tr>
<td>BIOCORE 383</td>
<td>Cellular Biology</td>
<td></td>
</tr>
<tr>
<td>BIOCORE 384</td>
<td>Cellular Biology Laboratory</td>
<td></td>
</tr>
<tr>
<td>BIOCORE 485</td>
<td>Organismal Biology</td>
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**Option B:**

<table>
<thead>
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<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ZOOLOGY/BIOLOGY 101</td>
<td>Animal Biology</td>
<td></td>
</tr>
<tr>
<td>ZOOLOGY/BIOLOGY 102</td>
<td>Animal Biology Laboratory</td>
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</tr>
<tr>
<td>BOTANY/BIOLOGY 130</td>
<td>General Botany</td>
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**Option C:**

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOCORE 381</td>
<td>Evolution, Ecology, and Genetics</td>
<td></td>
</tr>
<tr>
<td>&amp; BIOCORE 383</td>
<td>and Cellular Biology</td>
<td></td>
</tr>
<tr>
<td>AGRONOMY/HORT 338</td>
<td>Plant Breeding and Biotechnology</td>
<td></td>
</tr>
<tr>
<td>GENETICS 466</td>
<td>Principles of Genetics</td>
<td></td>
</tr>
<tr>
<td>GENETICS 468</td>
<td>General Genetics 2</td>
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Foundational Course

<table>
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<tr>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Select one of the following:</td>
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</tr>
<tr>
<td>BIOCORE 381</td>
<td>Evolution, Ecology, and Genetics</td>
<td></td>
</tr>
<tr>
<td>&amp; BIOCORE 383</td>
<td>and Cellular Biology</td>
<td></td>
</tr>
<tr>
<td>AGRONOMY/HORT 338</td>
<td>Plant Breeding and Biotechnology</td>
<td></td>
</tr>
<tr>
<td>GENETICS 466</td>
<td>Principles of Genetics</td>
<td></td>
</tr>
<tr>
<td>GENETICS 468</td>
<td>General Genetics 2</td>
<td></td>
</tr>
</tbody>
</table>
For AP Biology policy, as it applies to introductory biology in the biology major, see this link [http://biologymajor.wisc.edu/advising/advisor-resources/ap-ib-biology-policy](http://biologymajor.wisc.edu/advising/advisor-resources/ap-ib-biology-policy).

Does not count toward intermediate/advanced courses. Students completing the Evolutionary Biology option must complete either GENETICS 466 Principles of Genetics or GENETICS 468 General Genetics to fulfill the Foundational requirement. Students completing the Plant Biology option are not allowed to take MICROBIO 470 Microbial Genetics & Molecular Machines to fulfill the Foundational requirement.

Students may use BIOCORE 381 Evolution, Ecology, and Genetics and BIOCORE 383 Cellular Biology to contribute to introductory biology and satisfy foundation.

### INTERMEDIATE/ADVANCED COURSES

Minimum of 13 credits required and must include one approved lab course. Approved lab courses are indicated by footnote. Select one course from categories A or B below. Select one course from categories C or D below. Select one course from category E or from an unused category above.

#### A. Cellular and Subcellular Biology

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRONOMY/ HORT 338</td>
<td>Plant Breeding and Biotechnology</td>
<td>3</td>
</tr>
<tr>
<td>AGRONOMY/ BOTANY/HORT 339</td>
<td>Plant Biotechnology: Principles and Techniques I</td>
<td>4</td>
</tr>
<tr>
<td>AGRONOMY/ BOTANY/HORT 340</td>
<td>Plant Cell Culture and Genetic Engineering</td>
<td>4</td>
</tr>
<tr>
<td>BIOCHEM 501</td>
<td>Introduction to Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BIOCHEM 507</td>
<td>General Biochemistry I</td>
<td>3</td>
</tr>
<tr>
<td>BIOCHEM 508</td>
<td>General Biochemistry II</td>
<td>3-4</td>
</tr>
<tr>
<td>BIOCHEM/ BOTANY 621</td>
<td>Plant Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BOTANY/ENTOM/ PL PATH 505</td>
<td>Plant-Microbe Interactions: Molecular and Ecological Aspects</td>
<td>3</td>
</tr>
<tr>
<td>BOTANY 561</td>
<td>2-3</td>
<td></td>
</tr>
<tr>
<td>GENETICS 466</td>
<td>Principles of Genetics</td>
<td>3</td>
</tr>
<tr>
<td>GENETICS 467</td>
<td>General Genetics 1</td>
<td>3</td>
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</table>

Courses also approved for lab credit

#### B. Organismal Biology

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOCORE 486</td>
<td>Organismal Biology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>BOTANY 300</td>
<td>Plant Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BOTANY 305</td>
<td>Plant Morphology and Evolution</td>
<td>4</td>
</tr>
<tr>
<td>BOTANY 330</td>
<td>Algae</td>
<td>3</td>
</tr>
<tr>
<td>BOTANY/ PL PATH 332</td>
<td>Fungi</td>
<td>4</td>
</tr>
<tr>
<td>BOTANY/ F&amp;W ECOL 402</td>
<td>Dendrology</td>
<td>2</td>
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</table>

Courses also approved for lab credit

#### C. Ecology

<table>
<thead>
<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>AGRONOMY/ BOTANY/ SOIL SCI 370</td>
<td>Grassland Ecology</td>
<td>3</td>
</tr>
<tr>
<td>BOTANY/ ZOOLOGY 450</td>
<td>Midwestern Ecological Issues: A Case Study Approach</td>
<td>2</td>
</tr>
<tr>
<td>BOTANY/ F&amp;W ECOL/ ZOOLOGY 473</td>
<td>The Vegetation of Wisconsin</td>
<td>4</td>
</tr>
<tr>
<td>BOTANY/ENTOM/ ZOOLOGY 473</td>
<td>Plant-Insect Interactions</td>
<td>3</td>
</tr>
<tr>
<td>BOTANY/ENVIR ST/ F&amp;W ECOL/ ZOOLOGY 651</td>
<td>Conservation Biology</td>
<td>3</td>
</tr>
<tr>
<td>F&amp;W ECOL 550</td>
<td>Forest Ecology</td>
<td>3</td>
</tr>
<tr>
<td>F&amp;W ECOL/ LAND ARC/ ZOOLOGY 565</td>
<td>Principles of Landscape Ecology</td>
<td>2</td>
</tr>
<tr>
<td>MICROBIO/AN SCI/ BOTANY 335</td>
<td>The Microbiome of Plants, Animals, and Humans</td>
<td>3</td>
</tr>
<tr>
<td>PL PATH 300</td>
<td>Introduction to Plant Pathology</td>
<td>4</td>
</tr>
<tr>
<td>PL PATH 315</td>
<td>Plant Microbiomes</td>
<td>4</td>
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<tr>
<td>BOTANY 459</td>
<td>1-2</td>
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</table>

Courses also approved for lab credit

#### D. Evolution and Systematics

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>ANTHRO/BOTANY/ ZOOLOGY 410</td>
<td>Evolutionary Biology</td>
<td>3</td>
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<tr>
<td>BOTANY 400</td>
<td>Plant Systematics</td>
<td>4</td>
</tr>
<tr>
<td>BOTANY 401</td>
<td>Vascular Flora of Wisconsin</td>
<td>4</td>
</tr>
<tr>
<td>BOTANY 422</td>
<td>Plant Geography</td>
<td>3</td>
</tr>
<tr>
<td>BOTANY 563</td>
<td>Phylogenetic Analysis of Molecular Data</td>
<td>3</td>
</tr>
<tr>
<td>GENETICS 468</td>
<td>General Genetics 2</td>
<td>3</td>
</tr>
</tbody>
</table>

Courses also approved for lab credit

#### E. Applied Biology, Agriculture and Natural Resources

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>A A E/AGRONOMY/ INTER-AG/ NUTR SCI 350</td>
<td>World Hunger and Malnutrition</td>
<td>3</td>
</tr>
<tr>
<td>AGRONOMY 300</td>
<td>Cropping Systems</td>
<td>3</td>
</tr>
<tr>
<td>AGRONOMY 302</td>
<td>Forage Management and Utilization</td>
<td>3</td>
</tr>
<tr>
<td>AGRONOMY/ HORT 360</td>
<td>Genetically Modified Crops: Science, Regulation &amp; Controversy</td>
<td>2</td>
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<tr>
<td>AGRONOMY 377</td>
<td>Cropping Systems of the Tropics</td>
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### SEMINAR

<table>
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<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PL PATH 375</td>
<td>Special Topics (Frontiers in Plant Biology)</td>
<td>1-4</td>
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</table>

### CAPSTONE REQUIREMENT

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.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
</table>

### HONORS IN THE MAJOR

To earn Honors in the Major, students are required to take at least 20 honors credits. In addition, students must take BIOLOGY 681 Senior Honors Thesis and BIOLOGY 682 Senior Honors Thesis when completing their thesis project; please see the Honors in Major Checklist (http://www.cals.wisc.edu/academics/undergraduate-programs/get-involved/honors-program/honors-in-the-major) for more information.

### FOUR-YEAR PLAN—PLANT BIOLOGY OPTION

#### Sample Biology Four-Year Plan

<table>
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<tbody>
<tr>
<td>CHEM 103 or 109</td>
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<td>5</td>
</tr>
<tr>
<td>Math¹</td>
<td></td>
<td>3-5</td>
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<tr>
<td>COMM A or Breadth</td>
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### Freshman

#### Credits Spring

<table>
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<tr>
<th>Credits</th>
<th>4-5 CHEM 104</th>
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<tbody>
<tr>
<td>Stats / Math (if needed)</td>
<td>3-5 CHEM 344</td>
<td>2</td>
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<tr>
<td>Intro Biology Course³</td>
<td>3-5 Intro Biology Course³</td>
<td>3-5</td>
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</tbody>
</table>

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¹ To count BIOCORE 486 Organismal Biology Laboratory for capstone, students must also complete BIOCORE 382 Evolution, Ecology, and Genetics Laboratory and BIOCORE 384 Cellular Biology Laboratory.
### Breadth Course

<table>
<thead>
<tr>
<th>Credits</th>
<th>Credits</th>
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<tr>
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Total Credits 24-32

### Junior

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<th>Fall</th>
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<tr>
<td>Physics</td>
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<td>Physics</td>
<td>4-5</td>
</tr>
<tr>
<td>Foundational or Biocore</td>
<td>3-5</td>
<td>Biocore or Intermediate/Advanced Plant Biology 4</td>
<td>3-5</td>
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<tr>
<td>Electives</td>
<td>5-8</td>
<td>Plant Science Seminar</td>
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</table>

| Electives             | 5-7     |

<table>
<thead>
<tr>
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Total Credits 25-36

### Senior

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<tbody>
<tr>
<td>Intermediate/Advanced Plant Biology 4</td>
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<td>Capstone or Research</td>
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<td>Capstone or Research</td>
<td>2-3</td>
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<tr>
<td>Plant Science Seminar (if needed)</td>
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<td>Plant Science Seminar (if needed)</td>
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<tr>
<td>Electives</td>
<td>5-8</td>
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</table>

| Electives             | 5-8     |

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<tr>
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<tbody>
<tr>
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<td>13-17</td>
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</table>

Total Credits 26-34

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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. Suggested that CALS freshmen investigate INTER-AG 155: Issues in Agriculture, Environment and Life Sciences; BIOLOGY 375 Special Topics: Exploring Biology; or a FIG.

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 intermediate/advanced biology course lists.