Plant scientists use a variety of cutting-edge molecular tools as well as traditional breeding methods to develop plants with disease resistance, enhanced production qualities, and nutritional characteristics. Students in this emphasis will take courses in genetics, plant and microbial genomics, plant breeding and molecular techniques.

A. Major Courses (15-18 credits)
   ___ Agro 1660: First-Year Colloquium/Experience in Agroecosystems Analysis (2 cr, F)
   ___ Agro 1103: Crops, Environment and Society (4 cr, F)
   ___ Agro 3660 Plant Genetic Resources: Identification, Conservation, and Utilization (3 cr, S)
   ___ Agro 4096: Professional Experience – Internship (1-3 cr, F/S)
   or Agro 4097: Undergraduate Research Thesis (1-4 cr, F/S)
   ___ Select one of:
       CFAN 1501: Biotechnology, People, & the Environment (3 cr, S)
       CFAN 3001: Pests and Crop Protection (3 cr, S)
       Agro 3203W: Environment, Global Food Production, and the Citizen (3 cr, S)
       Agro 4103: World Food Problems (3 cr, F)
   ___ Agro 4660: Senior Capstone (2 cr, F)

B. Communications (4 credits)
   ___ Writ 1301: University Writing (4 cr, F/S)
   OR
   Writ 1401: Writing and Academic Inquiry (4 cr, F/S)

C. Mathematical Thinking (7-8 credits)
   ___ Stat 3011: Introduction to Statistical Analysis (4 cr, F/S)
   ___ Math 1142: Short Calculus (4 cr, F/S)
   OR
   Math 1031: College Algebra and Probability (3 cr, F/S)

D. Physical and Biological Sciences (36 credits)
   ___ Biol 1009: General Biology (4 cr, F/S)
   or Biol 1001: Introduction to Biology I (4 cr, F/S)
   ___ Biol 2022: General Botany (3 cr, F/S)
   ___ Chem 1061: Chemical Principles I (3 cr, F/S)
   ___ Chem 1065: Chemical Principles I Lab (1 cr, F/S)
   ___ Chem 1062: Chemistry Principles II (3 cr, F/S)
   ___ Chem 1066: Chemical Principles II Lab (1 cr, F/S)
   ___ Chem 2301: Organic Chemistry I (3 cr, F/S)
   ___ BioC 3021: Biochemistry (3 cr, F/S)
   ___ GCD 3022: Genetics (3 cr, F/S)
   ___ Biol 4003 Genetics (3 cr, F/S)
   ___ Agro 4401: Plant Genetics and Breeding (4 cr, S)
   ___ Phys 1101W Introductory College Physics I (4 cr, F/S)
   ___ Agro 4005: Applied Crop Physiology and Development (4 cr, F/S)
   or Biol 3002: Plant Biology Function (2 cr, S)
   or Biol 3005W: Plant Function Laboratory (2 cr, S)
   ___ Hort 3005W: Envrn. Effects on Horticultural Crops (4 cr, S)

E. Emphasis Area Electives (minimum 12 credits)

Emphasis area electives should be chosen in consultation with your faculty advisor to ensure they prepare you for your future career goals or graduate studies.

Take 12 or more credit(s) from the following:

BBE 3013: Engineering Principles of Molecular & Cellular Processes (3 cr, S)
BBE 4001 Chemistry of Plant Materials (4, F) or PBio 4516W: Plant Cell Biology (3 cr, varies)
or PBio 5516: Plant Cell Biology (3 cr, varies) or PBio 4601 Topics in Plant Biochemistry (3, S)
BioC 4025: Lab in Biochemistry (2 cr, F/S)
BioC 4125: Lab in Molecular Biology and Biotechnology (3 cr, S)
EEB 3001: Ecology and Society (3 cr, F/S)
Hort 4071W: Applications of Biotechnology to Plant Improvement (4 cr, F)
Hort 5031: Sustainable Fruit Production Systems (2 cr, F odd yrs)
Hort 5032: Sustainable Commercial Vegetable Production Systems (3 cr, S even yrs)
Hort 5052: Specialty Greenhouse Crop Production (3 cr, F even yrs)
PBio 5301: Plant Genomics (3 cr, F)
PBio 5412: Plant Physiology (3 cr, F)
PBio 5514: Plant Molecular Biology (3 cr, F)
PiPa 5103: Plant-Microbe Interactions (3 cr, F/S when feasible)
PiPa 5300: Current Topics in Molecular Plant Pathology (1 cr, S)
Soil 2125: Basic Soil Science (4 cr, F/S)
VBS 2032: General Microbiology with Laboratory (4 cr, F/S)

* Note: a number of these courses may require additional prerequisites not met through the major. Check the course catalog or consult with your faculty advisor to plan accordingly.
F. Liberal Education Requirements and Themes (15-24 credits)

Students are strongly encouraged to take classes that fulfill multiple liberal education and theme requirements. Students must complete all Core requirements and four of the five Theme requirements.

**Completed through required coursework:**

- _X_ F – Freshman Composition Requirement
- _X_ M – Mathematical Thinking Core Requirement
- _X_ B – Biological Science w/Lab Core Requirement
- _X_ P – Physical Science w/Lab Core Requirement
- _X_ E – Environment Theme

**Possibly completed through required coursework:**

- ___ GP – Global Perspectives Theme (3 cr) *(completed if taken Agro 3203W or Agro 4103)*
- ___ TS – Technology and Society Theme (3 cr) *(completed if taken CFAN 1501)*

**Most likely NOT completed through required coursework:**

- ___ SS – Social Science Core (3 cr)
- ___ L – Literature Core (3 cr)
- ___ AH – Arts/ Humanities Core (3 cr)
- ___ HP – Historical Perspectives Core (3 cr)
- ___ DSJ – Diversity and Social Justice in the US Theme (3 cr)
- ___ CIV – Civic Life and Ethics Theme (3 cr)

G. Writing Intensive Requirements

Required: 4 WI courses, 2 of them 3xxx OR 4xxx, one in your major.

- _X_ Phys 1101W *(completed if Agro 3203W taken)*
- ___ *(completed if Biol 3005W taken)*
- ___ *(completed if Hort 3005W taken)*
- ___ Additional writing intensive course if needed

Please note:

Students are strongly encouraged to have an international experience before graduation. Courses completed during an international experience (study, work, volunteer, research) can meet program requirements, liberal education requirements, and/or electives. Discussion with an advisor prior to commencing an international experience is required to plan how courses tie into the APS program and Plant Improvement emphasis area.

I. Free Electives (18-31 credits)

Students are encouraged to make choices that strengthen their expertise in an area and/or provide comparative understanding from another culture or discipline. To this end, students should strongly consider using free electives to complete a University minor, study abroad experience, or a student designed content area. Students construct these expertise areas with the help of their faculty advisors.
**APS: PLANT IMPROVEMENT AREA OF EMPHASIS**  
**Suggested 4-Year Plan**

(This is just one possible scenario for completing this curriculum in four years. There are many other possibilities.)

### First Year: 29 credits

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRO 1660 (2)</td>
<td>MATH 1142 (4)*</td>
</tr>
<tr>
<td>First Year Colloquium</td>
<td>Short Calculus</td>
</tr>
<tr>
<td>AGRO 1103 (4)</td>
<td>CFAN 1501 (3)</td>
</tr>
<tr>
<td>Crops, Environment, and Society</td>
<td>Biotechnology, People and the Env. TS theme**</td>
</tr>
<tr>
<td>CHEM 1061 / 1065 (3/1)</td>
<td>CHEM 1062 / 1066 (3/1)</td>
</tr>
<tr>
<td>Chemical Principles I &amp; Lab</td>
<td>Chemical Principles II &amp; Lab</td>
</tr>
<tr>
<td>WRIT 1301 (4)</td>
<td>CLE Requirement (4)</td>
</tr>
<tr>
<td>University Writing</td>
<td>Literature w/ Writing Intensive</td>
</tr>
</tbody>
</table>

Total: 14 credits  
Total: 15 credits

* Or MATH 1031

### Second Year: 30-33 credits

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>BIOL 1009 (4)</td>
<td>BIOL 2022 (3)</td>
</tr>
<tr>
<td>General Biology</td>
<td>General Botany</td>
</tr>
<tr>
<td>CHEM 2301 (4)</td>
<td>BIOC 3021 (3)</td>
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<tr>
<td>Organic Chemistry I</td>
<td>Biochemistry</td>
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<td>CLE Requirement (3-4)</td>
<td>PHYS 1101 (4)</td>
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<tr>
<td>Historical Perspectives</td>
<td>Introduction to College Physics</td>
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<td>CLE Requirement (3-4)</td>
<td>CLE Requirement (3)</td>
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<tr>
<td>Arts/Humanities</td>
<td>Social Science with Diversity &amp; Social Justice</td>
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<tr>
<td></td>
<td>Elective (3-4)</td>
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<td></td>
<td>Total: 14-16 credits</td>
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<tr>
<td></td>
<td>Total: 16-17 credits</td>
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### Third Year: 30-34 credits*

<table>
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<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>STAT 3011 (4)</td>
<td>AGRO 3203W (3)</td>
</tr>
<tr>
<td>Introduction to Statistical Analysis</td>
<td>Environment, Global Food Production and the Citizen</td>
</tr>
<tr>
<td>GCD 3022 (3)</td>
<td>Agro 4401 (4)</td>
</tr>
<tr>
<td>Genetics</td>
<td>Plant Genetics and Breeding</td>
</tr>
<tr>
<td>Plant Improvement Emphasis Elective (3-4)</td>
<td>AGRO 4005 (4)*</td>
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<tr>
<td>Elective (3-4)</td>
<td>Applied Crop Physiology and Development</td>
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<tr>
<td>Elective (3-4)</td>
<td>Plant Improvement Emphasis Elective (3-4)</td>
</tr>
</tbody>
</table>

Total: 13-15  
Total: 14-15 credits

* AGRO 4093 or AGRO 4096 should be taken fall or spring junior year even if work is actually done during the summer months (add 1-4 credits)

### Fourth Year: 29-31 credits

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRO 4660 (2)</td>
<td>Plant Improvement Emphasis Elective (3-4)</td>
</tr>
<tr>
<td>Senior Capstone</td>
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<tr>
<td>Plant Improvement Emphasis Elective (3-4)</td>
<td>CLE or Writing Intensive</td>
</tr>
<tr>
<td>Elective (3-4)</td>
<td>(if needed) or Elective (3)</td>
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<tr>
<td>CLE or Writing Intensive (if needed) or Elective (3-4)</td>
<td>CLE Requirement (3)</td>
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<tr>
<td>Civic Life and Ethics</td>
<td></td>
</tr>
<tr>
<td>Elective (3-4)</td>
<td>Elective (3)</td>
</tr>
<tr>
<td>Elective (3-4)</td>
<td>Elective (0-4) as needed to reach 120</td>
</tr>
</tbody>
</table>

Total: 14-18 credits  
Total: 15-16 credits

APS Plant Improvement Track – last updated January 2012