AGRONOMY, B.S.

CREATING A HEALTHIER, MORE PRODUCTIVE, MORE RESILIENT AGRICULTURE FOR WISCONSIN AND THE WORLD.

That is the challenge taken up by the faculty, staff, and students of the Department of Agronomy.

We generate and apply knowledge about the plants that feed and benefit humankind. Agronomic crops are typically grown for grain to feed people and livestock, or are processed into products. Feed crops are grown specifically to meet the nutritional needs of livestock. Forage crops are grown for their stems, leaves, and other edible plant parts.

We find and implement solutions to problems and opportunities concerning efficiency and sustainability of crop production and in safe and environmentally sound ways.

We generate knowledge on the genetics, genomics, biochemistry, and physiology of plants.

We study the interactions among cropping systems, climate, and the environment. We emphasize sustainable agriculture, whether precision, traditional or organic, in order to reduce the impact on the environment and the inhabitants of our planet.

We work to ensure that agricultural systems and products in Wisconsin and the world are able to meet rapidly-changing needs and those of future generations.

Undergraduates in the Department of Agronomy earn a bachelor of science degree to prepare them for everything from pursuit of a graduate degree to careers in science, education, agriculture, agribusiness, and environment and conservation.

HOW TO GET IN

To declare this major, students must be admitted to UW–Madison and the College of Agricultural and Life Sciences (CALS). For information about becoming a CALS first-year or transfer student, see Entering the College (http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#enteringthecollegetext).

Students who attend Student Orientation, Advising, and Registration (SOAR) with the College of Agricultural and Life Sciences have the option to declare this major at SOAR. Students may otherwise declare after they have begun their undergraduate studies. For more information, contact the advisor listed under the Advising and Careers tab.

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/#requirementsforundergraduatemainenertext) 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 AGRICULTURAL AND LIFE SCIENCES REQUIREMENTS

In addition to the University General Education Requirements, all undergraduate students in CALS must satisfy a set of college and major requirements. Courses may not double count within university requirements (General Education and Breadth) or within college requirements (First-Year Seminar, International Studies, Science, and Capstone), but courses counted toward university requirements may also be used to satisfy a college and/or a major requirement; similarly, courses counted toward college requirements may also be used to satisfy a university and/or a major requirement.

COLLEGE REQUIREMENTS FOR ALL CALS B.S. DEGREE PROGRAMS

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 103</td>
<td>General Chemistry I</td>
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</tr>
<tr>
<td>or CHEM 108</td>
<td>Chemistry in Our World</td>
<td></td>
</tr>
<tr>
<td>or CHEM 109</td>
<td>Advanced General Chemistry</td>
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<tr>
<td>Biological Science</td>
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<td>Additional Science (Biological, Physical, or Natural)</td>
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<tr>
<td>Science Breadth (Biological, Physical, Natural, or Social)</td>
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CALS Capstone Learning Experience: included in the requirements for each CALS major (see ‘Major Requirements’) (http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#requirementstext)

### MAJOR REQUIREMENTS

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td></td>
<td><strong>Mathematics and Statistics</strong></td>
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<tr>
<td>MATH 112</td>
<td>Algebra and Trigonometry</td>
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<tr>
<td>&amp; MATH 113</td>
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<tr>
<td>MATH 114</td>
<td>Algebra and Trigonometry</td>
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<td>MATH 171</td>
<td>Calculus with Algebra and Trigonometry I</td>
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<tr>
<td>MATH 211</td>
<td>Calculus</td>
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<td>MATH 221</td>
<td>Calculus and Analytic Geometry 1</td>
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<td>STAT 301</td>
<td>Introduction to Statistical Methods</td>
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<td>STAT 371</td>
<td>Introductory Applied Statistics for the Life Sciences</td>
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<td>STAT/B M I</td>
<td>541 Introduction to Biostatistics</td>
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<td>Statistical Methods for Bioscience I</td>
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<td>&amp; CHEM 104</td>
<td>and General Chemistry II</td>
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<td>ZOOLOGY/BOTANY 101</td>
<td>Animal Biology</td>
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<td>Animal Biology Laboratory</td>
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<td>Option 2:</td>
<td>BIOLOGY/BOTANY 151 &amp; ZOOLOGY/BOTANY 152 Introductory Biology</td>
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<tr>
<td>ENTOM/ZOOLOGY 302</td>
<td>Introduction to Entomology</td>
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<td>ENTOM 351</td>
<td>Principles of Economic Entomology</td>
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<tr>
<td>AG 100</td>
<td>Principles and Practices in Crop Production</td>
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<td>SOIL SCI 301</td>
<td>General Soil Science</td>
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<td>Introduction to Plant Pathology</td>
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<td>GENETICS 466</td>
<td>Principles of Genetics</td>
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<tr>
<td>AGRONOMY/HORT 338</td>
<td>Plant Breeding and Biotechnology</td>
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<td>ECON 101</td>
<td>Principles of Microeconomics</td>
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<td>ECON 111</td>
<td>Principles of Economics-Accelerated Treatment</td>
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<tr>
<td>SOIL SCI 301</td>
<td>General Soil Science</td>
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<tr>
<td>GENETICS 466</td>
<td>Principles of Genetics</td>
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<tr>
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<td>Select one of the following:</td>
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<tr>
<td>ENTOM/ZOOLOGY 302</td>
<td>Introduction to Entomology</td>
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<td>ENTOM 351</td>
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<td><strong>Electives within the Major</strong></td>
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<td>Select 14 additional credits of Agronomy courses ¹</td>
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<td><strong>Total Credits</strong></td>
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|            | ¹ No more than 3 credits total in AGRONOMY 299 Independent Study, AGRONOMY 399 Coordinative Internship/Cooperative Education, AGRONOMY 699 Special Problems. Credits used to satisfy the Capstone experience may not count here.

### FOUNDATION COURSES

<table>
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<tr>
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<tbody>
<tr>
<td>A A E 319</td>
<td>The International Agricultural Economy</td>
<td>3</td>
</tr>
<tr>
<td>A A E 320</td>
<td>Farming Systems Management</td>
<td>3</td>
</tr>
<tr>
<td>A A E 322</td>
<td>Commodity Markets</td>
<td>3</td>
</tr>
<tr>
<td>A A E 323</td>
<td>Cooperatives and Alternative Forms of Enterprise Ownership</td>
<td>3</td>
</tr>
<tr>
<td>A A E/ECON 421</td>
<td>Economic Decision Analysis</td>
<td>4</td>
</tr>
<tr>
<td>A A E/ECON 474</td>
<td>Economic Problems of Developing Areas</td>
<td>3</td>
</tr>
<tr>
<td>C&amp;E SOC/SOC 140</td>
<td>Introduction to Community and Environmental Sociology</td>
<td>4</td>
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<tr>
<td>C&amp;E SOC/SOC 222</td>
<td>Food, Culture, and Society</td>
<td>3</td>
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</table>

1. No more than 3 credits total in AGRONOMY 299 Independent Study, AGRONOMY 399 Coordinative Internship/Cooperative Education, AGRONOMY 699 Special Problems. Credits used to satisfy the Capstone experience may not count here.
### ANIMAL SCIENCE

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>AN SCI/DY SCI 101</td>
<td>Introduction to Animal Sciences</td>
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<tr>
<td>AN SCI 200</td>
<td>The Biology and Appreciation of Companion Animals</td>
<td>3</td>
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<tr>
<td>AN SCI 250</td>
<td>Horse Science and Management</td>
<td>3</td>
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<tr>
<td>AN SCI/DY SCI/ NUTR SCI 311</td>
<td>Comparative Animal Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>AN SCI 430</td>
<td>Sheep Production</td>
<td>3</td>
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<td>AN SCI 431</td>
<td>Beef Cattle Production</td>
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<tr>
<td>AN SCI 432</td>
<td>Swine Production</td>
<td>3</td>
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<tr>
<td>DY SCI 205</td>
<td>Dairy Cattle Improvement Programs</td>
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<tr>
<td>DY SCI 305</td>
<td>Lactation Physiology</td>
<td>3</td>
</tr>
<tr>
<td>DY SCI/AN SCI 361</td>
<td>Introduction to Animal and Veterinary Genetics</td>
<td>2</td>
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<tr>
<td>DY SCI/AN SCI 363</td>
<td>Principles of Animal Breeding</td>
<td>2</td>
</tr>
<tr>
<td>DY SCI/AN SCI 370</td>
<td>Livestock Production and Health in Agricultural Development</td>
<td>3</td>
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<tr>
<td>ENTOM/ ZOOLOGY 302</td>
<td>Introduction to Entomology</td>
<td>4</td>
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<tr>
<td>ENTOM 351</td>
<td>Principles of Economic Entomology</td>
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### ATMOSPHERIC SCIENCE

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<tbody>
<tr>
<td>ATM OCN 100</td>
<td>Weather and Climate</td>
<td>3</td>
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<tr>
<td>ATM OCN/ ENVIR ST 171</td>
<td>Global Change: Atmospheric Issues and Problems</td>
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### BIOLOGICAL SYSTEMS ENGINEERING

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<th>Code</th>
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<tbody>
<tr>
<td>BSE 201</td>
<td>Land Surveying Fundamentals</td>
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### FOOD SCIENCE

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<tr>
<td>FOOD SCI 120</td>
<td>Science of Food</td>
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<tr>
<td>FOOD SCI 440</td>
<td>Principles of Food Engineering</td>
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<tr>
<td>A A E/C&amp;E SOC/ SOC 340</td>
<td>Issues in Food Systems</td>
<td>3-4</td>
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<tr>
<td>NUTR SCI/ BIOCHEM 510</td>
<td>Nutritional Biochemistry and Metabolism</td>
<td>3</td>
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### MANAGEMENT

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<tbody>
<tr>
<td>ACCT I S 211</td>
<td>Introductory Managerial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCT I S 301</td>
<td>Financial Reporting I</td>
<td>3</td>
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<tr>
<td>ACCT I S 302</td>
<td>Financial Reporting II</td>
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<tr>
<td>A A E 320</td>
<td>Farming Systems Management</td>
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<td>A A E 322</td>
<td>Commodity Markets</td>
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<td>A A E 323</td>
<td>Cooperatives and Alternative Forms of Enterprise Ownership</td>
<td>3</td>
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<tr>
<td>A A E 419</td>
<td>Agricultural Finance</td>
<td>3</td>
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<td>A A E/ECON 421</td>
<td>Economic Decision Analysis</td>
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<td>A A E/ECON 474</td>
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### GEN BUS

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<tr>
<td>GEN BUS 301</td>
<td>Business Law</td>
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<tr>
<td>GEN BUS 302</td>
<td>Business Organizations and Negotiable Instruments</td>
<td>3</td>
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<tr>
<td>FINANCE/ECON 300</td>
<td>Introduction to Finance</td>
<td>3</td>
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<tr>
<td>INTL BUS 200</td>
<td>International Business</td>
<td>3</td>
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<tr>
<td>MARKETING 305</td>
<td>Consumer Behavior</td>
<td>3</td>
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<tr>
<td>MARKETING 310</td>
<td>Marketing Research</td>
<td>3</td>
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<tr>
<td>MARKETING/ INTL BUS 420</td>
<td>Global Marketing Strategy</td>
<td>3</td>
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<td>MARKETING 460</td>
<td>Marketing Strategy</td>
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<td>MARKETING 635</td>
<td>Sales Management</td>
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<td>MARKETING 640</td>
<td>Strategic Retailing</td>
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<tr>
<td>M H R 420</td>
<td>Managing Change and Organizational Effectiveness</td>
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<td>M H R 422</td>
<td>Entrepreneurial Management</td>
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<td>M H R 612</td>
<td>Labor-Management Relations</td>
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<td>R M I 300</td>
<td>Principles of Risk Management</td>
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### NUTRITIONAL SCIENCE

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<tr>
<td>NUTR SCI 132</td>
<td>Nutrition Today</td>
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<td>NUTR SCI/AN SCI/ DY SCI 311</td>
<td>Comparative Animal Nutrition</td>
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<td>NUTR SCI 332</td>
<td>Human Nutritional Needs</td>
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<td>NUTR SCI/A A E/ AGRONOMY/INTER- AG 350</td>
<td>World Hunger and Malnutrition</td>
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<td>NUTR SCI 540</td>
<td>Community Nutrition Programs and Policy Issues</td>
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### SOIL SCIENCE

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<tr>
<td>SOIL SCI/ ENVIR ST 324</td>
<td>Soils and Environmental Quality</td>
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<td>SOIL SCI 325</td>
<td>Soils and Landscapes</td>
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### BACTERIOLOGY, BIOCHEMISTRY, GENETICS

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<th>Code</th>
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<td>MICROBIO 101</td>
<td>General Microbiology</td>
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<td>MICROBIO 102</td>
<td>General Microbiology Laboratory</td>
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<td>MICROBIO 303</td>
<td>Biology of Microorganisms</td>
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<td>MICROBIO 304</td>
<td>Biology of Microorganisms Laboratory</td>
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<tr>
<td>MICROBIO/ FOOD SCI 324</td>
<td>Food Microbiology Laboratory</td>
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<td>MICROBIO/ FOOD SCI 325</td>
<td>Food Microbiology</td>
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BIOCHEM 501 Introduction to Biochemistry 3
GENETICS 466 Principles of Genetics 3

ECOLOGICAL SCIENCES

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<tr>
<td>F&amp;W ECOL/ENVIR ST 100</td>
<td>Forests of the World</td>
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<tr>
<td>F&amp;W ECOL 318</td>
<td>Principles of Wildlife Ecology</td>
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<td>F&amp;W ECOL/BOTANY 455</td>
<td>The Vegetation of Wisconsin</td>
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<td>F&amp;W ECOL/BOTANY/ZOOLOGY 460</td>
<td>General Ecology</td>
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<td>F&amp;W ECOL 550</td>
<td>Forest Ecology</td>
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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

1. Articulate the role of biological processes, management systems, environmental influences, and economic and social factors on world food, feed, and fiber production. Specific topics that all students should have knowledge of include: photosynthesis, nutrient cycling, genetic inheritance, and management and uses of primary U.S. crop species.
2. Develop a global perspective and appreciate the interdependencies among individuals and their workplaces, communities, environments, and the planet; and an understanding of the role of science in society.
3. Communicate effectively through writing and speaking, and will be able to identify and critically evaluate available sources of information.
4. Demonstrate the ability to critically and creatively analyze problems and evaluate systems.

FOUR-YEAR PLAN

FOUR-YEAR PLAN
SAMPLE AGRONOMY FOUR-YEAR PLAN

Freshman

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRONOMY 100</td>
<td>4</td>
<td>BOTANY/BIOLOGY 130</td>
<td>5</td>
</tr>
<tr>
<td>CHEM 103 or 109</td>
<td>4-5</td>
<td>CHEM 104 (or Elective)</td>
<td>5 (3)</td>
</tr>
<tr>
<td>MATH 112, 114, or 171</td>
<td>3-5 Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COMM A</td>
<td>3</td>
<td>ECON 101, 111, or A A E 215</td>
<td>4</td>
</tr>
<tr>
<td>First Year Seminar</td>
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Total Credits 27-35

Sophomore

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>Foundation Course²</td>
<td>3</td>
<td>Foundation Courses</td>
<td>5</td>
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<tr>
<td>ZOOLOGY/BIOLOGY 101 &amp; ZOOLOGY/BIOLOGY 102</td>
<td>5 Social Science Course</td>
<td>3</td>
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<tr>
<td>Statistics Course</td>
<td>3 Agronomy Course³</td>
<td>3</td>
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<tr>
<td>Ethnic Studies Course</td>
<td>3 COMM B</td>
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14 14

Total Credits 28

Sophomore

Summer

<table>
<thead>
<tr>
<th>Credits</th>
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<tbody>
<tr>
<td>Internship or Agronomy</td>
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<tr>
<td>Independent Study</td>
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Total Credits 1-3

Junior

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Agronomy Courses</td>
<td>6 ENTOM/ZOOLOGY 302 or 351</td>
<td>3-4</td>
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<tr>
<td>GENETICS 466</td>
<td>3 Agronomy Course</td>
<td>3</td>
<td></td>
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<tr>
<td>SOIL SCI 301</td>
<td>4 International Studies Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3 Humanities Elective Course</td>
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<td></td>
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<tr>
<td>Elective</td>
<td>3</td>
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</table>

16 15-16

Total Credits 31-32

Junior

Summer

<table>
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<tr>
<th>Credits</th>
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<tbody>
<tr>
<td>Internship or Agronomy</td>
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<tr>
<td>Independent Study</td>
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Total Credits 1-3
Agronomy, B.S.

**Senior**

<table>
<thead>
<tr>
<th>Credits Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Agronomy Course</td>
<td>3-4 Agronomy Courses</td>
</tr>
<tr>
<td>ZOOLOGY/BOTANY/ F&amp;W ECOL 460</td>
<td>4 Capstone</td>
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<tr>
<td>PL PATH 300</td>
<td>4 Electives</td>
</tr>
<tr>
<td>Humanities Course</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
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</table>

Total Credits 17-18

Total Credits 14-18

1 Determined by placement exam. Consult SOAR advisor.
2 Eight (8) credits of Foundation courses required. See Requirements tab for details.
3 Fourteen (14) credits of agronomy electives required. See Requirements tab for details.

**ADVISORY AND CAREERS**

**ADVISING**

The Department of Agronomy is faculty-advised, meaning that faculty members take on the responsibility of guiding and advising undergraduates through graduation. Students and faculty are matched as closely as possible by interest. All new freshmen and transfer students are temporarily advised by the student services coordinator until the advising relationship between professor and student is established. If you would like to have a conversation about joining the Department of Agronomy, please contact agronomy@wisc.edu (agronomy.wisc.edu).

**CAREERS**

An Agronomy degree is an open door to careers in many related fields such as biotechnology, plant genetics, crop management, agricultural financial management, farming, seed sales, crop consulting, Certified Crop Advising, Certified Professional Agronomy, agribusiness, extension agronomy, agricultural education, government work, and international agronomy.

**GENETICS**

The fastest growing sector of agriculture is plant breeding, genetics, and genomics. Plant scientists are working at the field, plant, cellular, and molecular level to create cultivars that are hardier, disease resistant, nutritious, and affordable. The industry's growth is currently outstripping the rate of graduation; graduates can take their pick of interesting, fulfilling careers in the public and private sectors.

**BIOFUELS**

The biofuel industry is also experiencing rapid growth, with research and development being focused on sugar-based biofuels, cellulosic biofuels, and biodiesels, made from plants as varied as switchgrass, sugar cane, corn, and wood pulp. These energy crops are harvested and processed into alternatives to fossil fuels.

**AGRIBUSINESS**

In agribusiness, agronomists take data and translate it into real world applications. They sell tools for crop production, provide agricultural loans, consult on crops, manage businesses, and much more. They are often responsible for translating technical research data into applications. Numerous agronomy graduates are also involved in the sale of agricultural products, which are vital to today’s economy. Other successful agronomists serve as crop advisers, farm managers, consultants, bank loan specialists, managers, and much more.

**RESEARCH/EDUCATION AND EXTENSION**

Agronomic educators specialize in teaching and working with high school and college students. They also teach and advise students who chose advanced studies for a master's degree and/or Ph.D. They are extensively involved in research, publishing findings on a regular basis and making scientific advances.

Extension agronomists usually work for a state, local, or national government; they consult with farmers and others to help find answers to their specific problems and help farmers translate research results into usable management practices. Government-employed agronomists also work with farmers and ranchers to plan for soil and water conservation so crops and land can be managed efficiently and with minimal impact to the environment.

**PEOPLE**

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WISCONSIN EXPERIENCE

The following opportunities can help students connect with other students interested in agronomy, build relationships with faculty and staff, and contribute to out-of-classroom learning:

- Badger Crops Club (https://www.facebook.com/badgercropsclub/), a professional, social, and educational group for agronomy students and students in related fields interested in any aspect of crop production.
- Collegiate FFA (http://collegiateffamadison.weebly.com/), an official collegiate chapter of the National FFA organization.
- AWA (http://awamadison.org/)—the Association of Women in Agriculture, a professional student organization for young women with a passion for agriculture.
- WISELI (http://wiseli.engr.wisc.edu/)—Women in Science and Engineering Leadership Institute, a research center aiming to increase the representation, advancement, and satisfaction of women faculty and members of groups currently underrepresented on the faculty and in leadership at UW–Madison.
- Study Abroad: Agronomy majors have the opportunity to go on experiential study abroad programs, where students can immerse themselves in research or global agronomy field experiences. Students can review the International Academic Programs website (https://studyabroad.wisc.edu/) and the CALS study abroad advising page (https://cals.wisc.edu/academics/undergraduate-students/international-programs/study-abroad-advising/) for information on these and other programs, as well as requirements that can typically be fulfilled abroad and things to consider when fitting study abroad into an academic plan.
- Research/Lab experience: Students are encouraged to get involved in research, whether in the agronomy department or through other plant-, soil-, or ecology-related departments. Research can be performed for either course credit or pay, depending on the opportunity. Research opportunities can primarily be found by inquiring with faculty members.

RESOURCES AND SCHOLARSHIPS

The Department of Agronomy is proud to participate in the CALS Scholarship Program, which awards thousands of dollars to undergraduate scholars every year. The majority of our students have some form of financial aid through CALS, the university, or work-study or laboratory jobs.

In addition, the department awards funds every year to students who wish to study abroad.