AGRICULTURAL SCIENCE AND TECHNOLOGY MAJOR

College of Agriculture and Natural Resources
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psla.umd.edu (http://psla.umd.edu)

Program Director: John Erwin, Ph.D.

Agricultural Science and Technology is an interdisciplinary major focusing on sustainable production of food, feed, fiber, fuel, and ornamentals as well as developing skills to provide agricultural education for all. This major is a science based curriculum that allows students to obtain technological skills while developing critical thinking in a broad area of agricultural studies. Within this major there are three specializations to choose from: Agronomy, Environmental Horticulture, or Agricultural and Extension Education.

Agronomy

Agronomy students will focus on a broad range of agricultural disciplines providing them with a comprehensive education in crop, soil and animal sciences. Students will take courses in animal science, crop science, soil science, agricultural economics and plant protection. This specialization has electives that allows students to design their curriculum and develop knowledge in areas that meet their future goals. Graduates will be prepared to work in the agricultural industry in agricultural extension, management, marketing, regulatory, support services, as well as other opportunities.

Environmental Horticulture

The Environmental Horticulture specialization focuses on the science, technology and management of fruit, vegetable, flower and woody ornamental plant production. The applied aspects of the curriculum include training in plant propagation, greenhouse crop production systems, containerized nursery production, food crop production and controlled environmental systems. Courses are taken in plant science, soil science, plant protection and food safety practices. Graduates of this program pursue careers in urban agriculture, horticultural enterprises and public education programs. Students can prepare for plant science graduate programs by taking additional courses.

Agricultural and Extension Education

The Agricultural and Extension Education specialization provides students with varying coursework in:

- agribusiness & communications;
- animal, food & plant sciences;
- biotechnology;
- environmental & natural resources;
- leadership, youth & career development;
- power, structural & technical systems;
- and foundational pedagogical education courses.

The Agricultural and Extension Education specialization provides students with varying coursework in agribusiness & communications; animal, food & plant sciences; biotechnology; environmental & natural resources; leadership, youth & career development; power, structural & technical systems; and foundational pedagogical education courses. Students practice agricultural literacy techniques throughout their individualized learning experiences to develop mastery in educating using agricultural concepts with diverse audiences. Inclusion within the Terrapin Teachers program provides cross-disciplinary and interdisciplinary opportunities for learning with peers. Graduates focused on formal education may become certified secondary high school agricultural teachers in public or private schools or specialize in an area for career technical education. Those focused as agricultural advocates may seek non-formal education jobs in non-profit agricultural literacy based foundations, become Extension youth educators, Extension agricultural specialists, or work within agricultural industry public relations areas. Proximity to federal agencies provides students with an opportunity to expand their international and regulation agency networking skills.

Undergraduates have two options. First option is to complete a double major in 4 years:

1. The first option is to complete a double major in 4 years: (1) Agricultural Science and Technology, Agricultural and Extension Education specialization and (2) Secondary Sciences Education.

2. The second option is to major in Agricultural Science and Technology, Agricultural and Extension Education specialization with no teacher certification and focus on Extension/Industry internships. Students wanting to complete a major's degree can enroll in the 5-year Integrated Master’s with certification program. These students are able to complete additional agricultural content courses due to the majority of their educational courses being completed in the 30 credit master’s program.

Program Learning Outcomes

1. Students will develop technical and knowledge-based skills in the required areas of study.
2. Students will use technical and basic learned knowledge to collaborate, solve problems, and then articulate conclusions.
3. Students shall develop effective communication skills and demonstrate the ability to present ideas with clarity to an appropriate audience.
4. Students will connect and build relationships with external groups in the appropriate fields of study.

Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSC101</td>
<td>Principles of Animal Science</td>
<td>3</td>
</tr>
<tr>
<td>ANSC103</td>
<td>Principles of Animal Science Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>BSCI337</td>
<td>Biology of Insects</td>
<td>4</td>
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<tr>
<td>or BSCI497</td>
<td>Insect Pests of Ornamentals and Turf</td>
<td></td>
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<tr>
<td>AREC250</td>
<td>Elements of Agricultural and Resource Economics</td>
<td>3</td>
</tr>
<tr>
<td>or AREC306</td>
<td>Farm Management and Sustainable Food Production</td>
<td></td>
</tr>
<tr>
<td>CHEM131</td>
<td>Chemistry I - Fundamentals of General Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM132</td>
<td>and General Chemistry I Laboratory</td>
<td></td>
</tr>
<tr>
<td>ENST200</td>
<td>Fundamentals of Soil Science</td>
<td>4</td>
</tr>
<tr>
<td>MATH113</td>
<td>College Algebra and Trigonometry</td>
<td>3</td>
</tr>
<tr>
<td>PLSC201</td>
<td>Plant Structure and Function</td>
<td>4</td>
</tr>
<tr>
<td>INAG250</td>
<td>Fundamentals of Agricultural Mechanics</td>
<td>3</td>
</tr>
</tbody>
</table>
Select one of the following: 3-4
PLSC275  Fundamentals of Agricultural Chemistry
CHEM231  Organic Chemistry I
& CHEM232  and Organic Chemistry Laboratory I
PLSC420  Principles of Plant Pathology
PLSC433  Weed Science

Specialization Requirements 38-71
Select one of the following specializations:
Agronomy
Environmental Horticulture
Agricultural and Extension Education

Total Credits 77-111

Specializations:
Agronomy

Course  Title  Credits
Agronomy Specialization Requirements
Accounting, Education, Computer Science or Policy
ANSC  Elective  3
ANSC220  Livestock Management  3
ANSC/PLSC/ LARC  Elective  3
AREC  Restricted Elective  3
BSCI160 & BSCI161  Principles of Ecology and Evolution and Principles of Ecology and Evolution Lab  4
ENST  Restricted Elective  3
PLSC112 & PLSC113  Introductory Crop Science and Introductory Crop Science Laboratory  4
PLSC  Restricted Elective  3
PLSC389  Internship  3
PLSC460  Application of Knowledge in Plant Sciences  3

Total Credits 35

Environmental Horticulture

Course  Title  Credits
Environmental Horticulture Specialization
BSCI170 & BSCI171  Principles of Molecular & Cellular Biology and Principles of Molecular & Cellular Biology Laboratory  4
AREC  Restricted Elective  3

Select one of the following: 3-4
ENST411  Principles of Soil Fertility
PLSC461  Cultural Management of Nursery and Greenhouse Systems: Substrates
PLSC462  Cultural Management of Nursery and Greenhouse Systems; Irrigation
PLSC464  Cultural Management of Nursery and Greenhouse Systems: Nutrients
PLSC203  Plants, Genes and Biotechnology

Agricultural and Extension Education: Teaching Certificate

Course  Title  Credits
PLSC110 & PLSC111  Introduction to Horticulture and Introduction to Horticulture Laboratory  4
or PLSC112 & PLSC113  Introductory Crop Science and Introductory Crop Science Laboratory  4
BSCI160 & BSCI161  Principles of Ecology and Evolution and Principles of Ecology and Evolution Lab  4
One of the following courses: 3
ANSC220  Livestock Management
ANSC242  Dairy Cattle Management
ANSC232  Horse Management
ANSC255  Introduction to Aquaculture
ANSC227  Eating with Eyes Wide Open  3
AGST442  (Developing Leadership in Youth and Volunteers)  3
PLSC235  Irrigation and Drainage  3
or INAG235  Irrigation and Drainage  3
AGST440  (Exploring Maryland Agriculture, Agricultural Industries & Agricultural Literacy)  3
PLSC471  Forest Ecology (or elective focused on Renewable Energy)  3
NFSC112  Food: Science and Technology  3
or PLSC115  How Safe is Your Salad? The Microbiological Safety of Fresh produce
EDHD426  Cognitive and Motivational Literacy Content  3
TLPL101  Inquiry Approach to Teaching STEM (Step 1)  1
TLPL102  Inquiry Teaching of STEM in Middle School  2
BSCI348  Special Topics in Cell Biology and Molecular Genetics (BSCI348T: Research Methods for Terrapin Teachers)  3
One of the following courses: 3
TLPL488  Special Topics in Education (TLPL488P: Project Based Instruction)
TLPL401  Student-Centered Curriculum and Instruction
TLPL414  Knowing and Learning in Mathematics and Science  3
TLPL415  Perspectives in Science  3
TLPL425  Learning and Teaching in Science  3
TLPL478  Professional Seminar in Education (TLPL478F: Professional Seminar in Education: Agriculture)  2
TLPL479  Field Experiences in Education (TLPL479F: Field Experience in Science Education)  1
Agricultural and Extension education: Extension/Industry

Course | Title | Credits
--- | --- | ---
PLSC110 & PLSC111 or PLSC112 & PLSC113 | Introduction to Horticulture and Introduction to Horticulture Laboratory | 4

One of the following courses:

- ANSC220 | Livestock Management |
- ANSC242 | Dairy Cattle Management |
- ANSC232 | Horse Management |
- ANSC255 | Introduction to Aquaculture |
- ANSC227 | Eating with Eyes Wide Open |
- AGST442 | (Developing Leadership in Youth and Volunteers) |
- PLSC235 or INAG235 | Irrigation and Drainage |

One of the following courses:

- AGST440 | (Exploring Maryland Agriculture, Agricultural Industries & Agricultural Literacy) |
- PLSC471 | Forest Ecology (or elective focused on Renewable Energy) |
- NFSC112 or PLSC115 | Food: Science and Technology or How Safe is Your Salad? The Microbiological Safety of Fresh produce |
- BSCI121 | Beekeeping |
- INAG252 | Agricultural Public Relations |
- AGST489 | (Internship or Elective Course) |
- AGST489 | (Internship) |
- TLPL101 | Inquiry Approach to Teaching STEM (Step 1) |
- TLPL102 | Inquiry Teaching of STEM in Middle School |

One of the following courses:

- TLPL488 | Special Topics in Education (TLPL488P Project Based Instruction) |
- TLPL401 | Student-Centered Curriculum and Instruction |
- TLPL414 | Knowing and Learning in Mathematics and Science |

Total Credits 68

1 Internship requirement: Students will either do two internships for a total of 6 credits or one internship for 3 credits and take a different elective course for 3 credits.

Additional information on developing a four-year academic plan can be found on the following pages:

- 4yearplans.umd.edu (http://4yearplans.umd.edu)
- the Student Academic Success-Degree Completion Policy (https://academiccatalog.umd.edu/undergraduate/registration-academic-requirements-regulations/academic-advising/) section of this catalog

Opportunities

Undergraduate Research Experiences

Students are encouraged to take part in faculty mentored research. Please contact an advisor for more information.

Internships

Internships are a part of the required curriculum and can be in private or government sector employment. Formal (K-12 schools) and non-formal (non-profits, industry & Extension) education settings are available for students in the Agricultural & Extension Education specialization.

Student Clubs and Professional Organizations

Faculty in the department advise student clubs. The department also sponsors student teams that participate in regional and national contests. These teams participate in competitions in the following areas: turf and crop science.

Scholarships and Financial Assistance

Several scholarships and awards are available to AGST students. Contact the Associate Dean's office at 301-405-2078 for additional information. The Department also maintains a listing of scholarships. For more information regarding these scholarships contact the Chair’s office in 2104A Plant Sciences, 301-405-4356.

The Office of Student Financial Aid (OSFA) administers all types of federal, state and institutional financial assistance programs and, in cooperation with other university offices, participates in the awarding of scholarships to deserving students. For information, visit: financialaid.umd.edu (http://financialaid.umd.edu).

Advising

The department has mandatory faculty advising for each of its major and minor programs. Students are required to meet with their faculty advisor at least twice a year.

For additional information please see:

- Dr. John Erwin (https://agnr.umd.edu/about/directory/john-erwin/), Chair and Director jerwin@umd.edu | Room: PLS 2104 | Phone: 301-405-4356
- Dr. Bill Phillips (https://agnr.umd.edu/about/directory/bill-phillips/), Assistant Clinical Professor, Agronomy Advisor billii@umd.edu | Room: PLS 2128 | Phone: 301-405-1061
- Dr. Diana Cochran (https://agnr.umd.edu/about/directory/diana-rena-cochran/), Assistant Clinical Professor, Environmental Horticulture Advisor cochrand@umd.edu | Room: PLS 2133 | Phone: 301-405-4336

Four Year Plan

Click here (https://agnr.umd.edu/academics/advising/four-year-plans/) for roadmaps for four-year plans in the College of Agricultural and Natural Resources.
Dr. Melissa Leiden Welsh (https://agnr.umd.edu/about/directory/melissa-welsh/), Assistant Clinical Professor, Agricultural and Extension Education Advisor
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