

# COLLEGE OF AGRICULTURE AND LIFE SCIENCES

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Students enrolled in the College of Agriculture and Life Sciences are provided a broad-based education that includes coursework in communications; biological, physical, and social sciences; humanities; and technical subject matter.

Upon graduation students find diverse career opportunities because of the well balanced education they have received as undergraduates. Opportunities for graduates of the College of Agriculture and Life Sciences include: agribusiness and industry, production agriculture, biological and environmental sciences, value-added processing, natural resource management, rural development, public agencies, education, animal and human health professions, and graduate studies.

## High School Preparation

Requirements for students entering from high school or transferring with less than 24 college credits into the College of Agriculture and Life Sciences include four years of English; three years of mathematics which must include one year each of algebra, geometry, and advanced algebra; three years of science which must include one year each of Biology and chemistry, or Biology and physics, or chemistry and physics; and two years of social studies. No foreign language is required for admission to the College of Agriculture and Life Sciences.

## Core Curriculum and Electives

All curricula in the College of Agriculture and Life Sciences lead to a bachelor of science degree. To graduate with a degree from the College of Agriculture and Life Sciences a student must complete while at Iowa State University a minimum of 18 credits from the College's departmental offerings, program offerings, and cross-listed program offerings. Twelve or more of those 18 credits must be 300-level or above. Some curricula within the College may have more restrictive requirements.

Each major has specific degree requirements for graduation based on department and college student learning outcomes. College of Agriculture and Life Sciences core curriculum requirements for the four areas listed below are established to provide the foundation for successful accomplishment of both departmental and college level learning outcomes.

Students pursuing a primary major in another college and taking a second major in the College of Agriculture and Life Sciences must fulfill the core curriculum requirements of the College of Agriculture and Life Sciences, and all the requirements of the second major. The College of Agriculture and Life Sciences core curriculum follows.

|   |    |
|---|----|
| Interpersonal and public communication skills               | 10 |
| 6 credits of English composition with grades of C or better |    |
| 3 credits of speech fundamentals with grades of C or better |    |

|  |           |
|--|-----------|
| 1 credit of LIB 160 Information Literacy   |           |
| <b>Total Credits</b>   | <b>10</b> |
| Mathematical, physical, and life sciences  | 17        |
| 3 credits of mathematics   |           |
| 3 credits of statistics  |           |
| 5 credits of physical science (e.g., chemistry, geological and atmospheric sciences, physics)  |           |
| 6 credits of life sciences including BIOL 101 Introductory Biology, or BIOL 211 Principles of Biology I, or BIOL 212 Principles of Biology II and 3 credits of life sciences from a college-approved list: ( <a href="http://www.ag.iastate.edu/student/student_services.php">http://www.ag.iastate.edu/student/student_services.php</a> ) |           |
| Personal development   | 15        |
| 3 credits of ethics from a college-approved list   |           |
| 3 credits of humanities from a college-approved list   |           |
| 3 credits of social sciences from a college-approved list  |           |
| 3 credits of U.S. diversity from an approved list  |           |
| 3 credits of international perspectives from an approved list  |           |

All students graduating with majors within the College of Agriculture and Life Sciences are expected to be proficient in the following college-level outcomes:

### Professional, Interpersonal and Cross-cultural Communications

- Speak and write clearly and persuasively.
- Prepare effective visual, oral, written and electronic presentations.
- Effectively read, listen, observe and reflect.

### Problem-Solving/Critical Thinking

- Apply a holistic approach to solving complex issue-laden problems.
- Apply a rational and objective process to:
  - Distinguish verifiable facts from value claims,
  - Determine the accuracy of statements,
  - Identify assumptions and detect bias,
  - Distinguish relevant from irrelevant information,
  - Prioritize needs.
- Summarize, analyze, and interpret simple research data and policy issues.

### Leadership

- Organize, facilitate, and participate effectively in a group, team, or organization.
- Define a problem or opportunity, implement an action planning process, work towards a goal and justify actions taken.

### Entrepreneurship

- Demonstrate innovativeness and creativity regardless of context.
- Identify and pursue opportunities that produce value.
- Be persistent in shepherding necessary resources and managing associated risk to facilitate change.

### Life-long learning

- Articulate how continued learning after graduation will enrich their lives.
- Identify and participate in new areas for learning beyond the classroom and after graduation.

### Ethics

- Define and assess their ethical perspective, moral responsibility, and values.
- Identify and critically evaluate contemporary ethical and moral issues in professional and private life.

### Environmental Awareness

- Explain the physical and Biological interactions within ecosystems
- Explain how human activities impact the environment and how societies are affected by environmental change.

### International/Multi-Cultural Awareness

- U.S. Diversity – Students should achieve two of the following outcomes. They should be able to:
  - Articulate how their personal life experiences and choices fit within the context of the larger mosaic of U.S. society, indicating how they have confronted and critically analyzed their perceptions and assumptions about diversity-related issues,
  - Analyze and evaluate the contributions of various underrepresented social groups in shaping the history and culture of the U.S.,
  - Analyze individual and institutional forms of discrimination based on factors such as race, ethnicity, gender, religion, sexual orientation, class, etc.,
  - Analyze the perspectives of groups and individuals affected by discrimination,
  - Analyze how cultural diversity and cooperation among social groups affect U.S. society.
- International Perspectives – Students should achieve two of the following outcomes. They should be able to:
  - Analyze the accuracy and relevancy of their own worldviews and anticipate how people from other nations may perceive that worldview,
  - Describe and analyze how cultures and societies around the world are formed, are sustained, and evolve,
  - Analyze and evaluate the influence of global issues in their own lives,
  - Describe the values and perspectives of cultures other than their own and discuss how they influence individuals' perceptions of global issues and/or events,
  - Communicate competently in a second language.

In addition to the College level learning outcomes, each department within the college has additional discipline-specific outcomes that apply to graduates of that department.

### Electives

Students use electives to broaden their education or to strengthen an area of specialization. Electives may be used to meet the requirements for a double major (see statement on double majors in this catalog). Those who wish to change their major, or who decide to graduate with a double major, must be enrolled for the last two semesters in the curriculum in which they expect to graduate. Students in ROTC may apply ROTC credits toward elective requirements. No more than 9 credits of 490 coursework from any Iowa State University curriculum may be applied toward graduation, although some individual curricula may establish a more restrictive use of 490 credits toward fulfillment of graduation requirements.

### Advising

Each student in the College of Agriculture and Life Sciences works closely with an academic adviser who is associated with the major in which the student is enrolled.

All entering students are strongly encouraged to participate in the summer orientation program in which they will have the opportunity to meet and work with academic advisers in planning their first semester schedule of classes.

The advisers also assist students in making personal adjustments to university life, offer suggestions on academic and co-curricular choices, and provide information on career choices. Advisers make a special effort to adjust course schedules in accordance with students' interests and capabilities.

A student may wish to prepare for admission to a professional program such as law, medicine, or veterinary medicine while pursuing a bachelor of science degree in the College of Agriculture and Life Sciences. This may be accomplished through several majors; however, it is recommended that the student work closely with an academic adviser.

Each department prepares a guide to help students chart their long-term programs and to specify the exact requirements for graduation. Visit the college web site [www.ag.iastate.edu](http://www.ag.iastate.edu) (<http://www.ag.iastate.edu>).

### Graduate Study

Graduate study in agriculture is conducted through the Graduate College. Details are found in the Graduate College section of this catalog.

Various departments in the College of Agriculture and Life Sciences also participate in the following graduate-level interdepartmental offerings:

Biorenewable Resources and Technology  
 Ecology and Evolutionary Biology  
 Environmental Science  
 Genetics  
 Immunobiology  
 Microbiology  
 Molecular, Cellular, and Developmental Biology  
 Neuroscience  
 Nutritional Sciences  
 Plant Biology  
 Seed Technology and Business  
 Sustainable Agriculture  
 Technology and Social Change (interdepartmental minor)  
 Toxicology

For details, consult the Graduate College section (<http://catalog.iastate.edu/previouscatalogs/2016-2017/graduatecollege>) of this catalog.

### Departments of the College

- Agricultural Education and Studies
- Agricultural and Biosystems Engineering
- Agronomy
- Animal Science
- Biochemistry, Biophysics, and Molecular Biology
- Ecology, Evolution, and Organismal Biology
- Economics
- Entomology

- Food Science and Human Nutrition
- Genetics, Development and Cell Biology
- Horticulture
- Natural Resource Ecology and Management
- Plant Pathology and Microbiology
- Sociology

## Majors in the College of Agriculture and Life Sciences

A student has many majors from which to choose. Each major is unique although many courses are common. This is helpful to students in that they may transfer from one major to another before the second year with little loss of credits. Options and areas of specialization further define the majors and required coursework within some majors. In all cases, majors are designed to help students succeed in their chosen professions. Majors in agriculture and life sciences are:

### Primary Majors

Agricultural Biochemistry ([http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofliberalartsandsciences/biochemistry\\_biophysics\\_andmolecularbiology/#curriculuminagriculturalbiochemistry](http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofliberalartsandsciences/biochemistry_biophysics_andmolecularbiology/#curriculuminagriculturalbiochemistry))

Agricultural Business (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofliberalartsandsciences/economics/#curriculuminagriculturalbusiness>)

Agricultural and Life Sciences Education (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/agriculturaleducationandstudies/#curriculuminagriculturalandlifescienceseducation>)

Agricultural Studies (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/agriculturaleducationandstudies/#curriculuminagriculturalstudies>)

Agricultural Systems Technology (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/technologysystemsmanagement/#curriculuminagriculturalsystemstechnology>)

Agriculture and Society (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/agricultureandsociety>)

Agronomy (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/agronomy>)

Animal Ecology (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/naturalresourceecologyandmanagement/#animalecologyaecl>)

Animal Science (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/animalscience>)

Biochemistry ([http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofliberalartsandsciences/biochemistry\\_biophysics\\_andmolecularbiology/#agriculturalbiochemistrymajorinthecollegeofagriculture](http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofliberalartsandsciences/biochemistry_biophysics_andmolecularbiology/#agriculturalbiochemistrymajorinthecollegeofagriculture))

Biology (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/biology>)

Culinary Food Science (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofhumansciences/foodscienceandhumannutrition/#curriculuminculinaryscience>)

Dairy Science (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/animalscience/#curriculumindairyscience>)

Dietetics (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofhumansciences/foodscienceandhumannutrition/#curriculumindietetics>)

Diet and Exercise (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofhumansciences/foodscienceandhumannutrition/#curriculumindietetics>)

Environmental Science (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/environmentalscience>)

Food Science (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofhumansciences/foodscienceandhumannutrition/#curriculuminfoodscience>)

Forestry (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/naturalresourceecologyandmanagement/#curriculuminforesstry>)

Genetics (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/genetics>)

Global Resource Systems (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/globalresourcesystems>)

Horticulture (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/horticulture>)

Industrial Technology (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/technologysystemsmanagement>)

Insect Science (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/entomology>)

Microbiology (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/microbiology>)

Nutritional Science (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/nutritionalscience>)

### Secondary Majors\*

Environmental Studies (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofliberalartsandsciences/environmentalstudies>)

International Agriculture (<http://catalog.iastate.edu/previouscatalogs/2016-2017/collegeofagricultureandlifesciences/internationalagriculture>)

Seed Science (<http://catalog.iastate.edu/previouscatalogs/2016-2017/interdisciplinaryprograms/undergraduate/seedsceince>)

\*A secondary major must be taken in conjunction with a primary major.

### Minors

Agricultural Biochemistry  
 Agricultural Business  
 Agricultural Education and Studies  
 Agricultural Systems Technology  
 Agronomy  
 Animal Ecology  
 Animal Science  
 Biology  
 Culinary Food Science  
 Emerging Global Diseases\*  
 Entrepreneurial Studies\*  
 Environmental Studies  
 Food and Society  
 Food Safety\*  
 Food Science  
 Forestry  
 Genetics

Horticulture  
Industrial Technology  
Insect Science  
International Agriculture  
Meat Science  
Microbiology  
Nutrition  
Sustainability\* (<http://www.las.iastate.edu/sustainability>)

\*The College of Agriculture and Life Sciences participates in these interdepartmental minors.

### **Certificate**

Occupational Safety

See statement on minors in the Colleges and Curricula section of this catalog.

## **Special Programs**

### **Agriculture Exploration**

Agriculture Exploration is a starting place for students who wish to pursue careers in the life sciences, food science, natural resources, production agriculture, business, or communications but who are unsure of which majors to choose. Students entering this program will be advised in the Student Services Office until they select their majors.

### **Preveterinary Medicine**

Students in the College of Agriculture and Life Sciences may complete the requirements for admission to the College of Veterinary Medicine by enrolling in any major within the college. Because a solid foundation in the sciences is basic to the program in veterinary medicine, those majors that emphasize the sciences are usually more compatible with preveterinary medicine (see College of Veterinary Medicine section of this catalog for specific admissions requirements).

Students who are undecided about choice of major may enroll in general preveterinary studies (Gen PV). These students will also enroll in an orientation course, which describes the various college majors. A Gen PV student has up to 1.5 semesters to select a major.

Preveterinary medicine students also have an opportunity, with careful planning, to complete the requirements for a bachelor of science degree in an individual curriculum within the College of Agriculture and Life Sciences after admission to the College of Veterinary Medicine. This may be done by completing the prescribed course of study established by an individual major. Students also may meet degree requirements of an individual major through the College of Agriculture and Life Sciences Honors Program. Further details are available from an academic adviser or from members of the College of Agriculture and Life Sciences Honors Committee.

### **Honors Program**

The College of Agriculture and Life Sciences Honors Program provides an opportunity for students of high ability to maximize their educational experience by individualizing their program of study. (See statement on Honors Program in the Colleges and Curricula section of this catalog). For more information, contact the chair of the College of Agriculture and Life Sciences Honors Committee, or a department Honors contact person.

## **Off-Campus Programs**

Coursework leading to a master of science degree in agricultural education, master of agriculture degree in professional agriculture and a master of science degree in agronomy are offered to students who choose to study off-campus; see Extended and Continuing Education for further information.

## **Study Abroad and International Travel Opportunities**

Agriculture and life sciences are part of a highly interconnected global system; decisions made in one sector have profound impacts worldwide. It is important for students to develop an understanding and appreciation for the global system and the role that U.S. agriculture plays in providing a safe and predictable food supply for a growing world population. The College of Agriculture and Life Sciences provides study abroad and international internship opportunities in more than 25 countries around the world. For additional information, contact the Office of Global Agriculture Programs in the College of Agriculture and Life Sciences.

## **Internships and Cooperative Education Programs**

Practical work experience can provide a unique learning opportunity that complements academic coursework. This experience is provided through internships or cooperative education programs. For additional information, contact a departmental adviser or internship coordinator.