

IOWA STATE UNIVERSITY

# The Environment

Agricultural Engineering  
Agricultural Systems  
Technology  
Agronomy  
Animal Ecology  
Biology  
Chemical Engineering

Chemistry  
Community and Regional  
Planning  
Earth Science  
Environmental Science  
and Environmental Studies

Forestry  
Genetics  
Geology  
Global Resource Systems  
Horticulture

Landscape Architecture  
Meteorology  
Microbiology  
Seed Science

**Iowa State University has more than 100 majors that provide virtually unlimited academic opportunities.** In this brochure you'll find information about your specific area of interest and a family of related majors that you may want to explore during your adventure here at Iowa State. Please use the contact information listed inside and let us help you discover your passions, unlock your potential, and **enjoy the adventure.**

## **Invest in the future of your world**

If we've learned anything in the last century of nuclear bombs, endangered species, diminishing resources, and the hole in the ozone, it's that we must better understand the environment so that we can preserve our natural resources for future generations. Your education at Iowa State provides you with the tools you need to make an impact in your field.

Your classroom lectures are complemented by practical, hands-on experience in our on- and off-campus laboratories. Iowa State's extension program trains and employs student consultants who work with specialists in the field.

Armed with a solid understanding of environmental science, specialized training in your chosen field, and your practical experience, you are prepared for careers in fields such as politics, public relations, engineering, law, government, science, or environmental design.

## **Take advantage of a unique environment**

You will find faculty and staff engaged in student-related activities such as directing student research projects, participating in club events, setting up field trips, and working side by side with students in campus greenhouses, field stations, gardens, and computing stations.

Faculty commitment to undergraduate education has earned them national teaching awards and national rankings for quality undergraduate education.

## **Select the program that's best for you**

The magnitude and complexity of environmental issues are creating a growing need for interdisciplinary study. You will find that many programs at Iowa State address these issues in relation to the professional challenges and opportunities they pose. Often, environmental studies courses may fulfill requirements for several majors. Your faculty adviser will encourage you to explore a broad range of academic options and help you design a curriculum that takes advantage of the opportunities Iowa State offers—specialized courses, cooperative learning programs, internships, research projects, student support groups, and learning communities.

# The Environment

## Agricultural Engineering

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As an agricultural engineering student you will learn how to design systems that directly impact peoples' lives. You will explore the biological, physical, and engineering sciences and apply your knowledge to solving problems using agricultural and biological engineering design methods. You may specialize in either power and machinery engineering, animal production systems engineering, or land and water resources engineering.

If you choose the power and machinery option, you will study functional analysis and design of agricultural field machinery, agricultural tractor power, instrumentation, agri-industrial

application of electric power and electronics, and fluid power engineering.

The animal production systems engineering option allows you to focus on all aspects of animal production including structural design and analysis, environmental control options for housed animals, and air quality issues associated with animal production.

In the land and water resources engineering option, you will study the design and evaluation of soil and water conservation systems, GIS and natural resource management, and principles of environmental engineering.

## Agricultural Systems Technology

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students/agricultural-systems-technology

As an agricultural systems technology major you will apply a systems-approach to technology management, which prepares you to oversee and optimize machinery, biological processes, and rapidly developing and changing systems in agriculture.

This is a hands-on curriculum with high quality laboratory experiences and team-based environment that will prepare you for challenging and rewarding careers. Key laboratories include diesel engines, fluid power hydraulics, biomaterials, biofuels, plastics, metals, manufacturing, automation/robotics, electronic

controls, and precision agriculture. Iowa State's state-of-the-art facilities provide access to industry-standard hardware and software ensuring that you graduate with competitive, marketable skills.

A degree in agricultural systems technology will open doors to rewarding careers and employment in agribusiness, agricultural machinery industries, biotechnology companies, environmental organizations, production agriculture companies, manufacturing industries, and government agencies.

## Agronomy

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Agronomy is the science of plants and soils for agriculture and the center of new frontiers in biotechnology, sustainable agriculture, and biorenewable fuels.

As an agronomy major you will learn about the role and diversity of plants, soils, and climates of the world. In addition to understanding ethical, cultural, and environmental issues that impact agriculture and natural resources, you will also solve problems, gain hands-on experience, and

research current agricultural issues. Graduates have the theoretical and practical knowledge needed for efficient and sustainable production of food, feed, fuel, and fiber.

With a degree in agronomy from Iowa State you will be prepared for a variety of careers such as agricultural climatologist, crop consultant, seed production manager, soil and water conservationist, crop protection specialist, and field representative.

## Animal Ecology

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Iowa State is the only university in the country that offers an undergraduate major in animal ecology. Your coursework will emphasize ecological principles and processes and their applications to natural resource management.

You will focus on one of four areas: wildlife biology, fisheries and aquatic sciences, interpretation of natural resources, or pre-veterinary and wildlife care.

A degree in animal ecology will prepare you for a variety of career paths with natural resource and environmental protection and animal care agencies, organizations, and businesses.

## Biology

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Iowa State is a major center for research and education in the biological sciences. Students have the opportunity to learn from some of the nation's leaders in biological research and teaching and to participate in innovative programs.

You may develop your program of study to target your goals by choosing from a wide variety of advanced courses in areas such as animal biology; plant biology; ecology; evolution; biodiversity; and genetics, development and cell biology. You will also have the opportunity to study abroad, take courses at field stations around North America, and participate in North American or

international field trips in biology. In addition, you may explore the frontiers of biology by doing research on campus or through summer field courses at Iowa Lakeside Laboratory or one of our affiliated institutes including the Organization for Tropical Studies or the Gulf Coast Research Laboratory.

Iowa State's high-quality academic program will prepare you for further studies in graduate school in a diverse range of biological fields or to continue on to professional training in environmental biology, human medicine, veterinary medicine, dentistry, optometry, physical therapy, chiropractic or pharmacy.

## Chemical Engineering

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As a chemical engineering major you will use science, experience, creativity, and ingenuity to deal with chemical and physical changes of matter and the conversion of energy.

The department provides a broad range of chemical engineering courses, as well as the opportunity to work with engineers at the Ames Laboratory of the U.S. Department of Energy,

which conducts physical and chemical science research related to energy technologies.

Your coursework will prepare you for employment in areas including product development, market research, economic feasibility studies, chemical process and design, supervision and operation, chemical plant construction, and pollution control and energy conservation.

## Chemistry

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When you study chemistry you have the opportunity to study scientific processes and reactions that define every aspect of daily life.

As a chemistry major you will learn how to design, implement, record, and analyze the results of a chemical experiment. Your coursework will focus on the environmental and ethical dimensions of problems and issues that face professionals. You will use modern instruments and classical techniques to identify and solve chemical problems as you explore new areas of research.

Students also have the opportunity to join both the Chemistry Learning Community and the Society for Chemistry Undergraduate Majors as a way to network with other chemistry majors.

A degree in chemistry from Iowa State will prepare you to continue in graduate school or professional studies, or qualify you for a career as an environmental chemist, pharmaceutical chemist, forensic scientist, science writer, technical salesperson, product development chemist, or researcher.

## Community and Regional Planning

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The Department of Community and Regional Planning at Iowa State is one of the nation's largest and longest-established planning programs, and one of only 16 accredited undergraduate planning programs in the United States. Planning is the profession that is dedicated to helping society manage change. Planners help to evaluate and seize opportunities and to understand and solve problems.

As a community and regional planning major you will combine classroom and studio-based instruction to learn how to use a systematic, creative approach to influence and manage the social, economic, and physical change of neighborhoods, small towns, cities, suburbs, metropolitan areas, regions, and states. Your classes will work closely with local communities

or governments to explore genuine planning problems and solutions.

You may choose to focus your studies around a specific area of planning such as Community Development and Social Policy, Ecological and Environmental Planning, Regional and International Planning, Physical Planning and Urban Design, or Transportation and Land Use. You may also choose to remain a generalist and complete a variety of courses in several areas of planning.

A degree in this major will prepare you for a career working with cities, counties, federal government agencies, consulting firms, computer software companies, and a wide variety of other career paths.

## Earth Science

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As an earth science major you will study how to describe the natural world, investigate the environment, and understand the reasons for changes in the structure of the planet we inhabit.

The earth science major represents a broad program of study: a foundation in the physical sciences such as chemistry, physics, and mathematics, and a well-rounded background in environmental sciences, meteorology, and geology.

Your coursework will feature studies in environmental geology, earth history, environmental science, and general earth science. The department offers a bachelor of science and, for those interested in teaching earth science, a bachelor of arts.

About one third of Iowa State earth science graduates pursue careers in teaching.

## Environmental Science and Environmental Studies

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[www.envs.iastate.edu](http://www.envs.iastate.edu)

Iowa State offers two distinct but allied undergraduate programs focused on environmental systems: environmental science and environmental studies.

The environmental science major provides a technically rigorous, quantitative, and integrated approach to the study of environmental systems. The magnitude and complexity of environmental problems are creating a growing need for scientists with interdisciplinary training in environmental science. The environmental science curriculum is designed to prepare you for a position of leadership in this rapidly changing discipline. Your coursework will provide you with

a solid foundation in the biological, chemical, and physical sciences and the specialized training necessary for integrated analysis of environmental systems.

Environmental studies is an interdepartmental, secondary major serving students with primary majors ranging from architecture to zoology. Designed to work in concert with your primary major, environmental studies can add an environmental component to any program of courses. This secondary major provides you with an understanding of major regional and global environmental issues and an appreciation of different perspectives regarding these issues.

## Forestry

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As a forestry major you will acquire an understanding of the forest ecosystem; your coursework will include plant identification, resource evaluation, forest economics, natural resource management, and sustainable forest systems.

Forestry includes exposure to a variety of systems including public and private lands, urban systems, biodiversity and sustainability, and agroforestry. Faculty work closely with students;

experiences include field trips, hands-on labs, and optional research experience, which allows you to work directly with faculty.

As part of your curriculum you participate in a 16-day, off-campus camp experience held at one of several locations across the country. This experience introduces you to practical techniques and exposes you to new landscapes and cultural circumstances.

## Genetics

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As a genetics major you will explore the characteristics of living organisms to determine how they are passed from generation to generation. Understanding heredity is fundamental to all the biological sciences, particularly animal science as it relates to production and the study of disease.

The department offers a broad range of courses in every aspect of genetics, from molecular genetics

of microorganisms to population genetics. You may also consider minoring in genetics to complement a major in another field of science, mathematics, or computer science.

A degree in genetics will prepare you for a career in research and development, teaching, biotechnology, health, and graduate or professional study in science, medicine, or veterinary medicine.

## Geology

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As a geology major you will encounter much more than the study of rocks and landforms. Geology is the study of the structure and origin of the earth, and the processes that shape its interior and surface. You will learn about how different Earth systems operate and interact to shape our environment and provide the resources that sustain society.

Your coursework will include background in basic sciences, and geology courses that provide hands-on experience with microscopes, Geographic Information Systems (GIS), and equipment used to monitor Earth processes

and image Earth's subsurface. Your geology courses will also include numerous field trips and exercises, both in the Midwest and in ecologically-rich, north-central Wyoming where Iowa State maintains a permanent geology field station on the western edge of the Bighorn Mountains.

A degree in geology will prepare you for a wide variety of career opportunities, including the oil and gas industry; federal, state, and local environmental agencies; environmental consulting firms; the mining industry; GIS analysis; and geoscience education.

## Global Resource Systems

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As a global resource systems major you will explore global food and agriculture, international resource issues, international development, and resource-related businesses worldwide.

Your coursework will emphasize global and cross-cultural engagement, while equipping you with strong technical competency in a resource area of your choosing.

As a graduate in global resource systems you will be prepared for leadership positions in international non-governmental organizations; global businesses; government agencies engaged in international trade and development; and globally engaged foundations, educational institutions, and volunteer organizations.

## Horticulture

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Iowa State's horticulture program focuses on enhancing the quality of the environment and fostering stability, vitality, and growth of horticulture to promote economic and rural development.

As a horticulture major you will learn about plant growth and development, the culture and management of crops, and the ethical and environmental issues facing professionals.

You will choose a specialization in environmental horticulture, greenhouse management, fruit and vegetable production and management, nursery crop production and management, turfgrass management, horticultural science, horticulture communications and public education, public garden management and administration, or planting design and installation.

## Landscape Architecture

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Iowa State's undergraduate landscape architecture program is ranked among the top 15 in the United States by DesignIntelligence. The professional, five-year bachelor of landscape architecture consists of a one-year preprofessional program followed by a four-year professional segment; entry into this nationally accredited program is competitive.

The landscape architecture curriculum focuses on environmental stewardship, wise planning, and artful design of urban, suburban, rural, and wilderness landscapes. Your coursework

will include studies in technologies, plant communities, ecology, and history. In addition you will gain design studio experience, which provides an in-depth understanding of the way natural, social, and cultural systems influence design.

As a landscape architecture student you have access to video imaging equipment and design graphics computers as you work on projects in image editing, three-dimensional modeling, and animation.

## Meteorology

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Tornadoes, hurricanes, cloud formations, and computer modeling are some of the phenomena you study when you major in meteorology. Meteorology is the study of the earth's atmosphere and the processes responsible for its behavior.

Meteorology will provide you with a background in weather observation, physics, dynamics of climate, application of new weather technologies, computer programming and modeling, and verbal and written communication. The meteorology program teaches you to use state-of-the-art equipment, so you will be competitive in the

field. The atmospheric science program maintains Linux workstations linked to the global Internet. Additional computing is performed using external facilities such as the supercomputer center of the National Center for Atmospheric Research.

A meteorology degree from Iowa State will prepare you for employment in a variety of professions including television meteorology, governmental weather forecasting, the military, and professors and researchers in higher education.

## Microbiology

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Microbiology is the study of living organisms and infectious agents. Microbiologists study the interaction of microorganisms with people, investigating how microbes exist and affect the ecosystem and our lives.

As a microbiology major you will study genetics, chemistry, biochemistry, physiology, physics, ecology, and pathology. With a degree in microbiology you may develop vaccines for

infectious diseases, test for infections, conduct research to determine how microorganisms cause disease, harness microbes to recycle waste, improve livestock production, or make food taste better and prevent spoilage.

Your degree will prepare you for professional study in human or veterinary medicine or for a career in clinical, food, industrial, or environmental technologies.

## Seed Science

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seed\_science.php

With a secondary major in seed science, you will study how seeds are produced, improved, monitored for quality control, marketed, and conditioned.

Iowa State houses the Seed Science Center and the largest seed testing laboratory, and is the only undergraduate degree in seed science in the nation. Programs in the Seed Science Center have reached over 80 countries in the world. The seed science major is taken in conjunction with

a primary major in another agricultural field of study such as agronomy, agricultural business, or horticulture.

With a background in seed science you will be able to work in research, production, quality assurance, marketing, or utilization and regulatory environments. Graduates of seed science may work for companies such as the U.S. Department of Agriculture or international agencies such as the World Bank.

## Honors and awards

You will have the opportunity to work with internationally acclaimed faculty on projects that are changing the world and our understanding of it.

Faculty have served as directors for the Whole Earth Telescope Collaboration, distinguished professors, and corporate CEOs. In addition to holding patents, our faculty have won several awards for teaching, advising, and research, such as Inventor of the Year and American Nursery and Landscape Association awards. Several faculty are members of the National Academy of Sciences.

## Unique learning environment

Iowa State features a variety of top-flight, hands-on laboratories where students collaborate with faculty, consult for industry, and conduct their own research.

Most undergraduates participate in undergraduate research projects or internships, which could include working with nationally or internationally recognized companies or with the Leopold Center for Sustainable Agriculture, Ames Laboratory, the USDA National Soil Tilth Lab, and the Plant Introduction Station, all located on campus.

In addition to off-campus learning opportunities, you will delight in the on-campus gardens, greenhouses, and laboratories.

The multidisciplinary Graduate Program in Sustainable Agriculture at Iowa State is the first of its kind in the nation for students continuing their education in environmental and sustainability agricultural production that enhances the vitality of rural communities nationally and worldwide.

## Unique learning opportunities

As an Iowa State undergraduate, you will have the option of participating in a wide variety of social, academic, and professional activities outside of the classroom. Some of these activities may include:

- Iowa Lakeside Laboratory—a biological field station on West Lake Okoboji, where students conduct summer research or take courses
- Learning communities—residence-based communities for new freshmen studying similar subjects
- Honors programs—recognizing academic excellence by permitting students to customize their programs of study and complete independent research projects
- International travel and field trips—to Asia, Australia, Europe, South America, and North America
- Botany herbarium—one of the largest plant collections in the nation, it contains hundreds of thousands of preserved plant specimens, some collected by George Washington Carver, an early professor in the department
- Greenhouses—provide plants for teaching purposes, a nationally recognized conservatory where rare and endangered plants are rescued and maintained, and hundreds of species of tropical and sub-tropical plants
- High-tech computer laboratories—feature microcomputers, CAD stations, high-quality printers, plotters, and video projectors
- State-of-the-art analysis and research laboratories—such as the Spangler Geotechnical Laboratory, the Bridge Engineering Center, and the Analytical Services Laboratory
- Iowa State Geology Field Station—near Shell, Wyoming, where students undertake a field course or conduct research

## Student organizations

Students are encouraged to join student clubs and professional organizations to support their academic pursuits. Organizations include:

- Agronomy Club
- American Institute of Chemical Engineers
- American Meteorological Society
- American Society of Agricultural Engineers
- American Society of Civil Engineers
- Arboriculture Club
- Astronomy Club
- Biochemistry Club
- Biological Sciences Club
- Biophysics Club
- Community and Regional Planning Club
- Cyclone Power Pullers
- Dairy Science Club
- Engineers for a Sustainable World (ESW)
- Entomology Club
- Fisheries and Wildlife Biology Club
- Food Science Club
- Forestry Club
- Genetics Club
- Geology Club
- Horticulture Club
- Leaders for a Sustainable Community
- Microbiology Club
- Omega Chi Epsilon
- Society of Chemistry Undergraduate Majors
- Soil and Water Conservation Club
- Student Society of Landscape Architecture
- Turf Club
- Xi Sigma Pi

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## Questions about admission

In addition to writing us at the address at left, we encourage you to visit our website, which features a course catalog, online application, and campus information.

Also, you can follow us on:



## Preparing to do your best while in school

The best preparation continues to be a strong college preparatory program of study, which includes courses in English, mathematics, laboratory science, social studies, and foreign languages. If you intend to transfer credits from another institution, you may contact our Office of Admissions for assistance in selecting the best courses for your program of study.

Material in this brochure was accurate at the time of printing. For the most up-to-date information, visit our website at [www.iastate.edu](http://www.iastate.edu).

Iowa State University does not discriminate on the basis of race, color, age, ethnicity, religion, national origin, pregnancy, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. veteran. Inquiries can be directed to the Office of Equal Opportunity, 3350 Beardshear Hall, (515) 294-7612.