College of Engineering

"I have an interest and aptitude for science and math and want to apply my skills to engineering. I see myself solving real-world problems and meeting the technical challenges of the 21st century. I want to make a positive impact on society."

IOWA STATE UNIVERSITY

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The College of Engineering is a prestigious program for students passionate about pursuing groundbreaking research, transforming technology, and being leaders that make a difference and create solutions to make the world a better place. Will you discover sustainable energy sources that won't pollute the air? Or create transportation systems to safely move people? There are many options in the College of Engineering that allow you to choose what inspires you most to help change the world.

SCIENCE BOUND

Qualifying Degree Programs*:
Tap the major you are interested in to learn more!

Click on a major from the list below to learn more!

Aerospace Engineering
Agricultural Engineering
Biological Systems Engineering
Biomedical Engineering
Chemical and Biological Engineering
Civil Engineering
Computer Engineering
Construction Engineering
Cyber Security Engineering
Electrical Engineering
Environmental Engineering
Industrial Engineering
Materials Science and Engineering
Mechanical Engineering
Software Engineering

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*Degree may be listed in more than one college *Qualifying majors may change based on the programs of study. Science Bound makes the final decision regarding which majors qualify for the scholarship. ** Student must work with SB staff to ensure acceptance. ***Students entering as Open Option must discuss courses with SB staff.*

AEROSPACE ENGINEERING

AIRCRAFT, ASTROPHYSICS, AUTONOMOUS VEHICLES AND MORE LEARN ENGINEERING FUNDAMENTALS AND DESIGN AND BUILD THE MACHINES OF THE FUTURE

WITH HANDS-ON EXPERIENCE & MOTIVATION AE PREPARES YOU FOR MANY ENGINEERING CAREERS. MORE THAN HALF OF OUR GRADUATE STUDENTS WORK IN FIELDS THAT GO BEYOND AIRPLANES AND ROCKETS.

THE FUNDAMENTALS OF AEROSPACE

AERODYNAMICS

FLIGHT DYNAMICS

PROPULSION

STRUCTURAL MECHANICS

FLIGHT CONTROLS

DESIGN AND SYSTEMS

AGRICULTURAL ENGINEERING

GOAL:

- ANALYZE & DESIGN MACHINERY, ANIMAL HOUSING, AND ENVIRONMENTAL SYSTEMS
- PRODUCE, PROCESS, STORE, HANDLE, DISTRIBUTE
- USE FOOD, FEED, FIBER AND OTHER BIOMATERIALS
- MANAGE NATURAL RESOURCES

CAREERS:

- EMPLOY IN DIVERSE AG & BIO RELATED INDUSTRIES + GOVERNMENT AGENCIES
- WORK WITH AG MACHINES AND BUILDINGS, ANIMAL AND ENVIRONMENTAL CONTROL, GRAIN PROCESSING AND HANDLING, SOIL AND WATER RESOURCES, FOOD, BIORENEWABLES, & BIOTECHNOLOGY

- ***THE AG-ENGINEERING PROGRAM IS ACCREDITED BY THE ENGINEERING ACCREDITATION COMMISSION***

BIOLOGICAL SYSTEMS ENGINEERING

WHAT IS IT?

BSE INVOLVES SUSTAINABLE PRODUCTION, STORAGE, AND CONVERSION OF BIOBASED MATERIALS INTO USEFUL PRODUCTS.
EXAMPLES RANGE FROM BREAKFAST CEREALS TO BIOLOGICALLY DERIVED FUELS LIKE ETHANOL & BIODIESEL

OPTION AREAS OF STUDY

ECOLOGICAL ENGINEERING:
USE BIOLOGY, ECOLOGY, AND ENGINEERING PRINCIPLES TO DESIGN ECOSYSTEMS FOR PEOPLE AND NATURE

FOOD + BIOPROCESSING ENGINEERING:
DESIGN AND OPERATE FOOD PROCESSING SYSTEMS WHILE IMPROVING THE ECONOMIC AND ENVIRONMENTAL SUSTAINABILITY OF BIORENEWABLE RESOURCE PRODUCTION SYSTEMS

OPEN OPTION:
ENJOY A CAREER IN ACADEMIA, LAW, OR INDUSTRY THAT HAS A FOUNDATION IN FUNDAMENTALS, SYSTEMS APPROACHES, BIOLOGY, AND CHEMISTRY

BIOMEDICAL ENGINEERING

WHAT IS IT?

Biomedical engineering (BME) focuses on biology that is related to medical systems. You will get hands-on experience in using engineering to solve medical problems.

FUTURE CAREERS

- research
- create medical devices
- better ways to treat disease
- work on software and systems to improve healthcare
- develop prosthetics

CHEMICAL & BIOLOGICAL ENGINEERING

IMPACT THE WORLD

WORK INVOLVES CONSUMER PRODUCTS, FUELS, BIORENEWABLE ENERGY, AND MEDICAL + HEALTH CARE ADVANCEMENTS

USED AS A SPRINGBOARD TO MEDICAL SCHOOL OR LAW SCHOOL

GROWING AREA

COVERS SPECIALTIES SUCH AS PETROCHEMICALS & GAS, AG PRODUCTS, BIOMEDICINE, PHARMACEUTICALS, AND FOODS AND BEVERAGES

CIVIL ENGINEERING

LEARNING:

- APPLY PRINCIPLES OF MOTION & MATERIALS
- PLAN, DESIGN, CONSTRUCT
- MAINTAIN & OPERATE PUBLIC + PRIVATE FACILITIES
- WORK UNDER ECONOMIC, SOCIAL, & ENVIRONMENTAL CONSTRAINTS

AFTER GRADUATION:

- PURSUE CAREERS IN CE OR RELATED PROFESSIONS
- COLLABORATE ON MULTI-DISCIPLINARY TEAMS
- ADDRESS THE NEEDS OF SOCIETY & THE ENVIRONMENT
- PURSUE LEARNING, PROFESSIONAL DEVELOPMENT, AND LICENSURE

WHAT CE LOOKS LIKE

- CE'S DESIGN MAJOR TRANSPORTATION PROJECTS
- THEY PLAN, DESIGN, AND SUPERVISE THE CONSTRUCTION AND MAINTENANCE OF BUILDING AND INFRASTRUCTURE PROJECTS
- THESE PROJECTS MAY INCLUDE FACILITIES, BRIDGES, ROADS, TUNNELS, AND WATER AND SEWAGE SYSTEMS

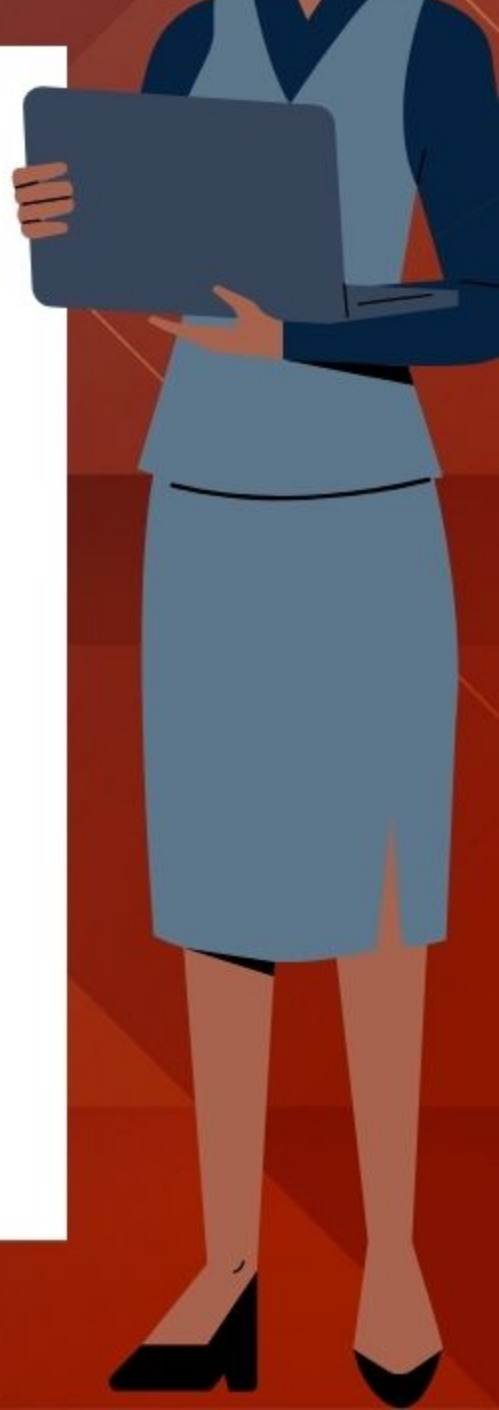
COMPUTER ENGINEERING

Focus areas:

software systems
embedded systems
networking
information security
computer architecture
VLSI.

Career options:

Machine Learning Engineer
Data Scientist
Software Developer
Computer Network Architect
Computer Systems Analyst
Database Administrator



CONSTRUCTION ENGINEERING

DUTIES:

- ENGAGE IN DESIGN
- COORDINATE PROJECT DESIGN
- SYSTEM DESIGN
- COST ESTIMATING & CONTROL
- PLAN AND SCHEDULE
- COMPANY AND PROJECT MANAGEMENT
- MATERIALS PROCUREMENT
- EQUIPMENT SELECTION

GROWING NEED:

- WITH THE EMERGENCE OF INTEGRATED PROJECT DELIVERY METHODS
  - IT'S EXPANDING THE NEED FOR TRAINED CE PROFESSIONALS THAT UNDERSTAND BOTH ASPECTS OF THE PROJECT DELIVERY ENVIRONMENT.

CYBER SECURITY ENGINEERING

What they do:

- Protect computer and networking systems from potential hackers and cyber attacks.
- Prevent cyber hackers from infiltrating data with their knowledge in the fundamentals of cyber security, computers, networks, and software systems.

Career opportunity examples

- Cybersecurity architect
- Penetration tester
  - simulate cyberattacks on computer systems & networks to identify security vulnerabilities & weaknesses
- Cybersecurity product designer
- Integrate cybersecurity into devices

ELECTRICAL ENGINEERING

EMPHASIS AREAS:

STUDENTS CHOOSE 1

- CONTROL SYSTEMS
- ELECTROMAGNETICS & NONDESTRUCTIVE EVALUATION
- MICROELECTRONICS AND PHOTONICS
- VLSI
- ELECTRIC POWER AND ENERGY SYSTEMS
- COMMUNICATIONS AND SIGNAL PROCESSING

WHAT ELECTRICAL ENGINEERS DO:

DESIGN, DEVELOP, TEST, AND SUPERVISE THE MANUFACTURE OF ELECTRICAL EQUIPMENT, SUCH AS ELECTRIC MOTORS, RADAR AND NAVIGATION SYSTEMS, COMMUNICATIONS SYSTEMS, OR POWER GENERATION EQUIPMENT

WHY YOU SHOULD DO ELECTRICAL

- IT'S IN HIGH DEMAND
- TAKE THE PE ELECTRICAL EXAM TO EARN A LICENSE
- EASIER TO GET A JOB IN ELECTRICAL ENGINEERING
- OPPORTUNITY TO STUDY ABROAD

ENVIRONMENTAL ENGINEERING

Design & implement effective, affordable solutions for environmental challenges involving water, air, and land.

Solve complex infrastructure challenges within the diverse areas of environmental engineering.

Career: Analyze + design systems for water supply & distribution, collect and process waste, control air quality, +more

For more general education - consider a major in civil engineering with environmental emphasis

INDUSTRIAL ENGINEERING

Learning:

1. Create + pass on solutions with ramifications
2. Develop and conduct experiments + analyze and interpret data
3. Design solutions for public health, safety, and welfare, as well as global, cultural, social, environmental, & economic factors

What is it?

IE is the optimization of complex processes, systems, or organizations by developing, improving and implementing integrated systems of people, money, knowledge, information and equipment

Career Overview:

Find ways to eliminate waste in production processes

Materials Science and Engineering

What do you do?

- Create new materials and improve existing materials
- Understand the relationship between the properties of a material and its internal structure

Areas of study

- Ceramics: Glass and its use in fiber optics and surgical devices.
- Metals: Many types of metals and alloys
- Polymers: Find new uses for plastic and learn how to make it better.

Overview:

Help a product become cheaper, easier to produce, or more durable also discover new materials

MECHANICAL ENGINEERING

MAKING A DIFFERENCE

Whether you're helping improve the environment, creating safer automobiles, or advancing medical technologies, and athletic performance, ME gives you all the tools

HANDS ON WORK

Work alongside a diverse group of highly skilled professors & students in research projects, labs, and clubs while working on groundbreaking engineering projects

CAREER IDEAS

- MECHANICAL ENGINEERING IS THE JACK OF ALL TRADES
- MANY ENGINEERING JOBS, PROJECT LEAD, MANAGEMENT, + SO MUCH MORE

SOFTWARE ENGINEERING

WHAT DO YOU DO?

Design, develop, and evaluate software, configure and install computer systems, and build and maintain software systems

LEARNING

Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which impact engineering solutions in global, economic, environmental, and societal contexts

CAREER OPTIONS

Applied skills:

- Application analyst
- Database administrator
- Forensic computer analyst
- IT technical support
- Sound designer
- Systems analyst

Related fields:

- Applications developer
- Cyber security analyst
- Game developer
- Information systems manager
- IT consultant
- Multimedia programmer
- Software engineer