



Biological Systems Engineering



Biological Systems Engineering brings engineering to life—working with living systems and the environment—by using engineering with biology and mathematics to improve peoples' lives. This major leads to rewarding careers in Biomedical Engineering, Food and Bioproducts Engineering, and Environmental and Water Resources Engineering. The program provides a broad, flexible engineering background with a biological emphasis.

Possible Engineering Career Areas

Prosthetic Design
Bioprocessing
Water Treatment
Biosensors

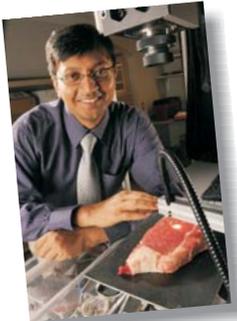
Erosion Control
Wetlands Restoration
Bioinstrumentation
Bioproducts

Bioremediation
Biofuels
Biomedical Imaging
Flood Mitigation



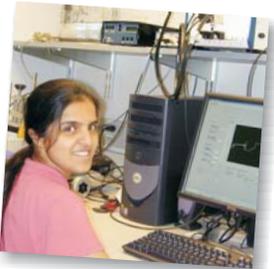
A high percentage of our students graduate and go to work immediately in well-paid positions. Our graduates are also admitted to the best graduate programs worldwide, leading to careers in medicine, law, dentistry, veterinary medicine, government, or business.

The curriculum includes a balance of required biological systems engineering courses; engineering core courses (including computer science); engineering electives; mathematics and statistics; biological sciences; chemistry, biochemistry, and physics; communications skills, humanities, and social sciences; and additional electives.



Examples of topics addressed in the curriculum include watershed protection, ecosystem restoration, nonpoint source pollution control, bioremediation, and pollution prevention; extrusion and bioreactor design, pharmaceutical and animal health product production, and plant and animal protection; surgical and prosthetic device development, biomechanics, biosignal and image processing, and biomedical imaging and tissue engineering. The curriculum emphasizes report writing, speaking, and teamwork, as well as computer-aided design.

The senior capstone engineering design sequence includes a two-semester project working with, and solving a problem for, a real-world client. These projects come from private, government, agencies, and academic settings.



Students are expected to work hard, maintain a minimum cumulative gpa of 2.4 (4.0 scale), have an interest in math and biology, and possess the desire to solve complex problems using engineering skills. Though not required, internships and co-operative work experiences are encouraged and widely available. Research and study abroad opportunities for undergraduate students are plentiful. There are several student clubs with professional affiliations for participation. An excellent faculty-to-student ratio, a faculty recognized for their teaching and advising skills, plus being awarded the University of Nebraska System Department Teaching Award in 2002, plus a top 10 ranking by US News and World Report, all combine for a superior quality education in the Biological Systems Engineering Department.

Please contact:

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College of Engineering

Department of Biological Systems Engineering

Program Emphasis Areas

Biomedical Engineering

If you're looking for a career field with unlimited potential and want to make a real impact on peoples' lives, look no further. Biomedical engineering is a rapidly expanding field encompassing a wide variety of subject matter and research. Ultrasound and MRI, surgical tool design, tissue engineering, prosthetic design, biomechanics, and rehabilitation engineering are just a few of the emerging fields in this specialty.

Environmental & Water Resources Engineering

Protecting and restoring the soil, air, and water that all biological systems depend on is a rewarding area of study with many career options. Learn about nonpoint source pollution, restoring streams, lakes, and wetlands, and protecting groundwater. This is a fantastic career choice for people who like to work outside and experience the hands-on results of their ideas and concepts. Study and participate in research that makes a difference for the planet and the quality of life we have come to treasure.

Food & Bioproducts Engineering

If you've ever wondered how Cheetos™ are made, or how the shelf life or the safety of a food product is determined, we'll show you how engineering applies to the science of food and agriculture. You'll also learn about new possibilities for bioproducts: from biofuels to new uses for grain by-products such as nutraceuticals and textiles, plus plant-derived plastics, waxes, oils, and coatings. Learn about this exciting technology and be involved in growing new ideas and processes in food and bioproducts.



The University of Nebraska–Lincoln is an equal opportunity educator and employer with a comprehensive plan for diversity.

Curriculum*

First Year

Semester 1

BSEN 100 Intro to Biological Systems Engineering (BSEN)
CHEM 113 General Chemistry I
ENGR 010 Freshman Engineering Seminar
MATH 106 Analytic Geometry and Calculus I
Electives: General Education (ACE)

Semester 2

BSEN 112 Problem Solving in BSEN
BSEN 130 Computer-aided Design
CHEM 114 General Chemistry II
MATH 107 Analytic Geometry & Calculus II
PHYS 211 General Physics I

Second Year

Semester 3

BSEN 225 Engineering Properties of Biological Materials
BIOS 102 Cell Structure & Function
CHEM 251/253 or 261/263 Organic Chemistry & Lab
ENGM 223 Engineering Statics
ENGR 020 Sophomore Engineering Seminar
MATH 208 Analytic Geometry and Calculus III

Semester 4

BIOC 321/321L or 431 Biochemistry & Lab
BSEN 244 Thermodynamics of Living Systems
ENGM 373 Engineering Dynamics
MATH 221 Differential Equations
Electives: Oral Communication, Computer Programming

Third Year

Semester 5

CIVE 310 or MECH 310 or CHME 332 Fluid Mechanics
BIOS 103 Organismic Biology
ELEC 211 Electrical Circuits
IMSE 321 or MATH 380 Calc-based Statistics
BSEN Elective

Semester 6

BSEN 344 Biological & Environmental Transport Processes
JGEN 200 Technical Communication
Electives: BSEN Emphasis Area; ACE; Engineering or Science; Organizational Skills

Fourth Year

Semester 7

BSEN 460 Instrumentation & Controls
BSEN 470 Senior Design I
IMSE 206 Engineering Economy 1
Electives: BSEN Emphasis Area; ACE; Engineering or Science

Semester 8

BSEN 480 Senior Design II
ENGR 400 Engineering Ethics & Social Responsibilities
Electives: BSEN Emphasis Area; ACE; Engineering

134 Credit hours

Degree awarded: B. S. in Biological Systems Engineering, College of Engineering

* Assuming no advanced college credit or summer school.