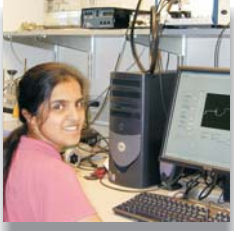




Biological Systems Engineering

Biological Systems Engineering brings engineering to life--working with living systems and the environment, by using biology, mathematics, and engineering 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. A high percentage of our students graduate and go to work immediately in well-paid positions.



Possible Engineering Career Areas

Prosthetic Design
Bioprocessing
Water Treatment
Biosensors

Erosion Control
Wetlands Restoration
Bioinstrumentation
Bioproducts

Bioremediation
Biofuels
Biomedical Imaging
Flood Mitigation

Post graduate study can also lead to careers in medicine, law, dentistry, veterinary medicine, or business.

The curriculum includes 21 credit hours of required biological systems engineering courses; 17 hours of engineering core courses (including computer science); 15 hours of engineering electives; 20 hours of mathematics and statistics; 12 hours of biological sciences; 19 hours of chemistry, biochemistry, and physics; 24 hours of communications skills, humanities, and social sciences, and 6 hours of additional electives. Graduation requires 134 semester hours.

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, biosignal and image processing, and industrial hygiene and safety. The curriculum emphasizes report writing, speaking, and teamwork, as well as computer-aided design.

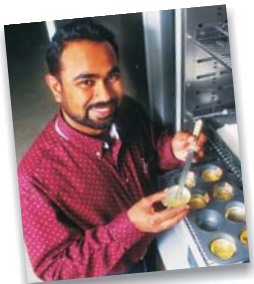
The senior capstone engineering design sequence includes a two-semester project working with, and solving a problem for, a real-world client. These projects come from private, government, agencies, and academic settings.

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. 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 2002 University of Nebraska System Department Teaching Award, and a top 10 ranking by US News and World Report, combine for a superior quality education in the Department of Biological Systems Engineering.

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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 of study encompassing a wide variety of subject matter and research. For example, the study of medical imaging, particularly ultrasound, is yielding new discoveries to help doctors and patients. Surgical tool design, tissue engineering, prosthetic design, and rehabilitation engineering are just a few of the emerging fields in this specialty.

Environmental & Water Engineering

Protecting and restoring the resources of soil, air, and water that humans, animals, and plants depend on is an exciting area of study with many career paths. 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 on subject matter that makes a difference for the planet and the quality of life we have come to value.

Food & Bioproducts Engineering

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



Curriculum

First Year

Semester 1

BSEN 100 Intro to Biological Systems Engineering. (BSEN)
CHEM 113 (or 109) Fundamental Chemistry I
ENGR 010 Freshman Engineering Seminar
MATH 106 Analytic Geometry and Calculus I
Electives: Humanity and Social Science

Semester 2

BSEN 112 Problem Solving in BSEN
BSEN 130 Computer Aided Design
CHEM 114 (or 110) Fundamental Chemistry II
MATH 107 Analytic Geometry & Calculus II
PHYS/ASTR 211 General Physics I

Second Year

Semester 3

BSEN 225 Engineering Properties of Biological Materials
BIOS 102 Cell Structure & Function or 103 Organismic Biology
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 Biochemistry & Lab
BSEN 244 Thermodynamics of Living Systems
ENGM 373 Engineering Dynamics
MATH 221 Differential Equations
Electives: Written Communication, Computer Programming

Third Year

Semester 5

CIVE 310 or MECH 310 or CHME 332 Fluid Mechanics
ELEC 211 Elements of Electrical Engineering I
IMSE 321 or MATH 380 Probability & Statistics
Electives: BSEN Emphasis Area, Humanity and Social Science, Oral Communication

Semester 6

BSEN 344 Biological & Environmental Transport Processes
Electives: BSEN Emphasis Area, Biological Sciences, Interpersonal Communication

Fourth Year

Semester 7

BSEN 460 Instrumentation & Controls
BSEN 470 Senior Design I
IMSE 206 or CHME 452
Electives: BSEN Emphasis Area, Humanity and Social Science

Semester 8

BSEN 480 Senior Design II
ENGR 400 Engineering Ethics
Electives: BSEN Emphasis Area, Biological Sciences, Humanity and Social Science

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