

BIOSYSTEMS ENGINEERING

Biosystems engineers are trained in biological, environmental and engineering sciences and challenged to improve the sustainability of production systems, decrease or eliminate environmental hazards and preserve natural resources.

Biosystems engineers devise practical, efficient solutions for producing, storing, transporting, processing and packaging biological and agricultural products. They solve problems related to systems, processes and machines that interact with humans, plants, animals, microorganisms and biological materials. They also develop solutions for responsible, alternative uses of biological products, byproducts and wastes and of our natural resources—soil, water, air and energy.

Pursuing Biosystems Engineering at UK

Why the University of Kentucky? The University of Kentucky is the only college in Kentucky that offers biosystems engineering. Biosystems engineering has historical roots in agricultural engineering, which is typically a part of each state's land grant university. The biosystems engineering program at UK includes more specialty areas than similar departments across the country. This flexibility in the curriculum allows for each student to customize their technical electives to their future career goals.

Courses cover all the essentials: statics, dynamics, mechanics and heat transfer as they are applied to biological, agricultural and environmental systems. The undergraduate degree culminates in the "capstone design" courses where seniors work in teams to handle real-world problems outside the classroom and get a taste of real world engineering work.

Undergraduate certificates are also available in power & energy as well as distillation, wine and brewing Studies.

First-Year Engineering Program

The University of Kentucky First-Year Engineering program is designed to remove as much guesswork from your major selection as possible. Instead of pushing through a major you don't like, or adding time and expense by changing majors, you can make an informed choice thanks to hands-on, team experiences that expose

you to all of our engineering disciplines from the start. If you are certain about your major, the program is still highly beneficial as it exposes you to other engineering disciplines that you will encounter in the workforce and teaches you skills that you will use throughout the remainder of your engineering curricula. If you are unsure about your major, you may enroll as "undeclared engineering" and choose your major during the second semester.

All incoming freshmen and transfer engineering students take part in the First-Year Engineering program. Freshmen students take a two-semester series which includes an overview of engineering disciplines, computer programming, computer-aided design, MATLAB, engineering design and analysis, project management, ethics in engineering, teamwork and oral and written technical communication. Transfer students complete a course series their first semester focused on similar topics. Studies have shown that students who participate in a First-Year Engineering Program are more successful in upper level engineering courses and are more inclined to graduate with an engineering degree.

Students may directly enroll as pre-engineering students in their chosen major; however, there are minimum admission requirements. Minimum freshman entry requirements are an ACT math score of 23 or a SAT math score of 570. Additionally, students must meet the university's minimum ACT/SAT reading and writing requirements to be admitted to the College of Engineering. Students not eligible to directly enroll in engineering should contact the director of recruitment at visit@engr.uky.edu for alternate pathways.

Experiential Education

Co-ops, internships and undergraduate research are not required but are strongly encouraged so students learn important, career-related skills as early as possible. Education abroad is another way to gain global perspective. Through an exchange program between the Department of Biosystems and Agricultural Engineering and several universities in Brazil, junior or senior level undergraduate students may spend approximately six months experiencing Brazilian culture, earning credits toward their degree and learning Portuguese.

FOR MORE INFORMATION, VISIT THESE WEBSITES:

Biosystems Engineering: www.uky.edu/bae

University of Kentucky: www.uky.edu

College of Engineering: www.engr.uky.edu

Admissions: www.uky.edu/admissions

Visit Engineering: www.engr.uky.edu/visit

Scholarships: www.uky.edu/scholarships

Biosystems Engineering Curriculum Sample

This is a sample list of classes a student will take to pursue a degree in biosystems engineering. As part of the biosystems engineering curriculum, students must complete the pre-engineering requirements, major requirements and general education coursework, called UK Core.

Note: This sample represents one of several paths to a College of Engineering degree. Consult the departmental websites for details on specific paths.

Freshman Year

Engineering Exploration I and II	3
Fundamentals of Engr Computing	2
Calculus I and II	8
Composition & Communication I and II	6
Chemistry I and Physics I and lab	9
UK Core course	3
Total hours	31

Sophomore Year

Economic Analysis for Biosystems	2
Introductory Biology I	3
Calculus III and IV	7
Chemistry II	3
Physics II and lab	5
Computer Graphics and Comm.	3
Statistical Inferences	3
Thermodynamics	3
Statics	3
UK Core	3
Total hours	35

Junior Year

Fluid Mechanics	4
Electrical Circuits and Electronics	3
Mechanics of Deformable Solids	3
Principles of Biology II	3
Technical Writing	3
Elements of Heat Transfer	3
DC Circuits and Microelectronics	3
Dynamics	3
Biological Science elective	3
Biosystems Core elective	3
Total hours	31

Senior Year

Biosystems Engineering Design I and II	4
Senior Seminar	1
Intro to Mechanical Systems	3
BAE Core or Technical electives	18
Supportive elective	3
UK Core courses	6
Total hours	35

Student Involvement

The BAE Student Branch is the main student organization for biosystems engineering students. It holds biweekly meetings that focus on a variety of topics such as areas of specialization, career opportunities and social events. Students have the opportunity to visit other schools as part of the Southern and Midwest Regional ASABE Rallies. Students may also consider joining the Quarter Scale Tractor Wildcat Pulling Team.

Alpha Epsilon is an honor society for outstanding agricultural, biological and food engineers. The objectives of the honor society are to promote the high ideals of the engineering profession, to give recognition to those who manifest worthy qualities of character, scholarship and professional attainment and to encourage and support the profession.

Career Prospects in Biosystems Engineering

Biosystems majors with an interest in bioenvironmental engineering are prepared to work in natural resource conservation and environmental quality enhancement. Those with an interest in machine systems engineering are prepared to conceive and design power units, tillage, planting and harvesting systems, materials handling equipment and processing equipment. Students with an interest in controlled environment systems are prepared to develop and design heating, cooling and ventilation systems for the control of indoor environments. Additionally biosystems majors with an interest in food and bioprocess engineering are prepared to develop equipment and methods for efficient and ecologically sound manufacturing of food products (from the farm to the grocery) and biological commodities (such as proteins, enzymes and biofuels). Entry-level salaries for engineering graduates with degrees in biosystems engineering average \$50,000-\$60,000 annually, depending on the individual's skills and work experience.

Scholarship Opportunities

Undergraduate students who enroll in Biosystems Engineering are eligible for scholarships from both the College of Engineering and the College of Agriculture, Food and Environment.

The University of Kentucky's biosystems engineering program is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

Revised July 2017. Information subject to change. For the most up-to-date information on the UK College of Engineering, visit www.engr.uky.edu.