



Biosystems Engineering

College of Engineering

The curriculum in biosystems engineering is administered jointly by the College of Engineering and the College of Agriculture. Graduates earn the Bachelor of Science in Biosystems Engineering degree.

Biosystems engineering provides an essential link between the biological sciences and the engineering profession. This linkage is necessary for the development of production and processing systems involving biological materials that preserve our natural resource base. Students have the latitude to develop an area of specialization relating to environmental engineering, biotechnology, food processing, machine systems, or controlled environment engineering. The curriculum is also ideal preparation for those students wanting to pursue a graduate or professional degree in biomedical engineering or veterinary medicine through the pre-biomedical and pre-veterinary medicine options.

Admission to the degree program is selective. Students should refer to the UK *Bulletin* for general information concerning admission and graduation requirements.

Degree Requirements

In addition to fulfilling University Studies and College of Engineering requirements, students must complete the biosystems engineering curriculum. The following curriculum meets the requirements for the B.S. degree.

Freshman Year

First Semester	Hours
BAE 102 Introduction to Biosystems Engineering	1
CHE 105 General College Chemistry I	3
ENG 104 Writing: An Accelerated Foundational Course	4
MA 113 Calculus I	4
CE 106 Computer Graphics and Communication	3
Second Semester	
BAE 103 Energy in Biological Systems	2
CHE 107 General College Chemistry II	3
CS 221 First Course in Computer Science for Engineers	2
MA 114 Calculus II	4
PHY 231 General University Physics	4
PHY 241 General University Physics Laboratory	1

Sophomore Year

First Semester	Hours
BAE 201 Economic Analysis for Biosystems	2
BIO 150 Principles of Biology I	3
EM 221 Statics	3
MA 213 Calculus III	4
PHY 232 General University Physics	4
PHY 242 General University Physics Laboratory	1
Second Semester	
BAE 202 Probability and Statistics for Biosystems	3
BIO 152 Principles of Biology II	3
ENG 2XX Writing Intensive Course	
or	
USP Humanities/Cross-Cultural Elective	3
EM 302 Mechanics of Deformable Solids	3
MA 214 Calculus IV	3
ME 220 Engineering Thermodynamics I	3

Junior Year

First Semester	Hours
CE 341 Introduction to Fluid Mechanics	4
EE 305 Electrical Circuits and Electronics	3
EM 313 Dynamics	3
Biological Science Elective	3
Core** or Technical Elective***	3
Second Semester	
COM 199 Presentational Communication Skills	1
ME 325 Elements of Heat Transfer	3
BAE 305 DC Circuits and Microelectronics	3
Core** or Technical Elective***	3
Technical Elective***	3
University Studies*	3

Senior Year

First Semester	Hours
BAE 402 Biosystems and Agricultural Engineering Design I	2
ME 340 Introduction to Mechanical Systems	3
BAE 400 Senior Seminar	1
Core** or Technical Elective***	3
Free Elective†	3
University Studies*	3
Second Semester	
BAE 403 Biosystems and Agricultural Engineering Design II	2
Core** or Technical Elective***	3
Technical Elective***	6
University Studies*	6

*To be selected from University Studies areas in Social Sciences, Humanities, Cross-Cultural and Electives in consultation with the academic advisor. A minimum of 15 credits in the humanities and social sciences are required.

**A minimum of 9 hours are required from the biosystems engineering core courses: BAE 417 Design of Machine Systems, BAE 427 Structures and Environment Engineering, BAE 437 Land and Water Resources Engineering, and BAE 447 Bioprocess Engineering Fundamentals.

***A minimum of 12 hours are to be taken in addition to the 9 core hours selected by the student. The technical electives allow the student an opportunity to concentrate or gain depth in one or more of the various specialty areas of biosystems engineering. The technical electives must be selected from the courses listed below and approved by the student's academic advisor. Other courses may be considered, each on its individual merit. In selecting technical electives students must concentrate their work in one or more of the professional areas of biosystems engineering. These areas include: bio-environmental engineering, food and bioprocess engineering, machine systems/automation engineering and controlled environment engineering. Interested students are encouraged to contact the Department of Biosystems Engineering to discuss technical elective sequences.

Approved technical electives: BAE 435G, 438G, 450, 513, 515, 517, 532, 536, 537, 538, 549, 580, 599; BCH 401G; BME 481G, 501, 530; CE 351, 451, 471G; CME 599; EE 402G; FSC 434G, 530, 536, 538; ME 321, 344, 406, 440, 501, 503, 513, 532; PGY 412G.

†Free electives are any University course excluding more elementary versions of required courses such as pre-calculus math or PHY 211.