

BIOENGINEERING

Bioengineering Program

Bioengineering integrates physical, chemical, mathematical sciences and engineering principles for the study of biology, medicine, behavior or health.

Bioengineering advances fundamental concepts, and develops materials, processes, implants, devices and informatics approaches for the prevention, diagnosis and treatment of disease, for patient rehabilitation and for improving health.

Bioengineers develop devices and procedures that solve medical- and health-related problems by combining their knowledge of biology and medicine with engineering principles and practices. Many do research, along with life scientists, chemists and medical scientists, to develop and evaluate systems and products such as artificial organs, prostheses, instrumentation, medical information systems and health management and care delivery systems. Some specialties include biomaterials, biomechanics, medical imaging, rehabilitation engineering and orthopedic engineering. The bioengineering curriculum at WSU includes concentration areas of bioinstrumentation and biodevices and lifespan engineering.

Career Opportunities

Fueled in large part by our aging society, the demand for bioengineers is increasing, and is expected to continue increasing for several years. Many graduates with a bioengineering Bachelor of Science degree go on to graduate

studies, medical school or work in industry. Employers of bioengineers include pharmaceutical companies, medical equipment manufacturers, hospitals and rehabilitation centers, and biomedical research institutes.

Admission

When you choose to major in bioengineering, your faculty adviser from the bioengineering program will help you plan your course of study and will outline specific requirements for degree completion. It is important that you complete the basic skills classes: Calculus I and II, Chemistry I and II, Biology I and University Physics I before the completion of 48 college hours.

Laboratory and Computer Facilities

Bioengineering students will have access to several different labs as part of their coursework. The main laboratory for the Bioengineering program is the Modular Multidisciplinary Bioengineering Lab, which houses equipment related to cardiovascular, metabolic and biomechanics evaluations. Students may utilize other labs on campus, including: the Human Performance Lab, the Biomaterials Lab and the Nanotechnology Lab.

Engineering students have access to computer laboratories equipped with microcomputers connected through a local area network and terminals connected to the university mainframe computer and the Internet.

Engineer of 2020

All graduates of the College of Engineering are required to complete three of the following six activities: undergraduate research, cooperative education or internship, study abroad or global learning, leadership and multidisciplinary education. These requirements have been made in response to recommendations by the National Academy of Engineering on the future society and the profession.

Related Opportunities

Bioengineering students are encouraged to participate in extracurricular organizations such as: Engineering Council, the Society of Women Engineers (SWE), Society of Hispanic Professional Engineers (SHPE), and National Society of Black Engineers (NSBE). If you are eligible, you may join Tau Beta Pi, the honor society for all areas of engineering.

Related Programs

All of Wichita State's engineering programs—aerospace, computer, electrical, industrial, manufacturing and mechanical—share a math/science background and technical orientation. Graduate programs leading to master's and doctoral degrees are offered in aerospace, electrical, industrial and mechanical engineering, as well as a master's program in engineering management.

Program Coordinator

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General Education Requirements	
Basic Skills (9 hours minimum)	Minimum number of semester hours
Must be completed in the first 48 college hours with a C or better	
<ul style="list-style-type: none"> • College English Composition (English 100 or 101 and 102) • Public Speaking (Communication 111) 	<p style="text-align: right;">6</p> <p style="text-align: right;">3</p>
Fine Arts, Humanities, and Social and Behavioral Sciences (18 hours minimum)	
<ul style="list-style-type: none"> • One introductory course from a fine arts discipline • One introductory course from a humanities discipline • One introductory course from a social and behavioral sciences discipline • One introductory course from a second social and behavioral sciences discipline • One further study course form one of the two disciplines in the division, humanities or social and behavioral sciences, in which two introductory courses are taken • Philosophy 385: Engineering Ethics 	<p style="text-align: right;">3</p> <p style="text-align: right;">3</p> <p style="text-align: right;">3</p> <p style="text-align: right;">3</p> <p style="text-align: right;">3</p> <p style="text-align: right;">3</p>
Engineering Core	
<ul style="list-style-type: none"> • Statics • Electrical Circuits • Thermodynamics I • Engineering Economics 	<p style="text-align: right;">3</p> <p style="text-align: right;">4</p> <p style="text-align: right;">3</p> <p style="text-align: right;">3</p>
TOTAL	13 Hours
Math & Natural Sciences	
<ul style="list-style-type: none"> • Calculus I, II • Differential Equations • University Physics I, II • General Chemistry I, II • Organic Chemistry • Engineering Probability and Statistics I 	<p style="text-align: right;">10</p> <p style="text-align: right;">3</p> <p style="text-align: right;">8</p> <p style="text-align: right;">10</p> <p style="text-align: right;">3</p> <p style="text-align: right;">3</p>
TOTAL	37 Hours
Major Requirements	
<ul style="list-style-type: none"> • Biology I • Human Anatomy & Physiology • Molecular Cell Biology • Intro to Biochemistry • Biomechanics • Intro to Biofluids • Biomaterials • Biomaterials Lab • Computer Applications • Design of Biodevices • BioTransport or Physics of Sound • Measurements Lab • Technical Electives • Bioengineering Senior Lab • Bioengineering Practicum • Capstone Design (Senior Design) 	<p style="text-align: right;">4</p> <p style="text-align: right;">5</p> <p style="text-align: right;">4</p> <p style="text-align: right;">3</p> <p style="text-align: right;">3</p> <p style="text-align: right;">3</p> <p style="text-align: right;">3</p> <p style="text-align: right;">1</p> <p style="text-align: right;">3</p> <p style="text-align: right;">3</p> <p style="text-align: right;">3</p> <p style="text-align: right;">3</p> <p style="text-align: right;">3</p> <p style="text-align: right;">12</p> <p style="text-align: right;">3</p> <p style="text-align: right;">3</p> <p style="text-align: right;">3</p>
TOTAL	59 Hours