

BIOLOGICAL ENGINEERING PROGRAM (BIOE)

School of Engineering, College of Engineering and Physical Sciences

Students interested in problems requiring the application of knowledge from both the biological sciences and engineering will find a challenge as a Biological Engineer. This field of engineering is the application of principles, methods and concepts of biology to systems and tools, ranging in scale from molecular to ecosystem level. This field combines engineering principles with life sciences to design creative solutions for biological systems, with applications ranging from pharmaceutical and food manufacturing, bioconversions to reduce waste, and production of sustainable, bio-based materials. For example, a Biological Engineer concentrating on biotechnology might design and manage bioreactors to improve their productivity. A Biological Engineering graduate can pursue a career in a number of exciting fields, including food safety, bio-instrumentation, diagnostics and sensorics in bio-systems, biomechanics and ergonomics.

Major (Honours Program)

Code	Title	Credits
Semester 1		
CHEM*1040	General Chemistry I	0.50
ENGG*1100	Engineering and Design I	0.75
ENGG*1500	Engineering Analysis	0.50
MATH*1200	Calculus I	0.50
PHYS*1130	Physics with Applications	0.50
Semester 2		
CHEM*1050	General Chemistry II	0.50
CIS*1500	Introduction to Programming	0.50
ENGG*1210	Engineering Mechanics I	0.50
MATH*1210	Calculus II	0.50
PHYS*1010	Introductory Electricity and Magnetism	0.50
Semester 3		
BIOL*1070 or BIOL*1090	Discovering Biodiversity Introduction to Molecular and Cellular Biology	0.50
BIOL*1080	Biological Concepts of Health	0.50
ENGG*2230	Fluid Mechanics	0.50
ENGG*2400	Engineering Systems Analysis	0.50
MATH*2270	Applied Differential Equations	0.50
STAT*2120	Probability and Statistics for Engineers	0.50
Semester 4		
BIOC*2580	Introduction to Biochemistry	0.50
ENGG*2100	Engineering and Design II	0.75
ENGG*2120	Material Science	0.50
ENGG*2450	Electric Circuits	0.50
ENGG*2660	Biological Engineering Systems I	0.50
MATH*2130	Numerical Methods	0.50
Semester 5		
ENGG*3160	Biological Engineering Systems II	0.50
ENGG*3260	Thermodynamics	0.50
ENGG*3450	Electronic Devices	0.50
ENGG*3830	Bio-Process Engineering	0.50

HIST*1250	Science and Technology in a Global Context	0.50
0.50 restricted electives		0.50
Semester 6		
ENGG*3100	Engineering and Design III	0.75
ENGG*3170	Biomaterials	0.50
ENGG*3430	Heat and Mass Transfer	0.50
ENGG*3440	Process Control	0.50
1.00 restricted electives		1.00
Semester 7		
ENGG*3240	Engineering Economics	0.50
ENGG*4000	Proposal for Engineering Design IV	0.00
ENGG*4380	Bioreactor Design	0.75
ENGG*4390	Bio-instrumentation Design	0.75
1.00 restricted electives		1.00
Semester 8		
ENGG*4110	Biological Engineering Design IV	1.00
1.75 restricted electives		1.75

Restricted Electives

(see Program Guide for more information)

The Engineering Program requires Biological Engineering students to complete the following combination of elective credits to complete their program:

- 1.75 credits from the BIOE-1 Biological Engineering electives
- 2.00 credits from Complementary Studies electives
- 0.50 credits in Free Electives

Consult the Program Guide for further information on the prerequisite requirements specific to each elective. Students can take a maximum of 1.50 credits at the 1000 level from the above list of electives.