BASC BIOMEDICAL MECHANICAL ENGINEERING

The purpose of the Biomedical Mechanical Engineering program is to graduate engineers proficient in the areas of biomedical engineering related to mechanical engineering. These include the design of medical devices such as artificial hearts, implants and prostheses, the development and selection of bio-compatible metallic and non-metallic materials for implants and medical equipment, robotics for medical applications, biomechanics and rehabilitation engineering.

The program structure parallels that of the regular Mechanical Engineering program, replacing eight courses in the regular program with biomedically-oriented courses.

This program has a broad scope, so that graduates may have a wide range of career choices, not only in the biomedical field but also in conventional mechanical engineering. Biomedical systems are among the most complex of mechanical systems; therefore, a strong and comprehensive education in standard mechanical engineering principles is provided, with emphasis on their application in biomedical systems.

This program is offered in English and in French.

Program Requirements

Co-operative education is available with this program.

Requirements for this program have been modified. Please consult the 2023-2024 calendars (http://catalogue.uottawa.ca/en/archives/) for the previous requirements.

Compulsory First-Year Courses:		
ANP 1106	Human Anatomy and Physiology II	3 Units
CHM 1311	Principles of Chemistry	3 Units
ENG 1112	Technical Report Writing	3 Units
GNG 1105	Engineering Mechanics	3 Units
GNG 1106	Fundamentals of Engineering Computation	3 Units
MAT 1320	Calculus I	3 Units
MAT 1322	Calculus II	3 Units
MAT 1341	Introduction to Linear Algebra	3 Units
MCG 1100	Introduction to Mechanical Engineering	3 Units
PHY 1122	Fundamentals of Physics II	3 Units
Compulsory Second-Year Courses:		
GNG 1103	Introduction to Engineering Design	3 Units
CVG 2140	Mechanics of Materials I	3 Units
ELG 2336	Electric Circuits and Machines for Mechanical Engineering	3 Units
MAT 2322	Calculus III for Engineers	3 Units
MAT 2377	Probability and Statistics for Engineers	3 Units
MAT 2384	Ordinary Differential Equations and Numerical Methods	3 Units
MCG 2101	Introduction to Design of Mechanical Systems	3 Units
MCG 2108	Dynamics	3 Units
MCG 2130	Thermodynamics I	3 Units
MCG 2131	Thermodynamics II	3 Units
MCG 2142	Biological and Engineering Materials II	3 Units
MCG 2360	Engineering Materials I	3 Units
Compulsory Third-Year Courses:		
ELG 3336	Electronics for Mechanical Engineers	3 Units
GNG 2101	Introduction to Product Development for Engineers and Computer Scientists	3 Units
MAT 3320	Mathematics for Engineers	3 Units
MCG 3110	Heat Transfer	3 Units
MCG 3130	Dynamics of Machinery	3 Units
MCG 3131	Machine Design	3 Units
MCG 3141	Advanced Strength of Materials and Applications to Biomechanical Systems	3 Units
MCG 3143	Biofluid Mechanics	3 Units
MCG 3305	Biomedical System Dynamics	3 Units
MCG 3307	Control Systems	3 Units
MCG 3340	Fluid Mechanics I	3 Units
Compulsory Fourth-Year Courses:		
3 course units from:		3 Units
GNG 4120	Technology Entrepreneurship for Engineers and Computer Scientists	
GNG 4930	Internship in Mechanical Engineering or Biomedical Mechanical Engineering	
HIS 2129	Technology, Society and Environment Since 1850	
PHI 2394	Scientific Thought and Social Values	
GNG 4170	Engineering Law	3 Units
MCG 4151	Design of Artificial Joint Prostheses and Implants	3 Units
MCG 4152	Design of Artificial Organs	3 Units
MCG 4308	Mechanical Vibration Analysis	3 Units
MCG 4328	Manufacturing	3 Units
MCG 4340	Mechanical Engineering Laboratory	3 Units
MCG 4366	Biomedical Mechanical Engineering Capstone Project	6 Units
PHI 2396	Bioethics	3 Units
3 technical electives units in mechanical engineering (MCG) at the 4000 level selected from the optional courses listed under the BASc in Mechanical Engineering program		3 Units
Total:		**132 Units**

List of Optional Courses

Stream A: Fluid Mechanics - Heat Transfer:		
MCG 4104	Building Energy Systems	3 Units
MCG 4110	Fluid Machinery	3 Units
MCG 4111	Internal Combustion Engines	3 Units
MCG 4126	Energy Conversion	3 Units
MCG 4128	Basic Nuclear Engineering	3 Units
MCG 4139	Computational Methods in Fluid and Heat Transfer	3 Units
MCG 4325	Gas Dynamics	3 Units
MCG 4345	Aerodynamics	3 Units
Stream B: Solid Mechanics - Design and Synthesis:		
MCG 4102	Finite Element Analysis	3 Units

MCG 4107	Dynamics II	3 Units
MCG 4127	Computational Methods in Mechanical Engineering	3 Units
MCG 4155	Advanced Engineering Materials	3 Units
MCG 4329	Reliability and Maintainability in Engineering Design	3 Units
Stream C: CAD/CAM - Industrial Engineering:		
MCG 4130	Industrial Planning	3 Units
MCG 4132	Robot Mechanics	3 Units
MCG 4133	Automation Design and Control	3 Units
MCG 4134	Robot Design and Control	3 Units
MCG 4136	Mechatronics	3 Units
Stream D: Biomedical		
MCG 4112	Introduction to Microfluidics	3 Units
MCG 4150	Bioinstrumentation	3 Units
MCG 4153	Biomechanics of Movement	3 Units
MCG 4154	Introduction to Biomaterials and Tissue Engineering	3 Units
Other Technical Electives:		
MCG 4100	Thesis	6 Units
MCG 4142	Corrosion: Principles, Prevention and Control	3 Units
MCG 4143	Product Design and Development	3 Units
MCG 4144	Introduction to Composite Materials	3 Units
MCG 4190	Selected Topics I	3 Units
MCG 4191	Selected Topics II	3 Units
MCG 4192	Selected Topics III	3 Units
MCG 4193	Selected Topics IV	3 Units
MCG 4220	Thesis	6 Units