The Biomedical and Mechanical Engineering program at Carleton University uniquely combines the foundation of mechanical engineering and the exciting and rapidly growing discipline of biomedical engineering. This combination includes the chemistry, biology and biochemistry knowledge needed to contribute to biomechanical technology development and design, and the engineering science and design disciplines of biofluids, biomaterials and biomechanics.

The integration of these topics gives students the ability and opportunity to design and build new components and systems for biomechanical applications. Other applications include the design of prostheses, artificial organs, new drug delivery systems and medical devices for improved health care and monitoring.

The Carleton advantage
Carleton University’s Bachelor of Biomedical and Mechanical Engineering (BEng) offers:

- a co-operative education option that combines study and work experience for top students;
- strong emphasis on hands-on laboratories and design, giving you a chance to learn by doing; and
- excellent scholarships for high-standing students.

Our laboratory and research facilities
At Carleton, you will benefit from:

- modern, well-equipped laboratories;
- excellent computer facilities on campus;
- proximity to, and collaboration with, area hospitals; and
- an interdisciplinary approach with opportunities to work with, and learn from, students in other biomedical and design programs.

Your co-op opportunities
As a student in the Biomedical and Mechanical Engineering program you will have the opportunity to apply to the Co-operative Education Program. Co-op integrates degree-related, paid work terms into your degree program. A minimum of four work terms are required to obtain the Co-op designation on your degree. Often, the four consecutive work terms following third year take place with the same employer. Our program is closely associated with research institutions and industry, giving students valuable work experience and contacts that will benefit them in the future. The pattern of work and study terms for the co-op option is shown in the following table.

Choosing the right program
The BEng program in Biomedical and Mechanical Engineering is fully accredited by the Canadian Engineering Accreditation Board. When you graduate from this program, you will meet the educational requirements for registration as a professional engineer. The program is also designed to meet the prerequisite courses required by many medical schools in North America.

You will spend the first year in this program learning the fundamentals of basic science and mathematics, with courses in biology, chemistry and physics. Second year offers introductory courses in fluid mechanics, thermodynamics, materials and biochemistry. In the third year, specialized biomechanical courses are offered, such as biofluids and biomaterials, along with mechanical engineering design courses and organic chemistry. Fourth year offers further specialization in biomechanics and biomechanical device design, as well as the opportunity to apply your knowledge in a major group design project relevant to the medical and health-care fields.
The courses of a typical biomedical and mechanical program are shown below.

<table>
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<tr>
<th>Study Term 1</th>
<th>Study Term 5</th>
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</table>
| - Introduction to Engineering  
- Calculus for Engineering or Physics  
- Linear Algebra for Engineering or Science  
- Introductory Biology I  
- General Chemistry I  | - Dynamics of Machinery  
- Biofluid Mechanics  
- Bioelectrical Systems  
- Biomedical Systems Modeling and Control  
- Mechanics of Solids II  
- Science elective (Biology, Chemistry or Biochemistry) |

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<tr>
<th>Study Term 2</th>
<th>Study Term 6</th>
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</table>
| - Mechanics I  
- Problem Solving and Computers  
- Differential Equations and Infinite Series for Engineering or Physics  
- Introductory Electromagnetism and Wave Motion  
- General Chemistry II  | - Probability and Statistics  
- Machine Design and Practice  
- Biomaterials  
- Ethics, Research Methods and Standards for BME  
- Numerical Methods |

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<tr>
<th>Study Term 3</th>
<th>Study Term 7</th>
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</table>
| - Multivariable Calculus for Engineering or Physics  
- Engineering Materials  
- Thermodynamics and Heat Transfer  
- Engineering Dynamics  
- Science elective (Biology, Chemistry or Biochemistry)  | - Feedback Control Systems  
- Biomechanics  
- Heat Transfer  
- Engineering Economics  
- Biomechanical Engineering project  
- Complementary studies elective |

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<tr>
<th>Study Term 4</th>
<th>Study Term 8</th>
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</table>
| - Mathematical Methods I  
- Engineering Graphical Design  
- Fluid Mechanics I  
- Mechanics of Solids I  
- Communication Skills for Engineering Students  | - Biomechanical Engineering project (continued)  
- Biomedical Device Design  
- Applied Thermodynamics  
- Engineering elective  
- Complementary studies elective  
- Professional practice |

Note: As study terms and courses offered may vary, please refer to the Carleton University Undergraduate Calendar at calendar.carleton.ca/undergrad for specific program requirements.

**Your future opportunities**

As a graduate of this program, you could find employment in health-care establishments and medical facilities, working with medical equipment or medical devices. You could also be employed in industry in the development of health-care technologies.

**Admission requirements**

For admission to the Biomedical and Mechanical Engineering program, you must have an Ontario Secondary School Diploma (OSSD) or equivalent, including a minimum of six 4U/M courses. Your six courses must include four prerequisite courses:

- Advanced Functions
- Chemistry
- Physics
- one of:
  - Calculus and Vectors*
  - Biology
  - Earth and Space Science

* Strongly recommended for applicants to all engineering programs.

Although it is not an admission requirement, at least one 4U course in either English or French is recommended. Equivalent courses may be substituted at the appropriate 4U level.

If you are from outside Ontario, or outside Canada, see Carleton University’s website at admissions.carleton.ca/apply for your specific program requirements.

Since the number of qualified applicants may be greater than the number of available spaces, cut-off averages and required marks may vary.

**For more information**

Please visit carleton.ca/mae or consult the Carleton University Undergraduate Calendar at calendar.carleton.ca/undergrad.

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Fax: 613-520-3847  
Email: liaison@carleton.ca  
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[carleton.ca/engineering-design](http://carleton.ca/engineering-design)