

# Aerospace ENGINEERING



If you find aircraft and spacecraft interesting and exciting, Aerospace Engineering could be the program of study for you. Canada's aerospace industry has annual revenues of about \$23 billion and employs 84,000 people. It is a vigorous, innovative and highly competitive industry with a worldwide reputation for leadership in a number of fields, including commuter and business aircraft, small gas turbine power plants, aircraft simulators, communications satellites and guidance systems.



## The Carleton advantage

Carleton University established the first Bachelor of Engineering (BEng) degree program in Aerospace Engineering in Canada. Carleton's program is recognized for:

- a wide range of topics offered within four streams of study;
- a unique and challenging final-year design project that emulates a design office project at an aerospace firm;
- an emphasis on problem-solving skills, and hands-on laboratory and design work; and
- excellent scholarships for high-standing students.

## Our laboratory and research facilities

Carleton's laboratory and computer facilities are unparalleled. For example, you will have access to multiple wind and water tunnels, including the unique high-speed wind tunnel in the Minto Centre for Advanced Studies in Engineering that provides a flow speed of up to one-and-a-half times the speed of sound. In addition, you will benefit from Carleton's proximity to, and close association with, government organizations such as the National Research Council Canada.

## Your co-op opportunities

Our Aerospace Engineering program offers you the opportunity to enrol in a co-operative internship option. Your pattern of work and study terms for the co-op option is shown in the following table.

Calendar Year	Fall	Winter	Summer
1	study term 1	study term 2	work term*
2	study term 3	study term 4	work term
3	study term 5	study term 6	work term
4	work term	work term	work term
5	study term 7	study term 8	

\* Optional placement to be arranged directly with an employer.

## Choosing the right program

The BEng program in Aerospace 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.

There are four streams in the Aerospace Engineering program: Aerodynamics, Propulsion, and Vehicle Performance; Aerospace Structures, Systems, and Vehicle Design; Aerospace Electronics and Systems; and Space Systems Design. All streams provide a foundation in the key disciplines of dynamics, thermofluids, solid mechanics and materials—disciplines that are essential to the design of airframes, space platforms and propulsion systems.

In the Aerodynamics, Propulsion, and Vehicle Performance stream, you specialize in aircraft aerodynamics, performance, control and propulsion technologies. The Aerospace Structures, Systems, and Vehicle Design stream focuses on lightweight structures and materials for aircraft and space vehicles. The Aerospace Electronics and Systems stream concentrates on modern aircraft and spacecraft electronics for navigation, guidance, communication and remote sensing. Included are courses on software structures, signal processing, electronics and telecommunications. The Space Systems Design stream emphasizes spacecraft and satellite design and mission planning, with courses dedicated to orbital mechanics, spacecraft design, communication, propulsion and dynamics.

All of the Aerospace streams begin with a common set of courses that provide a foundation in engineering, mathematics and science. These are followed by increasingly specialized courses throughout the remainder of the four-year program.

The courses of a typical Aerospace stream are shown below.

<b>Study Term 1</b> <ul style="list-style-type: none"> <li>Introduction to Engineering</li> <li>Calculus for Engineering or Physics</li> <li>Linear Algebra for Engineering or Science</li> <li>Chemistry for Engineering Students</li> <li>Complementary studies elective</li> </ul>	<b>Study Term 5</b> <ul style="list-style-type: none"> <li>Dynamics of Machinery</li> <li>Mechanics of Solids II</li> <li>Systems and Simulation</li> <li>Electrical Engineering</li> <li>Aerospace Materials</li> </ul>
<b>Study Term 2</b> <ul style="list-style-type: none"> <li>Mechanics I</li> <li>Problem Solving and Computers</li> <li>Differential Equations and Infinite Series for Engineering or Physics</li> <li>Introductory Electromagnetism and Wave Motion</li> <li>Complementary studies elective</li> </ul>	<b>Study Term 6</b> <ul style="list-style-type: none"> <li>Probability and Statistics</li> <li>Applied Thermodynamics</li> <li>Mechanical and Aerospace Engineering Laboratory</li> <li>Aerospace Design and Practice</li> <li>Fluid Mechanics II</li> </ul>
<b>Study Term 3</b> <ul style="list-style-type: none"> <li>Multivariable Calculus for Engineering or Physics</li> <li>Fluid Mechanics I</li> <li>Mechanics of Solids I</li> <li>Numerical Methods</li> <li>Communication Skills for Engineering Students</li> <li>Basic science elective</li> </ul>	<b>Study Term 7</b> <ul style="list-style-type: none"> <li>Aerospace Engineering Project</li> <li>Feedback Control Systems</li> <li>Aerospace Systems Design</li> <li>Aerodynamics and Heat Transfer</li> <li>Aerospace Vehicle Performance</li> <li>Engineering elective</li> </ul>
<b>Study Term 4</b> <ul style="list-style-type: none"> <li>Mathematical Methods I</li> <li>Engineering Graphical Design</li> <li>Thermodynamics and Heat Transfer</li> <li>Engineering Dynamics</li> <li>Engineering Materials</li> </ul>	<b>Study Term 8</b> <ul style="list-style-type: none"> <li>Aerospace Engineering Project</li> <li>Professional Practice</li> <li>Aircraft Stability and Control</li> <li>Engineering Economics</li> <li>Two Engineering electives</li> </ul>

Note: As study terms and courses offered may vary, please refer to the Carleton University Undergraduate Calendar at [carleton.ca/cuuc](http://carleton.ca/cuuc) for specific program requirements.

## Your future opportunities

As a graduate of the Aerospace Engineering degree program, you will be well prepared for a challenging career within the aerospace design and manufacturing industry, or in airline and space operations, government research laboratories, and aircraft certification and accident investigation authorities.

## Admission requirements

For admission to the Aerospace Engineering program, you must have an Ontario Secondary School Diploma (OSSD) or equivalent, including a minimum of six 4 U/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 *français* is recommended.

Equivalent courses may be substituted at the appropriate 4U level. The overall admission cut-off average and/or the prerequisite course average may be considerably higher than the stated minimum requirements for some programs.

If you are from outside Ontario, or outside Canada, see Carleton University's website at [carleton.ca/howtoapply](http://carleton.ca/howtoapply) 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 [www.mae.carleton.ca](http://www.mae.carleton.ca) or consult the *Carleton University Undergraduate Calendar* at [carleton.ca/cuuc](http://carleton.ca/cuuc).

**Department of Mechanical and Aerospace Engineering**  
 Carleton University  
 3135 Mackenzie Building  
 1125 Colonel By Drive  
 Ottawa ON K1S 5B6  
 Canada

**Undergraduate Recruitment Office**  
 Carleton University  
 315 Robertson Hall  
 1125 Colonel By Drive  
 Ottawa ON K1S 5B6  
 Canada

Tel: 613-520-5684

Fax: 613-520-5715

Website: [www.mae.carleton.ca](http://www.mae.carleton.ca)

Tel: 613-520-3663

Toll-free in Canada:

1-888-354-4414

Fax: 613-520-3847

Email: [liaison@carleton.ca](mailto:liaison@carleton.ca)

Website: [carleton.ca/admissions](http://carleton.ca/admissions)