Engineering physics applies fundamental physical science to the solution of technological problems. As an Engineering Physics graduate, you will be well educated in material science, applied physics, electronics and nanotechnology. You will also be highly skilled in the development of new technologies in semiconductor, optical and nanoscale integrated devices for telecommunications, biomedical and renewable energy applications.

The Carleton advantage
At Carleton University, the Bachelor of Engineering (BEng) degree program in Engineering Physics has two main areas of focus: integrated semiconductor devices, and optical devices and systems. This program offers:

- a set of options in fourth year that allow you to focus on either semiconductor devices and technology, or modern optics;
- the opportunity for you to design your own integrated circuits (ICs), which are manufactured right on campus;
- a unique team design project course in first year;
- excellent computing resources;
- an active student branch of the Institute of Electrical and Electronics Engineers; and
- excellent scholarships for high-standing students.

Carleton’s location in Canada’s high technology centre enables you to develop contacts that could lead to opportunities during work terms and after graduation.

Our laboratory and research facilities
At Carleton, you will benefit from outstanding computer networks and modern, well-equipped laboratories—Carleton is actually one of the few universities in the country with its own in-house IC fabrication facilities. You will also benefit from our proximity to, and close association with, the laboratories of the National Research Council Canada (NRC) and the Communications Research Centre.

Your co-op opportunities
As a student in the Engineering Physics 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. Our program is closely associated with some of Canada’s leading technology companies, many of which are located in the Ottawa region. You may also have the chance to work in state-of-the-art government labs, such as those at the NRC, 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.

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>Fall</th>
<th>Winter</th>
<th>Summer</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>study term 1</td>
<td>study term 2</td>
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<td>2</td>
<td>study term 3</td>
<td>study term 4</td>
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<td>study term 6</td>
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<td>4</td>
<td>work term</td>
<td>work term</td>
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<tr>
<td>5</td>
<td>study term 7</td>
<td>study term 8</td>
<td></td>
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</tbody>
</table>

Choosing the right program
The BEng degree program in Engineering Physics 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.
Your program begins with a broad and fundamental background in physics and electronics. During the first year, you will have a unique opportunity to participate in a small class and collaborate closely with a senior professor on a team project that involves the design and implementation of an optical system. This course introduces you to engineering design early in your studies, making your subsequent years more relevant and interesting.

The second and third years of the program provide you with a strong background in both physics and engineering, with courses in programming, electronics and modern physics. Fourth year allows you to specialize in either semiconductor device technology or applied optics. Electives are also available in IC design, telecommunications electronics, computer-aided design, microwave engineering, integrated sensors and many other areas.

The courses of a typical engineering physics program are shown below.

### Study Term 1
- Calculus for Engineering or Physics
- Linear Algebra for Engineering or Science
- Chemistry for Engineering Students
- Foundations of Physics I
- Complementary studies elective

### Study Term 2
- Problem Solving and Computers
- First Year Project
- Differential Equations and Infinite Series for Engineering or Physics
- Foundations of Physics II
- Communication Skills for Engineering Students

### Study Term 3
- Multivariable Calculus for Engineering or Physics
- Numerical Methods
- Modern Physics I
- Circuits and Signals
- Foundations of Imperative Programming

### Study Term 4
- Mathematical Methods I
- Wave Motion and Optics
- Switching Circuits
- Object-oriented Software Development
- Electronics I

### Study Term 5
- Basic Electromagnetic and Power Engineering
- Physical Electronics
- Electronics II
- Digital Electronics
- Elements of Quantum Mechanics
- Systems and Simulation

### Study Term 6
- Probability and Statistics
- Modern Physics II
- Mathematical Physics I
- Communication Theory
- Electromagnetic Waves

### Study Term 7
- Engineering Project
- Engineering Economics
- Introduction to Quantum Mechanics I
- Physics elective
- Engineering elective
- Complementary studies elective

### Study Term 8
- Engineering Project (continued)
- Professional Practice
- Fourth-year Physics Laboratory
- Physics elective
- Engineering elective
- Complementary studies elective

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.

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**Your future opportunities**

As an engineering physicist, you will be well equipped for work in the biomedical, renewable energy and telecommunications high-technology sectors, including IC fabrication, microelectronic devices, nanotechnology, microwave and optical systems, and sensor technology. Some engineering physicists also develop careers in biomedical engineering and medical physics. This degree also provides an ideal background for graduate studies in either electrical engineering or physics.

**Admission requirements**

For admission to the Engineering Physics 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 www.doe.carleton.ca or consult the Carleton University Undergraduate Calendar at calendar.carleton.ca/undergrad.

**Department of Electronics**

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Toll-free in Canada: 1-888-354-4414
Fax: 613-520-3847
Email: liaison@carleton.ca
Website: admissions.carleton.ca

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carleton.ca/engineering-design