Our planet is in need of clean and renewable sources of energy such as wind, solar, geothermal, tidal and biomass. Carleton University’s program in Sustainable and Renewable Energy Engineering provides you with the analytical, technical and marketing skills needed to design, build, operate and enhance sustainable energy systems. If you would like to participate in the development of environmentally responsible and economically beneficial solutions for energy generation, distribution and usage—this could be the engineering program for you.

The Carleton advantage
The Bachelor of Engineering (BEng) program in Sustainable and Renewable Energy Engineering offers:

- a problem-solving approach to learning, as well as a professional focus on sustainability and renewable energy technologies;
- the opportunity to follow one of two study streams suited to your background and interests;
- a challenging final-year design project that brings together knowledge, skills and expertise gained in the program; and
- generous scholarships to high-standing applicants.

Our laboratory and research facilities
Carleton University laboratory, fabrication and computer facilities are state-of-the-art. You will have access to:

- an energy, combustion and air emissions laboratory;
- a fuel cell development laboratory;
- a thermodynamics/energy conversion laboratory;
- a power electronics and smart grids laboratory; and
- Carleton’s microfabrication facility for photovoltaics and power harvesting.

Your co-op opportunities
As a student in the Sustainable and Renewable Energy 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 associated with a number of public and private organizations craving expertise in sustainable and renewable energy, 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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<tbody>
<tr>
<td>1</td>
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<tr>
<td>5</td>
<td>study term 7</td>
<td>study term 8</td>
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</table>

Choosing the right program
The BEng in Sustainable and Renewable Energy Engineering is fully accredited by the Canadian Engineering Accreditation Board. When you graduate from the program, you will meet the educational requirements for registration as a professional engineer.

There are two streams in the program:

- Stream A: Smart Technologies for Power Generation and Distribution
- Stream B: Efficient Energy Generation and Conversion

Both streams provide a solid core of courses and laboratory work that will prepare you for a successful professional career in industry and the public sector or for further
studies at advanced levels. Stream A emphasizes Electrical Engineering aspects of the energy sector, while stream B emphasizes Mechanical Engineering. Courses in basic and applied science, in combination with topics such as electronics, systems, environmental issues, heat transfer and thermodynamics (depending on your chosen stream) will give you the technical and professional tools to deal with the challenges of the energy field.

The courses of a typical sustainable and renewable energy engineering program are shown below. Courses separated by a slash (/) correspond to the two different streams.

### Study Term 1
- Introduction to Engineering
- Calculus for Engineering or Physics
- Problem Solving and Computers
- Linear Algebra for Engineering
- Complementary Studies Elective

### Study Term 2
- Introductory Electromagnetism and Wave Motion
- Chemistry for Engineering Students
- Differential Equations and Infinite Series for Engineering
- Mechanics I
- Communication Skills for Engineering Students
- Introduction to Sustainable Energy

### Study Term 3
- Multivariable Calculus for Engineers
- Foundations of Imperative Programming/Dynamics
- Thermodynamics and Heat Transfer
- Circuits and Signals/Electrical Engineering
- Numerical Methods
- Basic science elective

### Study Term 4
- Mathematical Methods I
- Fluid Mechanics I
- Process Analysis for Environmental Engineering
- Switching Circuits/Engineering
- Electronics I/Engineering Graphical Design

### Study Term 5
- Computer Organization/Engineering Materials
- Industrial Engineering
- Power Electronics/Fluid Mechanics II
- Sustainable and Renewable Energy Sources
- Electrical Power Engineering

### Study Term 6
- Probability and Statistics
- Systems and Simulation
- Applied Thermodynamics
- Energy Distribution and Efficient Utilization
- Sustainable Energy Systems Design

### Study Term 7
- Energy Engineering Project
- Automatic Control Systems I/Feedback Control Systems
- Air Pollution and Emissions Control
- Computer Communications/Heat Transfer
- Efficient Energy Conversion
- Engineering Elective

### Study Term 8
- Energy Engineering Project (continued)
- Professional Practice
- Engineering Economics
- Solar Cells/Thermofluids and Energy Systems Design
- Energy Economy, Reliability and Risk
- Engineering Elective

### Your future opportunities
Graduates from the Sustainable and Renewable Energy Engineering program find challenging positions in energy-intensive industries and related government agencies, including power utilities, generating facilities, distribution networks, smart grids and the construction industry. They are also in demand by manufacturers of materials and equipment for renewable energy projects, the hybrid vehicle design industry, and emerging service industries specializing in energy efficiency, to name only a few.

### Admission requirements
For admission to the Sustainable and Renewable Energy 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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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.