Cross-Faculty Education

The Faculty actively encourages collaborations across departments, Faculties and with the wider community to create innovations in teaching, research and technology that fuel diverse approaches to knowledge creation and education. This interdisciplinary mindset has enabled us to become one of the world’s premier engineering schools.

We are establishing a strong culture of entrepreneurship, through a variety of courses and resources such as The Entrepreneurship Hatchery, to open new avenues for our students to have an impact on the world. This year, 10 of our students, from over 1,000 applicants across the nation, were chosen to participate in The Next 36 program, which trains the country’s newest generation of innovators. Our Faculty’s Entrepreneurship Hatchery awarded its first $20,000 Lacavera Prize to the cross-disciplinary team of Anastasiya Martyts (EngSci 1T6) and Tiange Li (Life Sciences 1T6) for their innovative camera lighting system, Modly.

The importance of collaboration and cross-disciplinary approaches is integrated into many of our course offerings. The new Multidisciplinary Capstone Design course brings together students from different programs to transform their ideas and classroom knowledge into designs that tackle challenges proposed by industry clients. By enabling the next generation of makers, we continue U of T Engineering’s legacy of driving economic development, spurring innovation and offering solutions to some of the world’s greatest challenges.

Our interdisciplinary minors and certificates provide additional opportunities for our students to explore their interests outside of the traditional programs. Enrollment in interdisciplinary minors continues to increase, with 825 students participating in our five minors in 2013-14. Our Engineering Business minor remains exceedingly popular. To meet demand for this minor, we have expanded the number of summer course offerings to include three joint Rotman-Engineering core courses. In September 2014, the Faculty launched the Biomedical Engineering minor and certificates in Engineering Leadership and Renewable Resources Engineering.
Selected Cross-Faculty Education Highlights

**Second-Year Students’ Photography Lighting System Wins The Entrepreneurship Hatchery’s $20,000 Lacavera Prize**

Creating a light, affordable camera lighting system to replace the heavy bulk of typical photographic equipment earned Anastasiya Martyts (EngSci 1T6) and Tiange Li (Life Sciences 1T6) The Entrepreneurship Hatchery’s first $20,000 Lacavera Prize. Martyts and Li presented Modly — their modular, customizable lighting system — at The Entrepreneurship Hatchery’s Demo Day in September 2013. Competing against eight other teams, the pair won the top prize sponsored by telecommunications entrepreneur Anthony Lacavera (CompE 9T7), founder, chair and CEO of Globalive Holdings.

**Women in Science & Engineering Conference a WISE Choice**

U of T hosted the March 2014 Women in Science & Engineering (WISE) National Conference, which brought together more than 200 students and young alumni to celebrate careers in science and engineering while learning more about the field. Organized by WISE’s U of T chapter, the event inspired participants through more than a dozen workshops, keynote speakers and panel discussions focusing on the theme: ‘Experience: The Measure of Tomorrow.’ The day also included two case competitions in business technology and social entrepreneurship, each with $1,000 cash prizes.

**U of T Engineering Students Take Ten of “The Next 36” Positions**

Ten of the students selected from across Canada for The Next 36 program were from U of T Engineering, a record showing for the Faculty since the program’s inception in 2010. This increasingly popular program – which attracted close to 1,000 applicants this year — is designed to train Canada’s next generation of innovators and business leaders. Selected students are given the opportunity to develop their business ideas and put them into action with help from Canadian business leaders, and mentorship and lectures from world-class faculty over a nine-month period. The entrepreneurship-immersion program also provides winners up to $95,000 in seed investment for new ventures.

**Faculty’s First MOOC: Our Energetic Earth**

In October 2013, the Faculty introduced its first massive open online course (MOOC) on the edX platform. Taught by CivE Professor Bryan Karney, the lectures focused on how the world’s energy forces — from wind, waves, storms and currents — animate the Earth’s surface and allow our planet to support life. Enrolment reached nearly 11,000.

**Multidisciplinary Capstone Design Course**

Sixty-five students in MIE Professor Kamran Behdinan’s new Multidisciplinary Capstone Design course used competencies and knowledge from several engineering disciplines to tackle complex, real-world design projects. The course, in its first year, translated into 17 projects from an impressive group of organizations, including Defence Research and Development Canada, Atomic Energy of Canada Limited, Cameco, Bombardier Inc. and Magna International. Teams of three to four students — each from a different department — worked together on new solutions, such as software that helps pilots manage jetlag or new caterpillar tracks for an amphibious vehicle. Students were given full opportunity to apply creative and iterative design processes to address significant business needs identified by the companies with which they worked.

**U of T Engineering Grads Make Aeronautical History**

An aerospace team with strong U of T Engineering connections made history in June 2013 by winning the $250,000 AHS Igor I. Sikorsky Human-Powered Helicopter Prize, for the first-ever sustained flight of a human-powered helicopter. The prize was created in 1980 and AeroVelo Inc. — founded by U of T Engineering alumni Todd Reichert (EngSci 0T5, UTIAS PhD 1T1) and Cameron Robertson (EngSci 0T8, UTIAS MASc 0T9) — successfully met the award’s rigorous conditions: a flight lasting 60 seconds and reaching an altitude of three meters while remaining in a 10-meter square space. Several U of T Engineering undergraduate students participated in the AeroVelo team, and through their collective efforts made the historical flight possible.
In September 2014, the Faculty launched three new interdisciplinary minors and certificates:

**Biomedical Engineering (BME) Minor**
This new undergraduate BME minor prepares students for direct entry into the applied biomedical engineering industry. It has a greater biomedical focus than the existing Bioengineering minor and is designed for students who are interested in applying their engineering knowledge specifically to the healthcare sector. Course work includes pharmaceutical and therapeutic technologies, medical devices, medical diagnostics, healthcare delivery, health regulatory and policy development, medical diagnostic technologies, biomedical devices and bioinformatics. This is the first minor to include supporting co-curricular activities such as mentoring, as well as a required seminar course and optional courses in biostatics and biodesign.

**Certificate in Engineering Leadership**
U of T Engineering’s Institute for Leadership Education in Engineering (ILead) expanded its academic courses by offering a certificate program for students in September 2014. Courses focus on the cognitive and psychological foundations of effective leadership, helping students to think analytically and systematically about leadership, and to effectively handle complex challenges. They are also taught practical approaches to becoming more productive engineers based on the premise that, for technology to become a reality, it must be translated through people.

**Certificate in Renewable Resources Engineering**
Our Engineering Cross-Disciplinary Programs Office has been collaborating with the Faculty of Forestry over the last two years to create a selection of interdisciplinary offerings for engineering students, highlighting expertise in sustainable resource management, bio-economics, sustainable energy production, product manufacturing and sustainable communities. These courses reflect the strong interconnections between work in renewable resources and various branches of engineering. The certificate provides recognition for a demonstrated focus in renewable resources.

In summary, we offer the following minors and certificates:

**Minors**
- Bioengineering
- Biomedical Engineering (new in 2014)
- Engineering Business
- Environmental Engineering
- Robotics & Mechatronics
- Sustainable Energy

**Certificates**
- Engineering Business
- Engineering Leadership (new in 2014)
- Entrepreneurship, Innovation & Small Business
- Global Engineering
- Mineral Resources
- Nuclear Engineering
- Preventative Engineering & Social Development
- Renewable Resource Engineering (new in 2014)

**Summer Course Offerings**
The Faculty has continued to expand the number of summer course offerings to include all three joint core courses for the Engineering Business minor, a technical elective in Nuclear Engineering for the certificate program and an Energy Policy course for the Sustainable Energy minor. Also, for the first time, incoming first-year students were able to take online Calculus with Engineering Applications I (APS162) for credit during the summer.
It is easy to identify the popularity of the Faculty’s cross-disciplinary programs through a quick summary of recent enrolment numbers. The overall number of students enrolled in minors has dramatically increased over the past seven years (Figure 4.1). The Engineering Business minor continues to experience the largest enrolment, representing 63 per cent of minor registrations. Interest in the joint Rotman-Engineering courses, created as the core of the minor and certificate, continues to surpass expectations. In 2013-14, 16 sections of the three joint core courses were offered to U of T Engineering students.

Figure 4.1 Undergraduate Enrolment in Engineering Minors, 2007–2008 to 2013–2014

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<td>138</td>
<td>195</td>
<td>168</td>
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<td>Environmental Engineering (Collaborative Program)</td>
<td>(95)</td>
<td>(74)</td>
<td>135</td>
<td>105</td>
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<td>Sustainable Energy</td>
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<tr>
<td>Total Enrolment</td>
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<td>528</td>
<td>514</td>
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