

## CAREER OPPORTUNITIES

Graduates from the Engineering Physics Nano and Micro Devices stream have a solid scientific background and a thorough knowledge of engineering design, theory, and fabrication. The broad nature of the Engineering Physics degree allows graduates to pursue any career of interest in almost any industry.

The background Engineering Physics provides is primarily suitable for employment or further higher education in any high technology discipline. There is a steady and high demand for trained high technology engineers. Graduates have achieved success in many sectors of research and industry, maintaining involvement in:

- Consulting firms
- Start-up companies
- Private industry
- Universities
- National laboratories

With the problem solving skills and resourcefulness obtained in Engineering Physics, graduates may succeed in any career path of their choice.



## ABOUT THE DEPARTMENT

The Department of Engineering Physics offers 30 undergraduate courses for the 4 stream options. Programs offered include:

- Interdisciplinary Engineering
- Nuclear Engineering & Energy Systems
- Nano and Micro Device Engineering
- Photonics Engineering

Undergraduate class sizes range from 30-60 students, varying per year, with an average of 32 hours of classes per week, six to nine of which are in a hands-on or laboratory setting.

In addition to undergraduate studies, the department offers a variety of programs for graduate studies, and conducts cutting edge research, developing tomorrow's advanced technologies.

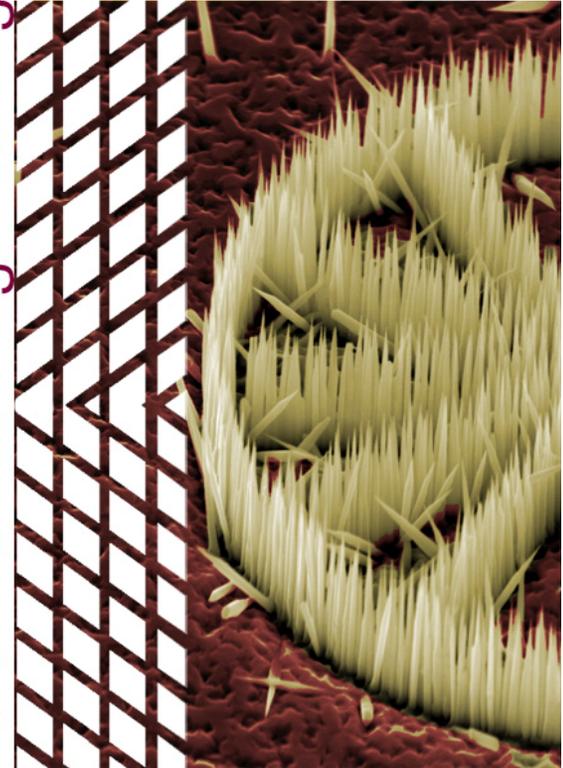


## CONTACT US

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# Engineering Physics

Nano & Micro Device Engineering



## NANO & MICRO DEVICES

Devices that are constructed on the nano-metre or micrometre scale are the technological backbone of the modern age of computers and high-tech communication. Since the introduction of the integrated circuit in the 1960's, device components have decreased in size and cost at an exponential rate, while increasing in speed and capabilities. The rapid advances in computer capabilities has transformed the worldwide economy and has led to a more prosperous society.

The invention of the transistor in 1947 is an example of an engineering feat that has changed the world, leading to a \$500 billion a year industry in integrated circuit fabrication.

In the Nano & Micro Devices Stream, students gain an understanding of device science and engineering through a series of courses and hands-on device fabrication. In Level 4, students will fabricate and test a working integrated circuit using industrially relevant processes.

## STREAM CURRICULUM

The Engineering Physics core curriculum offers a broad education in the physical and engineering sciences. Topics in the core curriculum include:

- Electricity & Magnetism, Thermodynamics Engineering & Classical Mechanics
- Quantum Mechanics and its Applications
- Electronic Devices and Circuit Design
- Computer Modeling and Signal Processing
- Mathematics and Mathematical Physics
- A Variety of Engineering Design Projects

Other topics in the Nano & Micro Device stream include:

- Fundamentals of Physical Optics
- Semiconductor Device Design
- Microsystem Device Technologies
- Applied Physics Laboratory

All streams offer the opportunity to take 5-7 technical electives, which may be chosen among Engineering Physics courses, or from other Engineering departments to allow for a broadened Engineering education and diverse set of technical skills.

## INDUSTRIAL RELEVANCE

There has never been a more exciting time to be an engineer in nano and micro devices. The transistors in modern integrated circuits have feature sizes smaller than 100 nanometres. There are many challenges and opportunities as transistor dimensions are reduced to the atomic scale.

Using the same conventional semiconductor fabrication techniques to make modern electronics, scientists and engineers have created other small devices with new and unique capabilities such as:

Micro-electro-mechanical systems (MEMS), which are miniature mechanical sensors, actuators and other machinery to complement the logic and memory of today's computers.

Microfluidic devices promise to revolutionize biochemistry, pharmaceutical research and medical testing.

Photonic devices are at the heart of today's telecommunications revolution, and are also being applied in medicine.

### OTHER OPTIONS

All Engineering Physics streams include the following options:

Engineering & Management  
(5 year program)

Engineering & Society  
(5 year program)

Co-op or Internships  
(4-6 year program)

