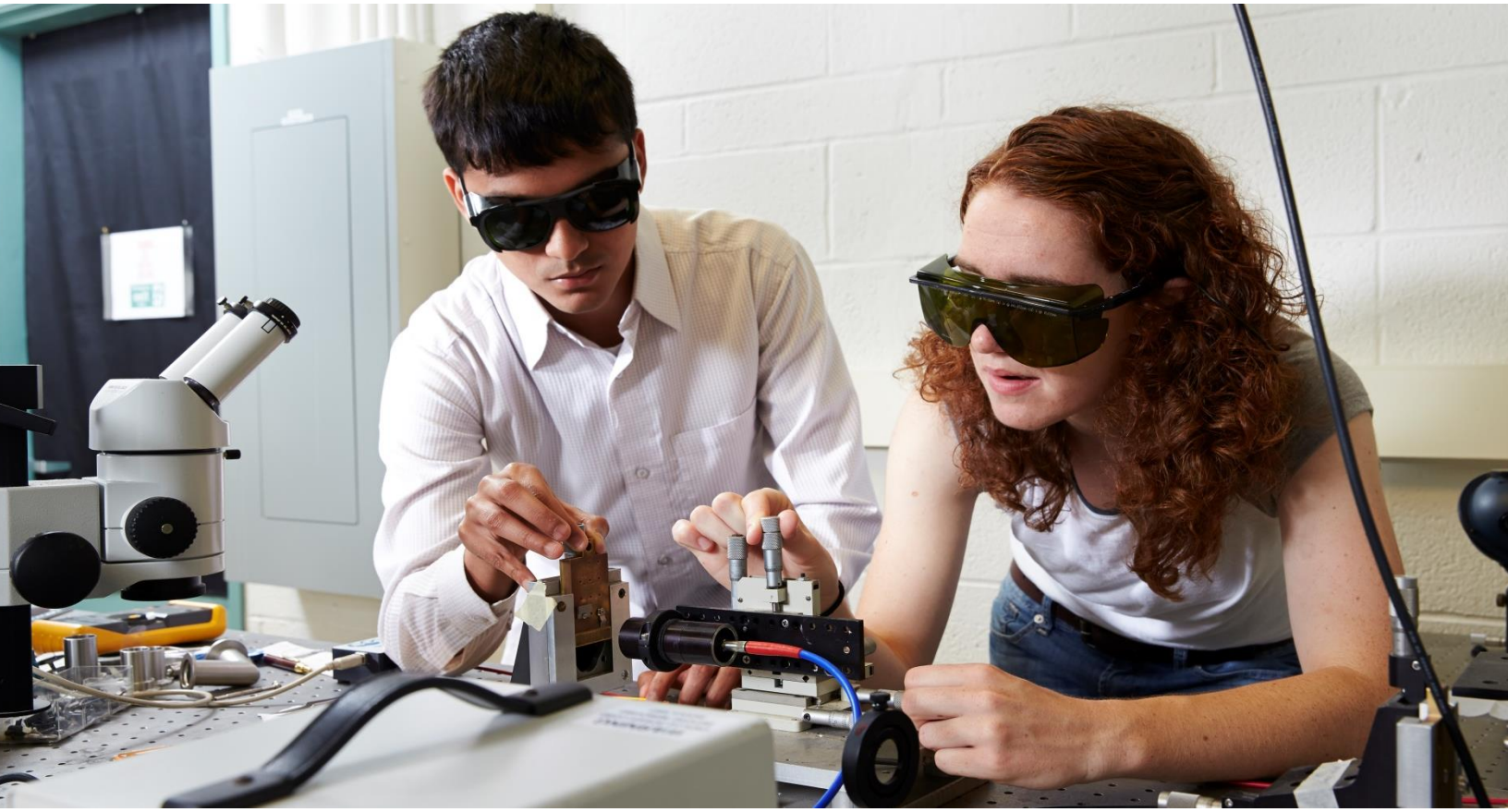
Engineering Physics | **ENGINEERING AT McMASTER**



Nano & Micro Devices | Nuclear & Energy Systems | Interdisciplinary | Photonics

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McMaster University ENGINEERING

Nano & Micro Device Engineering

Devices that are constructed on the nanometre or micrometre scale are the technological backbone of the modern age of computers and high-tech communication.

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.

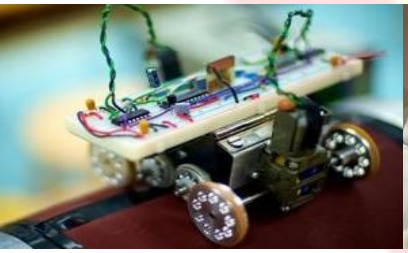
Stream Curriculum

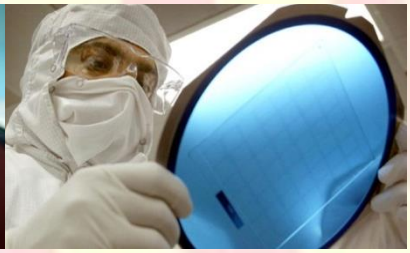
Topics in the core curriculum include:

- 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

Additional topics in the Nano & Micro Device stream:

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





Career Opportunities

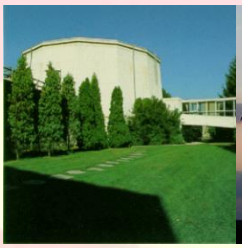
Graduates from the Engineering Physics Nano and Micro Devices stream have a solid scientific background and a thorough knowledge of engineering design, theory, and fabrication. Graduates have achieved success in many sectors of research and industry, maintaining involvement in:

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

Nuclear Engineering & Energy Systems

Nuclear engineering involves the application of scientific principles, engineering design and analysis, computer modeling and simulation, and government regulation for the peaceful use of nuclear energy. The nuclear engineering component of the McMaster program was one of the first of its kind in Canada, and is one of the most prestigious in the country. Students also have the opportunity to complete labs in McMaster's very own nuclear reactor.

Principles of alternative energy sources such as photovoltaics (solar cells), fuel cells, and wind power are explored in-depth.



Stream Curriculum

Topics in the core curriculum include:

- Engineering & Classical Mechanics
- Quantum Mechanics & its Applications
- Electronic Devices & Circuit Design
- Computer Modeling & Signal Processing
- Mathematics & Mathematical Physics
- Thermodynamics & Heat Transfer
- A variety of Engineering Design Projects

Additional topics in the Energy stream:

- Principles of Nuclear Engineering
- Introduction to Energy Systems
- Industrial Monitoring & Detection
- Nuclear Reactor Analysis

Career Opportunities

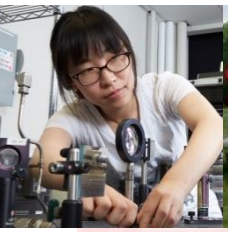
The Nuclear Engineering & Energy Systems stream has a solid scientific background and a thorough knowledge of engineering analysis and design skills. Graduates have excelled as problem solvers in many sectors including:

- Electrical Power Generation Utilities
- Nuclear Power Plant Design
- Nuclear Safety & Policy
- Consulting Firms
- Private Industry
- Research Institutions

Interdisciplinary Engineering

New technologies require engineers that have an understanding of many different aspects of science and engineering designs. As such, the Engineering Physics Interdisciplinary stream addresses these issues by exposing the student to a broad range of engineering sciences, from thermodynamics to circuit theory.

In addition to the broad scientific curriculum, students have the opportunity to explore a variety of engineering topics that relate to many industries, enabling them to assess problems from a truly interdisciplinary perspective.




Stream Curriculum

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

Topics in the Interdisciplinary stream include:

- Fundamentals of Physical Optics
- Semiconductor Junction Devices
- Industrial Monitoring & Detection Techniques
- Principles of Nuclear Engineering
- Next Generation Devices

Career Opportunities

Graduates from the Interdisciplinary Engineering stream have a solid scientific background and a knowledge of engineering design and theory. Graduates have achieved success in many areas including:

- Government regulatory agencies
- National laboratories
- Consulting firms
- Manufacturing
- Start-up companies
- Financial institutions

Photonics Engineering

Photonics is a branch of science and engineering that involves the generation, control, and detection of light to provide useful applications for society. The application of light also extends to many other industries such as medicine, biophotonics, sensors, displays, nanotechnology, manufacturing, and traditional optical engineering.

In the Engineering Physics Photonics stream, an understanding of the science behind the application of light is gleamed through courses that explore concepts from a theoretical and an applied industrial perspective.

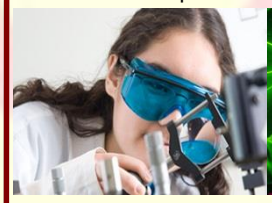
Stream Curriculum

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

Topics in the Photonics stream include:

- Fundamentals of Physical Optics
- Applications of Photonics
- Lasers & Electro-Optics
- Optical Instrumentation
- Optical Communication Systems



Career Opportunities

Graduates from the Photonics Engineering stream have a solid scientific background and a knowledge of engineering design and theory, and have been in demand by major companies. Graduates have achieved success in many areas including:

- Medicine & Biomedical Applications
- Instrumentation & Process Control
- Entertainment Industry
- Electronics & Consumer Products
- Military, Defense, & Aviation

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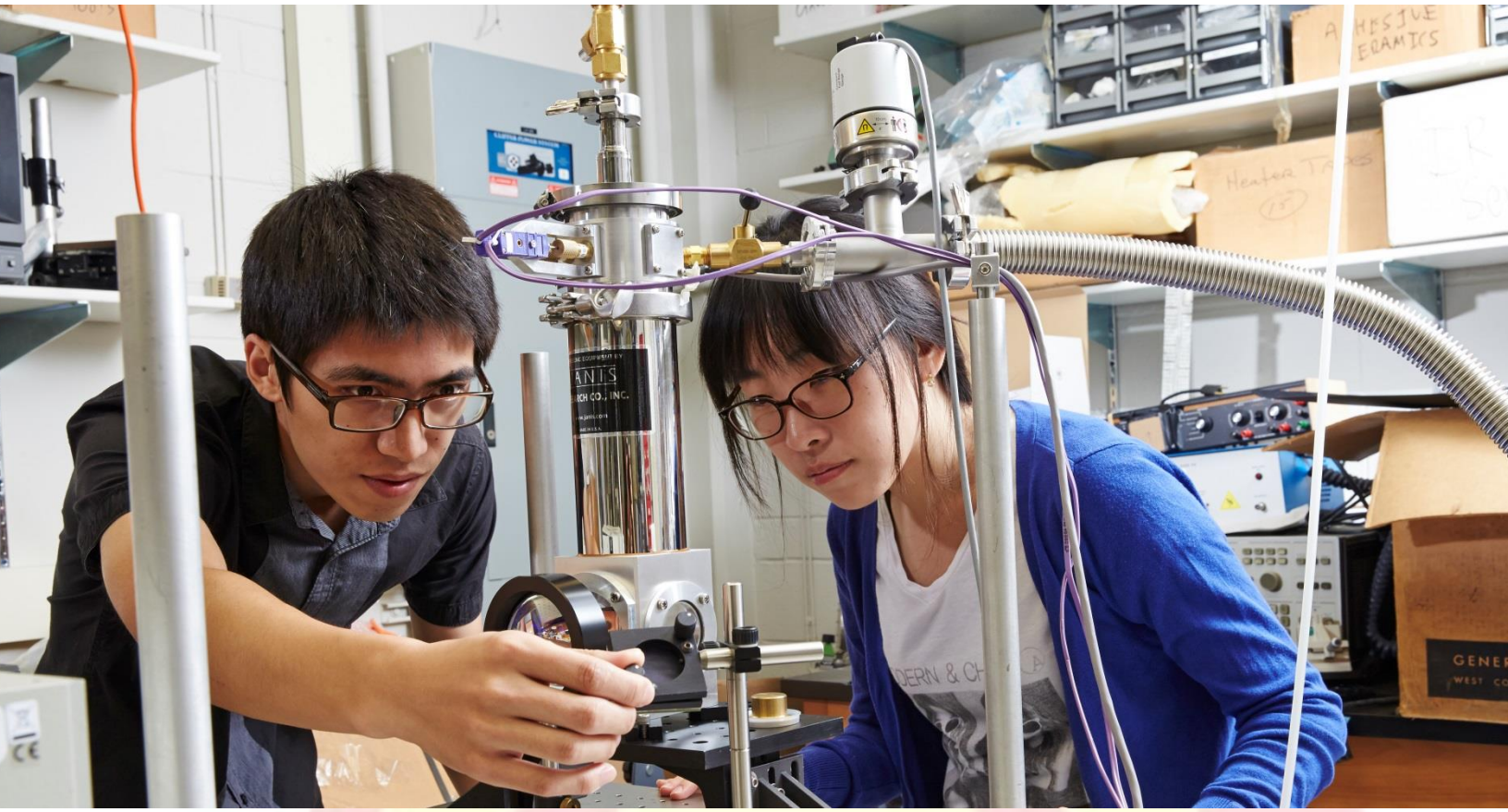

Additional Information

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.

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)

This brochure is a fraction of what the Department of Engineering Physics has to offer. For more information about our courses, career opportunities, professors, and examples of past graduates and their work, check out:

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