

## 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 in industries that utilize photonics technologies. The broad nature of the Engineering Physics degree allows graduates to pursue any career of interest in almost any industry.

There is a steady demand for trained high technology engineers. Graduates have achieved success in many industries that require the use of photonics technologies, including:

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

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

**Email:** [engphys@mcmaster.ca](mailto:engphys@mcmaster.ca)  
**Phone:** (905) 525-9140 ext. 27925  
**Web:** <http://engphys.mcmaster.ca>  
**Address:** McMaster University  
Engineering Physics, JHE A315  
1280 Main Street West  
Hamilton, Ontario, L8S 4L7

# Engineering Physics

Photonics Engineering



McMaster  
University 

## PHOTONICS ENGINEERING

Photonics is the branch of science and engineering that involves the generation, control, and detection of light to provide useful applications for society. In the past two decades, Photonics Engineering has emerged as an important new discipline, partly due to an explosive growth in fibre optic communications. The application of light also extends to many other industries such as medicine, biophotonics, sensors, displays, nanotechnology, manufacturing, and traditional optical engineering.

Laser light is one of the greatest inventions of the past century, with significant impact on modern life. From manufacturing to medicine, the application of light is everywhere.

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

## 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

Topics in the Photonics stream include:

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

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

The application of light is crucial to many industries, as it is the most non-invasive way to inspect or detect anomalies in a manufacturing process, making photonics a very useful tool for quality control.

The same concepts that are used in manufacturing are also used in medicine to do everything from tattoo removal to laser eye surgery to cancer treatment. Light is also used in the entertainment industry through CCD camera technology, projectors, and LCD screens, which can only be designed through an understanding of light.

In short, photonics already makes a massive impact on everyday life, and will only impact it more as applications are developed. The courses teach many concepts that are directly used in industry, and design projects allow students to practice these techniques and prepare them to succeed in industry.



### 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)

