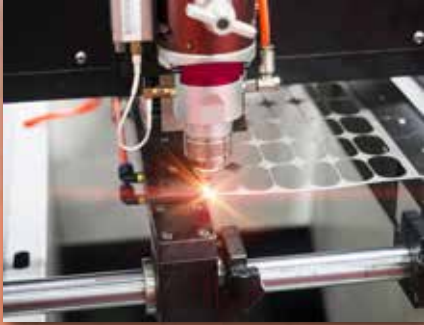


Optical Systems & Sensors



Carleton
UNIVERSITY



BACHELOR OF INFORMATION TECHNOLOGY
www.bitdegree.ca

ALGONQUIN
COLLEGE

High quality graduates that have both theoretical and practical ability is important in selecting new research and development employees at Ciena. The program delivers the exact mix of skills we need today, and the breadth to develop for the future.

R.G. Wilson, Senior Director, Ciena

INTRODUCTION

Light has played a key role in technology of the last century, however this century it will dominate the industry. Development of optical and light-based technology is accelerating at an astonishing rate and companies need trained professionals that understand the intricacies of the field. Autonomous cars require computer vision and LIDAR (Light Detection and Ranging) to navigate busy streets, robotic manufacturing use machine vision cameras to detect defects and process materials rapidly, key infrastructure networks use fibre-optic systems to communicate at speeds in excess of 1 Terabits / second. Lasers are being used for everything from scanning architectural artifacts to cutting and manufacturing various materials, and even delicate surgical operations. If you want to be at the forefront of this technology, then the Optical Systems and Sensors program may be just what you are looking for. The program is designed to provide you with the expertise to work in many areas in the field and the ability to shape its future.

PROGRAM OVERVIEW

Carleton University has joined forces with Algonquin College to offer this unique program. When you graduate, you will receive both a Bachelor of Information Technology degree in Optical Systems & Sensors from Carleton University and

an Advanced Technology diploma from Algonquin College. The program offers a comprehensive education combined with practical experience. You will build a strong foundation in mathematics, programming, physics, and optics prior to tackling specialized topics including: optical communications, optoelectronic devices, computer vision, signal and image processing, biomedical applications, quantum computing and lasers. You will learn about all of these topics while enjoying extensive hands-on experience with state-of-the-art equipment. You will also take courses in business, marketing, humanities to round out your knowledge and awareness of the role of technology in society. The program emphasizes the development of oral and written communication skills.

CO-OPERATIVE EDUCATION

A flexible co-operative education option will be available to you as an OSS student. The co-op option adds an additional year to your studies. Usually, you will complete your first co-op term in the summer after your second year of studies, and your second, third and (optional) fourth co-op terms in the winter, summer and fall after the fall term of your third year. Your placements are expected to be in the large number of companies working in optical systems and sensor technologies found in Ottawa, but a range of other opportunities exist in areas such as Toronto, Montreal and further afield. This also helps you to build contacts for both summer and future employment.

FUTURE OPPORTUNITIES

Technologies from the program permeate education, research, and many different industries. Your future could be as varied as designing displays for next-generation smartphones to developing life-changing laser-based surgical equipment. All of this through one program!

ADVANTAGES OF THE PROGRAM

Once registered for this program, you will be considered a student at both Algonquin and Carleton. You will benefit from the outstanding facilities, teaching staff, resources and expertise that both institutions offer. This unique combination of resources and expertise will give you a clear advantage in this area.

Note: The program has been designed for full-time studies. To ensure the necessary student/teacher interaction, enrolment in the program is limited.

LABORATORY FACILITIES

Carleton University's laboratory and computer facilities are extensive, our well established optical and semiconductor fabrication facility and a new Centre for Nanoscale Technology. At Algonquin College, courses are offered in advanced lasers and photonics, and optical communication network laboratories. Both institutions offer smart classrooms and state-of-the-art computer and optics labs.

TUNED INTO INDUSTRY

Both institutions regularly consult with representatives from related industries to track changing trends in the IT, optics, communications, computer vision, and display fields.

THE CAPITAL ADVANTAGE

Where better to study optical systems than in Ottawa, Canada's capital? Ottawa has a thriving high-tech sector that makes extensive use of optics-related technologies, as well as important government research facilities in optics and specifically lasers.

COURSES

To graduate from this program, you will need 20.0 credits, generally completed over four years. The required courses include:

Year 1

- Calculus
- Newtonian Physics
- Programming and Problem Solving
- Applications in Photonics & Optoelectronics
- Intro. to Automation and Simulation
- Linear Algebra
- Electromagnetism & Modern Physics
- Optics/Optical Fibers
- Introduction to Optics
- Intermediate Programming

Year 2

- Intro. to Signals and Systems
- Fundamentals of Light Sources
- Circuits and Signals
- Manufacturing Photonics Components
- Integrated Circuits
- Optical Communications Networks I
- Laser Systems
- Assembly & Machine Language
- Intro. to Statistics
- Differential Equations & Multivariate Calculus

Year 3

- Fundamentals of Electromagnetics
- Digital Signal Processing
- Data Structures
- Software Design for OSS
- Optical Communication Networks II
- Optical Waves, Waveguides, and Sensors
- Communication Skills
- Real-Time Systems
- Project Management
- Design of Optical Components & Systems

Year 4

- Remote Sensing
- Introduction to Business
- Image Processing
- Computer & Machine Vision Systems
- Optoelectronic Devices
- Photonics Research Project
- Marketing in the IT Sector
- Medical Imaging & Biosensors
- Arts and Humanities Elective

Note: As study terms and courses are continually evolving to meet the needs of industry, please refer to the Carleton University Undergraduate Calendar at carleton.ca/cuuc for an up-to-date list.



CAREERS

Typical careers for students graduating in the OSS program include: Optical Network Designer, Photonics Specialist, Optical Internet Security Researcher, Photonics Software Technologist, Fiber Sensor Designer, Optical Sensor Integration Specialist, Photonics, Optical Medical Diagnostics Technician, Display Researcher, Remote Sensing Technician, Computer Vision Developer, LIDAR Software Developer

COMPANIES

Graduates and coop students from the program are currently employed at the following companies: Nokia, Ciena, Viavi Solutions, Mitsubishi, OZ Optics, Allied Scientific Pro, General Dynamics, Magellan Aerospace, National Research Council, Bell Canada, JGR Optics, Iridian, Juniper Networks, and Defense Research and Development Canada.

ADMISSION REQUIREMENTS

To be eligible for admission to the first year of the Optical Systems and Sensors Program, Ontario students must have an Ontario Secondary School Diploma (OSSD) with a minimum of six 4 U/M courses. Your six courses must include:

- **Advanced Functions (MFV4U)**

For all applicants outside of Ontario, please visit admissions.carleton.ca/requirements.

Please note that the program is not structured to accommodate part-time studies.

CONTACT US

For more information on the Optical Systems and Sensors program, or any of the other programs under the BIT degree/diploma (Information Resource Management, Interactive Multimedia and Design, or Network Technology), visit the BIT website at bitdegree.ca, consult the Carleton University Undergraduate Calendar at carleton.ca/cuuc, or contact Carleton University or Algonquin College as indicated below:

Carleton University

Undergraduate Recruitment Office
315 Robertson Hall
1125 Colonel By Drive
Ottawa ON K1S 5B6
Canada

Tel: 613-520-3663
Toll-free in Canada: 1-888-354-4414
Email: liaison@carleton.ca
Website: admissions.carleton.ca

Algonquin College

1385 Woodroffe Avenue
Ottawa ON K2G 1V8
Canada

Tel: 613-727-0002 (General inquiries)

PROGRAM QUESTIONS

Email: infoOSS@bitdegree.ca
Website: bitdegree.ca/OSS