Bachelor of Computer Science

Carleton University
Canada’s Capital University
carleton.ca
Computers are an integral part of society and control many of the systems and resources that are essential for daily life.

Computers and computer systems play an essential role in business, communication, science and medicine. As the range of computer applications continues to expand, so does the demand for computer scientists.

Computer Science is an ever-changing discipline that studies the theory, design and implementation of computer applications and systems. Carleton’s program teaches you the fundamentals of computer science while allowing you to explore and experiment with the latest computer systems and applications. You will learn the principles that will help you adapt to changing technology, while also acquiring the skills for working in the information technology, biotech and multimedia industries.

**The Carleton advantage**

Carleton’s School of Computer Science has earned national recognition for its innovative undergraduate programs. Building on a strong core program in computer science and software engineering, our Bachelor of Computer Science Honours degree adds opportunities to learn about important application areas such as computer games, the life sciences and business. The core program gives all BCS graduates strong preparation for work in the IT industry or for advanced studies in computer science.

Students who choose to also gain expertise in an application area will have a considerable advantage if they are interested in a job in that area after graduating.

**CO-OP OPTION**

Our co-operative education program will provide you with industry experience and introduce you to a world of global technology. Ottawa offers the opportunity to work with many prominent high-tech companies, as well as with federal government departments and agencies.

Here are some of the places that have recently hired Carleton Computer Science students for co-operative education work terms:

- Alcatel-Lucent
- IBM
This lightning image, created by a Carleton professor and graduate student, demonstrates the use of path planning as a tool for creating content for virtual worlds.

EXPERT FACULTY
Our professors bring knowledge and experience from a variety of backgrounds and maintain strong links with international high-tech leaders. The School is internationally recognized for its research, particularly in the areas of security, high-performance computing, networks, human-computer interaction and algorithms.

Our faculty includes:

- Dr. Paul Van Oorschot, who holds a Canada Research Chair in Authentication and Computer Security and is researching, among other things, the security of Internet transactions including online banking. He is also an inventor on 15 U.S. patents and an expert in applied cryptography and software security.

- Dr. Jörg-Rüdiger Sack. Dr. Sack is a founding member of the High Performance Computing Virtual Laboratory, which in 10 years has received public and private investments of over $200 million.

- Dr. Sonia Chiasson, a researcher in Human-Computer Interaction who is the School’s Canada Research Chair in Human Oriented Computer Security.

The capital advantage
Ottawa is often referred to as Silicon Valley North because of the large number of high-tech companies that are situated here. These high-tech companies, as well as the federal government, often turn to Carleton students to fill co-op positions and to Carleton graduates to fill full-time employment positions. Over 150 high-technology companies in the Ottawa area trace their roots to the research work of Carleton alumni, faculty and students.

Choosing the right program
The Honours Computer Science program at Carleton is organized into diverse streams so that you can develop a particular expertise. Our specialty streams allow you the opportunity to concentrate on one important area of computer science and our multidisciplinary streams give you the chance to examine areas of increasing opportunity for computer scientists. You may also choose to take the Honours degree without a stream, or to start without a stream and add one later.

All streams share a common core of computer science courses, including courses in programming,
algorithms, software engineering, databases and web applications. Our Honours degree has been approved by the Canadian Computer Science Accreditation Council (CSAC). The degree is generally completed in four years.

**Specialty streams**

**COMPUTER GAME DEVELOPMENT**
Computer game development has become a sophisticated subject, drawing on advanced knowledge in a number of areas of computer science, such as artificial intelligence and computer graphics. In this stream, you will learn about both the principles and practice of designing and developing modern computer games.

**ALGORITHMS**
In addition to core courses in computer science, this stream includes foundational courses on algorithms. These courses will teach you to design, analyze, experiment with and reason about algorithms that arise in modern applications such as search engines, games, social networks, markets, economics and computer networks. The stream is especially suited for students with strong mathematical ability who wish to pursue an advanced degree or a career in cutting-edge research.

**MOBILE COMPUTING**
We are in the midst of a long-term shift of computing applications from desktop machines to mobile platforms such as smartphones and tablet computers. In the Mobile Computing stream you will study some of the fundamental problems related to computing on mobile devices, and at the same time develop the practical skills needed to develop sophisticated mobile applications. Students in the stream must have their own laptop computer.

**SOFTWARE ENGINEERING**
Learn to efficiently and effectively develop reliable and secure software. You will focus on methodologies and techniques for the design, implementation, and validation of large-scale cost-effective software systems.

**COMPUTER AND INTERNET SECURITY**
Computer and Internet security has become a critical issue in society because of the vulnerability of our computing and communication networks to hackers and malicious software such as viruses and worms. You will acquire a solid background in computer science and software engineering, as well as depth in both the foundations and the practice of information systems security, including computer and network security, cryptography and software security.

**NETWORK COMPUTING**
You will learn about the challenges of computing in a networked environment. We will teach you how to design and develop a range of systems including client-server and peer-to-peer systems, and equip you with an understanding of building safe networks and the knowledge to fix network problems.

**Multidisciplinary streams**

**MANAGEMENT AND BUSINESS SYSTEMS**
Receive the latest training in business and the application of computers within large business organizations. You will learn how to manage IT projects and companies by taking courses offered by both Carleton's School of Computer Science and the Sprott School of Business.

**PSYCHOLOGY**
Learn about the relationship between computer science and psychology, including areas such as cognitive science, human factors, human-computer interaction, product-design methodology and social aspects of computer use. Graduates in

CARLETON UNIVERSITY
Are you tied to your smartphone? Do you think there should be an app for everything? You might want to consider entering the Mobile Computing stream in Computer Science. The program is structured around four courses that depart from the usual lecture format; instead, you learn by creating and collaborating.

BIOMEDICAL COMPUTING

This stream is geared toward those seeking employment as a computer scientist or software engineer in biotechnology, medical computing or the life sciences in general. You will learn about some of the most interesting computational problems in the field, while developing a solid understanding of biology.

COMBINED PROGRAMS

Computer Science can be combined with Mathematics.

Professional designation

Students graduating with a BCS (Honours) degree from Carleton’s School of Computer Science can also earn an Information Systems Professional (ISP) designation. Carleton is the first university in Canada to make the ISP designation an integral part of their BCS (Honours) program. This designation is given by the Canadian Information Processing Society (CIPS), the national association of IT professionals, which is also in charge of the evaluation and accreditation of the Bachelor of Computer Science programs in Canada as well as the code of ethics for IT professionals in Canada. The designation is awarded to Carleton graduates following two years of professional employment. No additional exams are required.

Major degree program

For those desiring a somewhat less rigorous program and opportunities for greater breadth, the school also offers a four-year Major degree program. Please note that an Honours degree is usually required for admission to postgraduate studies.

Minors

Computer Science students can add another area of study, called a minor, to their program. Having
The School of Computer Science at Carleton University offers many specialized and multidisciplinary streams, as well as well balanced courses and well equipped computer labs, giving students all the tools necessary to succeed in their studies. In addition to the many important skills related to computer science that I have acquired, I have been able to develop and hone my critical thinking and analytical skills, all of which have made me a valuable asset to potential employers.

Quyen Le,
Computer Science student

Future opportunities
Carleton Computer Science graduates go on to prosperous careers in such fields as:

- software design and development;
- web services and infrastructure;
- software and systems security analysis; and
- biotechnology, artificial intelligence, computer gaming and business applications.

For Honours students interested in postgraduate studies, Carleton offers graduate programs in Computer Science, at both the master’s and doctoral levels.

**Admission requirements**
For admission to the Computer Science program, you must have the Ontario Secondary School Diploma (OSSD) or equivalent including a minimum of six 4 U/M courses. Your six 4 U/M courses must include at least one of Advanced Functions or Calculus and Vectors. For admission to the Biomedical Computing stream, 4U Chemistry is also required. It is Carleton University policy to consider your best performance in any eligible course in the admissions assessment. Since the number of qualified applicants may be greater than the number of available spaces, cut-off averages and required marks may vary. Please refer to our website at admissions.carleton.ca/requirements for the current admission requirements.

Support Services
At Carleton, we offer a network of support services to ensure that you make a successful transition to university life.

Our Student Experience Office runs student orientation programs as well as programs that promote student engagement and develop leadership skills. carleton.ca/seo

The Student Academic Success Centre offers academic advising and workshops on such topics as note-taking, exam preparation and time management. carleton.ca/sasc

The International Student Services Office is a valuable resource for our international students and for those students interested in studying abroad. carleton.ca/isso

Our on-campus Health and Counselling Services offers medical and counselling services and workshops promoting a healthy lifestyle. carleton.ca/health
Connect with Carleton

Everything a prospective student needs to know about Carleton University can be found on our undergraduate admissions website. carleton.ca/admissions

Ask Carleton
You have questions and we have the answers. admissions.carleton.ca/ask

facebook.com/carletonfuture

Insight
Subscribe to our electronic newsletter. carleton.ca/insight

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Get an inside perspective from our student bloggers. carleton.ca/blogs

Discover Carleton with our Carleton Admissions mobile app. carleton.ca/mobile

Check out our ever-expanding video gallery. admissions.carleton.ca/video

If you have any questions or wish further information, do not hesitate to contact us. Please see the back cover for our contact information.

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Do you want more information?
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