What can I do with a degree in Computer Science?

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Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Computer Science.

What is Computer Science?

Computer Science is about using computers to solve everyday problems. Computer scientists use the skill of writing code to develop software and applications that run on computers.

On top of programming, computer scientists also do work like designing innovative ways to interact with all sorts of devices (computers, phones, cars, factory machines), creating secure and reliable communication networks, and making sense of lots of data involving machines and artificial intelligence.

The field of computer science is wider than this even and computer scientists may also work in medical imaging, autonomous vehicles and "intelligent" learning environments. All of these areas are experiencing rapid growth in Aotearoa New Zealand and internationally.

Learn more

It is important to do some research when planning a future career. Speak with, ask questions of, and follow relevant professional bodies, organisations, companies, thought leaders and industry professionals to learn more about:

- Career opportunities, work environments and salary information
- Education and training requirements.

Examples of professional bodies

- IT Professionals New Zealand
  ⌨ www.itp.nz
- Software Innovation New Zealand
  ⌨ www.softwareinnovation.nz
- Association for Computing Machinery
 ⌨ www.acm.org

Career and study information

Some study pathways and degrees have a recommended school background, and some careers may require further study beyond a first degree or additional experience.

Gather helpful information from:

- Subject-specific content at
  ⌨ www.canterbury.ac.nz/study/academic-study/subjects/computer-science
- Job profiles on career websites like
  ⌨ www.careers.govt.nz
- Job adverts/vacancy descriptions
- Industry professional bodies.

This resource is part of a set of brochures focused on subject majors; many can also be studied as minors.

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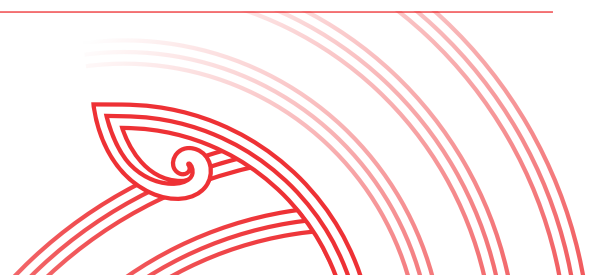
Career and study information continued

Should I study Computer Science or Software Engineering?

These related disciplines both provide technical training in various aspects of computation but with different emphases. Computer Science provides a broad exploration into areas of fundamental research, as well as links between computation, the sciences and arts.

In contrast, Software Engineering focuses on practical and human aspects of software development and management of teams.

What skills can graduates gain?

Through studying a degree in Computer Science, graduates develop various technical and transferable skills that can include:

- Practical application of technology and science
- Adaptation to technological changes
- Computational thinking
- Programming and design
- Understanding of the social impact of technology
- Deep technical knowledge in their specialist area (e.g. security, artificial intelligence, human-computer interaction)
- Problem analysis and solving
- Analytical and critical thinking
- Creativity and innovation.

Applied learning

Opportunities to apply learning are available through practical lab work and programming projects that assist in developing a portfolio of work. Students can also enrol in a software development project course.

These experiences can deepen graduates' skillset, awareness of others, working knowledge and employability.

What do employers look for?

Many employers look for generic skills such as communication, client/customer-focus, bicultural competence, cultural awareness, teamwork and initiative.

With technology, globalisation, and other drivers changing society, skills such as resilience, problem solving, and adaptability are important.

Skills that are likely to grow in importance include analytical and creative thinking, systems thinking and technological literacy.[*]

[*]*World Economic Forum: www.weforum.org/agenda/2023/05/future-of-jobs-2023-skills*

How can these skills be developed?

- Some skills are gained through studying
- Extra-curricular activities can help, such as getting involved in clubs, mentoring, cultural groups, part-time work or volunteering
- Be open to professional and personal development opportunities, whether it is undertaking work experience, overseas exchange, skills seminar, or joining an industry group.

Where have graduates been employed?

There has been an ongoing demand in Aotearoa New Zealand for IT related professionals. UC graduates have found opportunities in:

- Software development and services
- Telecommunications, networking and geolocation
- Automation, autonomous and embedded devices, and heavy industries
- Mobile app and game development
- Financial and legal services
- Web and cloud solutions
- Electronics manufacturers
- Energy companies
- Grocery, e-commerce or retail
- Media, entertainment and marketing
- Government or state-owned enterprises
- Agri-tech
- Education.

We also have former students starting their own companies, e.g., Komodo Monitr, Lab3 or Vxt.

What jobs and activities might graduates do?

Graduates with this degree are employed in a range of jobs — see some examples below.

Note: This list is not exhaustive, and some jobs may require further study, training or experience. It is recommended to start with the section 'How can I gain a sense of career direction?'

Full-stack developer

- Focus on the business-side of (web-based) software solutions
- Build prototypes to demonstrate the feasibility or economic viability of new software
- Test and maintain existing software

Web developer (or front-end developer)

- Design both pleasant and usable screens to capture or present information
- Work on accessibility problems (i.e. how to make software systems usable by visually impaired or elderly persons)

Computational science research

- Develop advanced simulations and models for studying intricate real-world phenomena
- Apply computational methods to tackle complex challenges across scientific fields
- Collaborate with experts, advancing both computational techniques and scientific understanding

Infrastructure and security engineer

- Look after the infrastructure aspects of IT systems
- Design, deploy and maintain the computing machines, network devices and security procedures
- Monitor in real time the state of a network

Business intelligence and analyst

- Apply mathematical and analysis skills to make sense of lots of data
- Help businesses make informed decisions regarding infrastructure or marketing aspects of software systems

Mobile developer

- Design engaging mobile applications
- Improve functionality, performance, and user experience through testing and optimisation
- Collaborate, release updates, and stay updated with trends

Game developer

- Develop (successive versions of) a game from story boards
- Work on various aspects of game development such as the graphics or engine (environment)
- Apply cutting edge technologies and methods to develop, test and roll out games

Examples of other job titles and careers include:

- Applications analyst / developer
- Systems analyst
- Cyber security analyst
- Forensic computer analyst
- Data analyst
- Machine learning engineer
- Software engineer
- UX designer
- IT Consultant.

Further study options

Computer Science graduates are able to progress their studies from honours through to PhD level. Postgraduate study can explore topics from machine learning, AI, security, to computer graphics.

Further study may facilitate career benefits such as specialist skills, entry into a specific occupation, higher starting salary, faster progression rate, and advanced research capability.

It is important to determine which, if any, further study options align with future career aspirations.

For further UC study options visit:
🖥 www.canterbury.ac.nz/study/academic-study

How can I gain a sense of career direction?

Understanding yourself and others is important to gain a sense of direction. This grows with experience; therefore, trying new things and reflecting on an ongoing basis is important.

Career planning checklist

❑ **Discover and reflect on:**

- Your values, interests, strengths, abilities, and aspirations
- Your connection to whānau, people, and places
- Lifestyle preferences and location
- The skills you want to gain, use, or enhance

❑ **Engage in a variety of experiences to learn about:**

- How you want to contribute to society, the environment, and global challenges
- The tasks, responsibilities and work environments you prefer
- Your work values, priorities and interests

❑ **Learn more and gather career and study information**
(refer to page one of this resource)

- Speak with people working in careers that interest you; check the realities of a job/career
- Gather information from various sources

❑ **Identify your next steps**

- Talking to a career consultant can help you to identify your next steps. Visit:
🖥 www.canterbury.ac.nz/life/jobs-and-careers

What have other students and graduates done?

Explore career stories of students' university experiences and UC alumni who make a difference globally in varied ways.

Visit: 🖥 www.canterbury.ac.nz/about-uc/why-uc/our-students/student-stories

Doug

Software Engineer (Infrastructure) - DevOps Enablement, Xero

Bachelor of Science in Computer Science

Tell us a bit about your career.

I joined Xero through their graduate program in 2021 and spent the year moving through a few different teams within the company. I worked on internal tools, core products, and even did some mobile development. It was a great opportunity to experience various technologies and team dynamics while getting paid to learn!

Since then, I have settled in the internal tooling & enablement space, where I primarily develop software and processes to help other engineering teams make changes to our core product in a fast and secure manner. I use my experience to guide new engineers and have accumulated the credibility to enact wider change within the company.

What do you enjoy most?

The aspect of this job that I enjoy most is the scale of what we do, and the impact even minor changes can bring. For example, decreasing a webpage load time by 100 milliseconds doesn't sound like much, but when that webpage is loaded 100 million times per month by millions of users, that 100 milliseconds translate to approximately 116 days (about 4 months) worth of collective time saved every month. Optimisation excites me.

How do you think your time at UC set you up for your career?

The tech industry is moving fast. We have access to a vast amount of information in this digital age, and I believe that developing a strong foundation is crucial for critically assessing the value behind the hype of the latest advancements. My time at UC provided me with the opportunity to build this foundation and understand fundamental concepts such as algorithms, data structures, and software engineering principles. It's not just about knowing how to use the latest tools; it's about understanding the underlying principles that drive technology forward.

While I studied computer science, UC allowed me to enroll in the software engineering course, SENG302, a year-long course that gave me experience working in a group to create a complex application. It gave me a taste of solving that constantly changing, never-ending puzzle as a group.

Do you have advice for Computer Science students?

Just like any challenge, it becomes easier with time and dedication! I initially struggled a lot but found the greatest success when I treated university as if it were a job and simply showed up every day. Given the broad application of Computer Science and the problem-solving mindset it nurtures, recognise that you are investing in skills that will pay dividends throughout your life—not only in your vocational endeavors but in all aspects of your personal and professional growth.

Career guidance

Career services are available for future and current students, and recent graduates. To learn more, contact:

Te Rōpū Rapuara | Careers
T: +64 3 369 0303
E: careers@canterbury.ac.nz
🖥 www.canterbury.ac.nz/life/jobs-and-careers

Helpful career insights

- Speaking with employers is key to finding opportunities; not all jobs are advertised
- Developing an online presence is useful as employers can search for future employees online
- Learning about recruitment patterns and where to find opportunities is important.

Study advice

Student Advisors at UC help with questions focused on starting, planning and changing studies. To connect with Student Advisors, visit:

🖥 www.canterbury.ac.nz/study/study-support-info/study-support

Future students – contact:

The Future Students team
T: 0800 VARSITY (0800 827 748)
E: futurestudents@canterbury.ac.nz

First year students – contact:

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T: +64 3 369 0409
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🖥 www.canterbury.ac.nz/study/academic-study/engineering

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