Nau Mai, Haere Mai,

And welcome to the Wellington Faculty of Engineering at Victoria University of Wellington

Internationally accredited degree

Graduate job ready

7 Majors: Including computer science and electronics

New Zealand’s first undergraduate cybersecurity degree

Wellington innovation and technology capital of New Zealand

2021

1,000+ students

1,300+ alumni

100+ Summer scholarships

Leaders in AI research

Lecturers who are experts in their field
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Victoria University of Wellington has been awarded five stars plus overall in the QS Stars university ratings system. In addition, the University received five stars in all eight categories on which it was evaluated.
WELCOME

Do you want to make the next major breakthrough in technology, help save a life, build the next big game, or start the next Instagram? Are you someone who likes problem-solving, creativity, and building things? If so, welcome to the School of Engineering and Computer Science (ECS)—we can’t wait to show you what ECS has to offer you.

Our Bachelor of Engineering with Honours programme is a four-year professional accredited degree with majors in Cybersecurity Engineering, Electrical and Electronic Engineering*, and Software Engineering.

We also offer majors in Computer Graphics, Computer Science, Electronics and Computer Systems, and Renewable Energy Systems within the three-year Bachelor of Science degree.

Whichever path you choose, our focus on digital-based technology will provide you with the knowledge to succeed in the modern workplace—from day one you will be designing and building autonomous robots, smartphone apps, and computer games.

Technology is changing all the time—but that is our challenge. We aim to be New Zealand’s leading institution for high-tech ICT and engineering training to prepare you for the careers of the future. To achieve this, we are introducing exciting new majors and programmes of study at the forefront of technology and industry. In recent years we have launched new programmes in Cybersecurity and Renewable Energy Systems.

What’s also important is that, as new students, you feel a real sense of belonging to your faculty from the very beginning. Your lecturers care about your progress, and there is support when you need it. We’re excited about providing an environment for you to learn, to grow, and to help you to get where you want to go in the world.

Our experienced, international staff are of the highest calibre and are passionate about supporting students to follow their natural curiosity into new areas of study and research. Victoria University of Wellington is ranked number one in New Zealand for intensity of high-quality research, and it values the professional skills of entrepreneurship, ethics, and sustainability. We are all here to help you succeed and to make sure you maintain a healthy work–life balance at university, thanks to our exemplary pastoral care team.

Our motto within ECS is “Think it! Plan it! Build it!” This motto not only refers to new technology such as the awesome robots you will be designing from your first year, but also applies to your academic career. Think about what you want! Plan how to get there! Build the skills and tools you need to do so!

It is a real privilege to be the dean of such a buzzing faculty full of dedicated staff and outstanding students. Engineers and computer scientists are some of the most sought-after professionals in today’s society, with interesting and well-paid careers. We have developed a well-deserved reputation for the quality and employability of our graduates, with many of our alumni pursuing amazing careers all over the world.

If you’re looking for a future where you can make a real difference—and one that is rewarding and enjoyable—come and join us at ECS. I sincerely look forward to announcing your name at a graduation ceremony in years to come.

Noho ora mai

Professor Dale Carnegie
Dean of Engineering / Amo Pūkaha
ACCREDITATION

The Electronic and Computer Systems Engineering (ECEN) major in the Bachelor of Engineering with Honours is fully accredited by Engineering New Zealand under the Washington Accord*. Our newest major, Cybersecurity Engineering (CYBR) will also go through the same rigorous accreditation process.

The Software Engineering (SWEN) major in the Bachelor of Engineering with Honours has been recognised with full accreditation by both Engineering New Zealand under the Washington Accord and IT Professionals New Zealand under the Seoul Accord, making it one of the few dual-accredited degrees in the world.

You can be confident knowing that your degree will be recognised internationally.

*Subject to regulatory approval, Electronic and Computer Systems Engineering will be renamed Electrical and Electronic Engineering.

DIVERSITY AND INCLUSION

In a world where equality and equal opportunity for all is yet to be fully realised, we pride ourselves on creating an inclusive, welcoming environment in which everyone can achieve their full potential.

Our commitment to non-discrimination communicates our desire to support anyone and everyone who wants to work or study with us, regardless of perceived differences—and we believe that these differences are our greatest strengths as we unite in the pursuit of academic excellence.

The Wellington Faculty of Engineering welcomes students, staff, and visitors regardless of ethnicity, gender, national origin, religion, or sexual orientation. The Faculty is committed to teaching and research that is free from all such discrimination.

Students from all walks of life who come to study with us experience our exemplary pastoral care and graduate with academic success and bright futures at the end of their journey with us.

The Faculty is also a founding partner of Engineering New Zealand’s diversity agenda, which aims to see 20 percent more women in engineering roles by 2021.
Āwhina is the support team for Māori students. Our kaupapa (goal) is to provide academic and holistic support for Māori students enrolled in any degree or course on any of our campuses. Our experienced staff offer one-on-one advising and mentoring sessions, study tutorials and wānanga, and a range of workshops to help you achieve your study and work goals. Our culturally inclusive environment includes whānau rooms with computer facilities, study areas, free tea and coffee, kitchenettes to prepare food, and space to meet with peers or tuākana (senior students). We can help you transition successfully from secondary education or work into tertiary education. Nau mai, haere mai—come and visit us at the Kelburn, Pipitea, and Te Aro campus spaces listed on our webpage.

💌 awhina@vuw.ac.nz
נוער www.wgtn.ac.nz/awhina
Pasifika engagement advisers and mentoring coordinators foster Pasifika learning and teaching communities in an environment that is welcoming, safe, and focused on academic excellence, personal growth, and wellbeing, with Pasifika culture at the core. Our students have access to a mentoring programme for 100-level to 300-level courses, course-specific study sessions, exam-oriented preparation, and workshops that support learning and development as well as meeting cultural needs. Our team is here to help you navigate the crossing into tertiary study and looks forward to welcoming you on board. We have Pasifika spaces at the Kelburn, Pipitea, and Te Aro campuses.

**PASIFIKA HAOS**
15 Mount Street
Kelburn Campus
✉ pasifika@vuw.ac.nz
🌐 www.wgtn.ac.nz/pasifika
GETTING ADVICE

We are committed to supporting students throughout their studies.

University programmes have a higher workload than secondary school programmes, and many students are away from home for the first time.

Staff in the faculty office have extensive knowledge about the services offered by the University, including academic support, clubs, and financial, medical, and counselling services.

Our first-year programme director, Dr Craig Watterson, is responsible for coordinating first-year teaching across ECS, and has a wealth of knowledge about the courses and processes. Get in touch with him if you’d like to discuss which courses to take.

Our senior tutors, Dr Ali Ahmed, Morgan Atkins, and Dr Howard Lukefahr (pictured below) and Hamish Colenso are the go-to people for tutorials and academic support in Engineering, Mathematics, and Physics courses. You will see them teaching in many of our regular weekday laboratories and tutorials. They are also course coordinators for several of our key first-year courses.

Besides the tutorials run as part of your course, there are workshop-based tutorials in the evenings, which you can choose to attend to get help with assignments and subject revision for the first-year Computer Graphics, Computer Science, Engineering, Mathematics, and Physics courses.

In your first year, you will also encounter engineering technician Arthur Roberts who teaches and supervises laboratories and tutorials in the core first-year courses.

Our senior tutor team comprises passionate educators who have a wealth of professional and educational backgrounds, and who sought out positions helping students. No question is a silly question. We want to help all our students.
MAJORS
The four-year Bachelor of Engineering with Honours (BE(Hons)), is a professional degree with a choice of three majors:
- Cybersecurity Engineering (CYBR)
- Electrical and Electronic Engineering (EEEN)*
- Software Engineering (SWEN).

SECONDARY SCHOOL SUBJECTS
If you are planning to enrol in a BE(Hons), it is important to study Computing, Mathematics with Calculus, Statistics, and Technology at secondary school. We also encourage you to take Physics.
- We recommend having at least 16 NCEA Level 3 credits in Mathematics (or equivalent secondary school qualification).
- We also encourage students taking EEEN to have 18 NCEA Level 3 credits in Physics, including Achievement Standard AS91524 (Mechanical Systems), AS91526 (Electrical Systems), and AS91523 (Wave Systems) or AS91521 (Practical Investigation), or an equivalent secondary school qualification.

You can discuss entry requirements for specific courses with the staff.

All students are expected to have experience using computers, although the programme does not assume any background in computer programming. If you have a background in computer programming—14 NCEA Achievement Standard Level 3 credits in Digital Technology, including 6 credits in Computer Programming—you may wish to enrol in COMP 112 instead of COMP 102.

The BE(Hons) focuses on the design and implementation of real-world systems. A common thread of practical application of knowledge runs through the degree, helping you build a solid grounding in the underlying principles of mathematics and science—essential for professional engineers.

Design and project work are common throughout the degree, giving you an understanding of the practical aspects of engineering design and development. All students undertake a major group project in their third year and a research project during the last year of the programme. These projects will help you produce a real engineering system.

In addition, the BE(Hons) programme provides training for you in the practical skills required to be a success in your chosen career, as you will also be required to complete 800 hours of industrial work placement.

The solid scientific underpinnings of the programme, in combination with extensive practical work, will enable you to thrive in a range of careers, including software and systems development for applications that underpin all areas of society; communication network design and management in a massively connected world; cybersecurity analysis and development for a new era of cyberthreats; and electronics, mechatronics, and robot design for next-generation devices. Our graduates are creating new systems that make more efficient use of our limited energy supplies, increase the safety of our transportation systems, and improve our healthcare—not to mention enhance our entertainment.

*Subject to regulatory approval.
FIRST-YEAR PROGRAMME

STRUCTURE

The set of courses you choose in your first year of Engineering will depend, in part, on which major you intend to take.

You should attempt to complete all the requirements of Part 1 of the BE(Hons) programme in your first year. A full programme of study consists of eight courses per year.

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All first-year EEEN* students should take these 100-level Part 1 courses

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<td>(This course meets the Physics requirements for the SWEN major)</td>
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You may substitute MATH 142 and MATH 151 for ENGR 121 and ENGR 122 if you intend to take mathematics at higher levels.

SWEN students will need to complete a physics-related paper in their first two years, and courses from a range of options, including CGRA 151, ENGR 141, and ENGR 142. Students who wish to take non-engineering mathematics papers in later years are welcome to contact us to discuss options.

*Subject to regulatory approval.
The Cybersecurity major has been developed to meet the increasing demand for cybersecurity graduates. Cybersecurity is at the forefront of modern technology and focuses on protecting and safeguarding computers, networks, and data from unauthorised access, attack, and damage. You will learn how to recognise these security threats and develop the practical skills needed to mitigate them.

Your study will include a range of technology-based courses and interdisciplinary courses that include aspects of law, policy, social and human factors, ethics, and risk management.

### All first-year CYBR students should take these 100-level Part 1 courses

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Our Cybersecurity programme will give you the technical and communication skills needed to excel in this profession. You will:

- apply secure programming techniques, software development methods, cryptographic mechanisms, and assessment of human factors to networks and operating systems to develop secure computer systems, security mechanisms, and assessment tools
- learn how to apply adversarial thinking, security evaluation techniques, risk assessment methodologies, and incident-handling best practices to the operation, maintenance, and analysis of computer systems, including hardware, software, networks, and people
- develop an understanding of the role of integrity, ethical behaviour, legal constraints, relevant professional standards, and local and international policy in practising as a computer security professional
- gain knowledge of a range of fundamental principles of security engineering that will provide the basis for future learning and enable you to adapt to the rapid development of the field
- gain experience working in a team to build, operate, analyse, and test the security of computer systems
- learn skills that enable you to communicate confidently, including writing effective reports, policies, and procedures; summarising information; giving effective oral presentations; and delivering clear oral instructions.
Luisa Kristen decided to pursue engineering because she wanted to take advantage of a niche job market that doesn’t include many women.

“I didn’t do much technology at high school, but I loved playing around with the computer at home. I thought I’d give engineering a go—and it turns out to be the best decision I could have made,” she says.

Planning to explore a career as an iOS developer, Luisa believes that one must understand how to create safe apps that don’t breach privacy. This led her to take cybersecurity courses as part of her degree. “It’s really important to understand how to apply basic security principles in any job,” she says.

“The courses have been really interesting. I enjoy the assessments, which are practical in nature, because they let you see, in a safe environment, what total access can mean and how to be careful with data.”

Luisa first interacted with staff at the Wellington Faculty of Engineering when she came for an Open Day session. “I got to meet some of the lecturers even before I applied, and they were so kind and welcoming. It felt like a good environment to be part of. I’m now a tutor for the first-year papers. My experiences, working with the tutor team, further reiterate the fact that this is a good place to be.”

Luisa recently won the InPhySec Cybersecurity scholarship. “It’s a great feeling, as I didn’t expect to win it. I’ve also had the opportunity to meet with the company’s partners, and there may be an opportunity to do some work with them. This kind of industry exposure is really crucial for an IT career.”

Having researched engineering degrees at other universities, Luisa chose Victoria University of Wellington because “Wellington is wonderful! There’s something here for everyone—whether you want to go on a hike, take a bike around to the waterfront, or drink coffee from different cafés.”
If you want to help create the technologies that are shaping our modern world—then choose Electrical and Electronic Engineering (EEEN)*.

You will cover core theories of maths, physics, and computer science, and study specialist areas such as renewable energy systems, communication engineering, robotics, and machine learning.

Electrical and electronic engineers can be found in many industries, including communications and control, electronic design, power systems, and signal processing. Your programme will therefore be broad, covering a range of engineering and scientific fundamentals.

During the first year of study, you will learn digital electronics, and even build a robot, while developing sound foundations in computer science, mathematics, and physics.

In the later years of the programme, you will develop your skills as you take courses that are of particular interest to you and include extensive practical components, culminating with a full-year engineering project in your final year.

You will also gain hands-on industry experience with 800 hours of work experience, and you will graduate ready to step into an exciting career with the skills and knowledge to make digital products.

There are many careers available to graduates of the Electrical and Electronic Engineering programme. Your degree will provide you with a range of electrical, electronic, and mechanical hardware design skills. You will also understand how to use embedded programming, control engineering, communication techniques, and sustainable design technologies to create future electronic systems.

Whatever field you decide to pursue, the study of it will provide you with the tools for a career of solving real problems.

### All first-year EEEN students should take these 100-level Part 1 courses

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*Subject to regulatory approval.
Captivated by computers and electronics, and with a desire to understand how everyday devices work, Joel Robertson found an outlet for his curiosity in engineering.

“As a musician, I use a lot of electronics and software in music production and performance. I find the technology behind them fascinating, and understanding how my tools work allows me to get the most out of them.”

The degree has a strong focus on team projects, which Joel said was beneficial to his personal development. “I’ve learnt to work better with others, to manage and prioritise my workload, and to be a team leader. I’ve also learnt to be more self-sufficient during my study.

“I enjoy applying problem-solving skills in engineering to create new devices and expand my understanding of physics and mathematics. All my courses have been packed with interesting and useful knowledge, including lots of practical learning. I’ve worked as a tutor for first-year students, and the Summer of Tech programme, sponsored by the University, helped me get a summer job as a software developer after my second year of study.”

Joel has found that electronic engineering encompasses both hardware and software design, making it an extremely versatile area of study. “There are so many good job opportunities worldwide, with good starting salaries and great possibilities for career progression.”

Joel is hoping to move overseas sometime in the next couple of years. “I’d really like to work for an audio-electronics company. The best opportunities for that are in Europe and North America.

“At some point, I’d like to be self-employed as an electronics designer, and spend some time working on my own projects. I have a lot of ideas I think would be worth developing. I’d also like to work in management, as the human connection aspect of engineering is really important to me.”

*Subject to regulatory approval, Electronic and Computer Systems Engineering will be renamed Electrical and Electronic Engineering.*
SOFTWARE ENGINEERING

Almost all aspects of the modern world involve computers—but it’s the software they run that turns these devices into useful tools that can drive our economy and improve lives.

In this major, you will gain skills and knowledge to develop the software that drives many of the most innovative and exciting companies such as Uber, Facebook, Google, Trade Me, and Xero, as well as the programs we rely on to communicate, collaborate, share, and trade.

If you plan to make a difference in the world, software can help you formulate solutions to address key global challenges.

Software engineers are the most sought-after graduates because they provide the core skills on which the modern world is built.

Our Software Engineering programme will give you the skills and knowledge needed to excel in this profession. You will:

- learn how to write code proficiently in modern object-oriented languages
- learn both the principles and the practice of networking and distributed systems
- learn the importance of developing good user interfaces
- learn about penetration testing and network security
- learn how to design and implement complex algorithms
- work in teams, using state-of-the-art tools to manage your code
- have opportunities to contribute to large open-source projects to enhance your portfolio
- cut your teeth on important practical topics, including compilers, databases, design patterns, distributed systems, the internet of things, software modelling, touch-screen and gesture-based interfaces, server-side and app development, web services, and more
- get exposure to the latest research being conducted by our world-renowned scientists.

Graduates from the University’s Software Engineering programme have gone on to work for companies such as Xero, Trade Me, Weta, Google, Apple, Intel, LinkedIn, Microsoft, MetService, Amazon, Facebook, Aura Information Security, Harmonic, CityLink, and Palantir. Others have joined exciting start-ups, developing technology for mobile phones, financial models, and more.
**All first-year SWEN students should take these 100-level Part 1 courses**

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The BE(Hons) degree also requires a first-year physics-related course that can be chosen from a list of introductory physics courses that includes CGRA 151 Introduction to Computer Graphics due to its coverage of basic physics of objects in the real world. Or, you can take ENGR 141 in your second year.

You can optionally elect to complete one of two specialisations—Artificial Intelligence or Networked Applications—by choosing specific courses within the major.
DIVYA PATEL

Graduate, Bachelor of Engineering with Honours in Software Engineering

With an interest in technology, problem-solving, and creativity, Divya Patel realised that software engineering was the perfect match for her.

A BE(Hons) in Software Engineering was a natural progression and a great way of exploring the creative side of engineering. Divya really enjoyed the practical component of the programme.

“As I got further into the programme, I found that more of the courses were very practically focused and had a range of group projects. In industry, you work with a team, so learning how to handle team projects was very useful.

“Some highlights for me included developing a 3D game, designing an online shopping platform, creating a water-quality-testing pod for an underwater remotely operated vehicle, and making a website to showcase a range of different interactive visualisations.”

The degree requires students to complete at least 800 hours of practical work experience during their years of study. Divya found that this particular component of the degree prepared her for the working world.

“While studying at Victoria University of Wellington, I completed two internships as a software engineer at Google. Through these, not only did I develop my technical skills, but I also improved my communication skills and learnt a lot about project management within a wider organisation.

“I currently work at Xero as a graduate data scientist. In my final year of study, I enjoyed the machine-learning courses I took. I found them to be challenging, but rewarding, and decided that I wanted to explore the area further. My current job allows me to do this, with a large part of my time dedicated to learning more about machine-learning models and what can be achieved by applying them in various areas of the business.

“Data science is a new area for me. I hope to become better in this area and continue working in an environment where I am constantly challenged and can do work that I love.”
The Bachelor of Science (BSc) comprises three-year programmes in Computer Graphics (CGRA), Computer Science (COMP), Electronic and Computer Systems (ELCO), and Renewable Energy (RESY), enabling careers in artificial intelligence, communications, computer graphics, games development, computer systems, mechatronics, distributed systems, electronics, logic, computation, software engineering, and sustainable energy. These programmes can also lead to postgraduate Honours and Master’s degrees and PhDs.
Humans are visual creatures: most of our information about the world comes through our eyes. Computer graphics is the dominant way computers communicate with people. Computer games and movie visual effects are the most obvious applications, but your smartphone, tablet, or desktop computer would be much less useful without its graphical user interface. Live-action TV and movies are all put through digital post-production, where computer graphics is used to tweak, enhance, and alter the content. Even the weather forecast on TV is presented using 3D computer graphics.

Computer graphics is a large, sophisticated field. We use vast amounts of computing power to create animated movies that are practically indistinguishable from reality. We build artificial worlds that we can interact with in real time, for both entertainment and simulation. We can visualise enormous quantities of scientific or medical data and make quick, accurate judgements because a visual representation is such a good fit to our natural abilities.

Victoria University of Wellington’s Computer Graphics programme is unique in Australasia. It was developed in collaboration with the thriving Wellington graphics industry in movie visual effects (for example, at Weta Digital) and computer games (such as local mobile game company PikPok). It builds on the University’s substantial expertise in Computer Science, Design, Engineering, and Mathematics. It aims to produce people who can build the next generation of computer graphics tools for use by artists, designers, scientists, and medics.

You will learn the principles and practice of computer graphics, taught by our team of world-class experts. This includes how we program computers to do 2D and 3D modelling, rendering, lighting, texturing, ray tracing, and animation. Supporting the core material are courses from the Computer Science major, in which you learn the key concepts of algorithm design. You will also spend time at the School of Design learning, alongside future designers, how the computer tools are used in practice. At the other end of our spectrum of courses, you will learn the mathematics needed to allow you to build new computer tools to create visual effects as yet undreamt of.
First-year programme

The Computer Graphics major has four aspects in the first-year programme, each with two courses.

**COMPUTER GRAPHICS**

- CGRA 151 Introduction to Computer Graphics
- DSDN 132 3D Animation and Visual Effects I

**COMPUTER PROGRAMMING**

- COMP 102 Introduction to Computer Program Design or COMP 112 Introduction to Computer Science*
- COMP 103 Introduction to Data Structures and Algorithms

**FUNDAMENTAL MATHEMATICS**

- ENGR 121 Engineering Mathematics Foundations or MATH 151 Algebra*
- ENGR 123 Engineering Mathematics with Logic and Statistics or MATH 161 Discrete Mathematics and Logic*

**OPTIONS**

- Two further 100-level courses of your own choice+

*The two optional courses can be taken from the University’s range of first-year courses. We offer guidance about what would be appropriate. If you want to consider optional courses in the School of Design in later years, you should consider taking DSDN 101 Design Visualisation. ENGR 122 Engineering Mathematics with Calculus is useful for those who want to strengthen their mathematics but do not want to take advanced Mathematics courses later. Those with appropriate NCEA credits who want to take advanced Mathematics courses in later years should consider MATH 141 Calculus IA and MATH 142 Calculus IB. If you want to keep your options open to taking either a BSc in Computer Graphics or a BE(Hons) in Software Engineering, you should register for BE(Hons), taking DSDN 132 3D Modelling and Animation I and CGRA 151 Introduction to Computer Graphics as your options; you can then make a decision about which degree to take at the end of your first year.

*Alternative course. COMP 112 is for those with substantial prior programming experience. MATH 151 and MATH 161 are for those who plan to go on to take Mathematics courses in later years.
Ruth Holness says when considering where to study, she was immediately drawn to Wellington and the major in Computer Graphics.

“I was fascinated by the visual effects industry and wanted to learn how the technology used in film and television worked behind the scenes. I have always enjoyed the visual aspects of computer programming and I was excited to explore that area in more depth.

“I have loved studying the maths behind visual effects, so much so that I changed my degree to include Mathematics as a major. I am now studying a triple major in all but name as I try to include as many computer graphics and visual effects courses as possible!”

Ruth says the programme has exceeded her expectations and given her the opportunity to undertake a software engineering internship with Google in Sydney.

“Through the internship, I learnt so much about what it’s actually like to work in a technological field, plus I met so many amazing people and had the best time.”

She also says Wellington is the perfect student city.

“It’s the perfect balance between city and nature, and everybody here is so friendly. It is the best city to be a student as there is so much to do, and yet there are still places to go to relax, wind down, and just be. It’s safe to say I’d recommend it to anyone!”

Ruth plans to continue to postgraduate study before going into industry, where she hopes to work in technical research and development for the film industry.
COMPUTER SCIENCE

It is an exciting time to be a computer scientist. From the clever speech recognition algorithm on your phone to any of the myriad complex software systems that we depend on every day, new creations continue to arise that would have been impossible without the science of computing.

An education in computer science prepares you to go on to innovate in extraordinary ways—whether directly in the technology itself or beyond it in wider society.

The BSc in Computer Science is a flexible three-year degree that can include a selection of courses from areas including algorithms, artificial intelligence, computer graphics, cybersecurity, databases, networking, programming languages, and software development.

You can choose to focus entirely on Computer Science or combine it with other disciplines at the University, giving you a broad interdisciplinary foundation for working in jobs that apply computing to new areas. A BSc in Computer Science can include up to half its credits from other fields in the sciences. It can be combined with another subject offered at the University to make a double major. Some of the other majors that you can combine your Computer Science major with could be Computer Graphics (CGRA), Data Science (DATA), Electronic and Computer Systems (ELCO), Information Systems (INFO), or Mathematics (MATH).

Whichever path you choose, your study will start with courses in which you will learn the fundamental skills of computer programming and understanding algorithms. In later courses, you will build on these skills while learning new concepts and techniques for applying computing to many different tasks and problems.

SPECIALISATIONS

As part of the major in Computer Science, you can optionally elect to complete one of two specialisations—Artificial Intelligence or Cybersecurity—by choosing specific courses within the major.

You don’t have to choose straight away, but taking MATH 177 (for Artificial Intelligence) and CYBR 171 (for Cybersecurity) in your first year will give you the option to easily add these specialisations later.

First-year programme

The following are typical first-year programmes with a Computer Science major.

Computer Programming:

- COMP 102 Introduction to Computer Program Design or COMP 112 Introduction to Computer Science*
- COMP 103 Introduction to Data Structures and Algorithms.

Fundamental Mathematics:

You must take two Mathematics courses, which can be either of the two combinations below:

- ENGR 121 Engineering Mathematics Foundations along with ENGR 123 Engineering Mathematics with Logic and Statistics
- MATH 161 Discrete Mathematics and Logic along with MATH 177 Probability and Decision Modelling or QUAN 102 Statistics for Business or STAT 193 Statistics in Practice.

You must complement these four courses with further courses from a selection of choices across the University to make up a full first-year workload. We offer guidance about what would be appropriate.

*Alternative course is COMP 112 is for those with substantial prior programming experience.

WHERE CAN COMPUTER SCIENCE TAKE YOU?

Our graduates in Computer Science are sought by local and international employers and are valued for their clear thinking as well as their technical skills. The qualification is an entry into a range of jobs across artificial intelligence, gaming, graphics, machine learning, networking, software development, and other applications of computing.

The BSc is also the basis for postgraduate study such as a BSc with Honours, a Master’s, or a PhD. These research degrees lead to novel ways of using computers to solve problems facing the world.
Originally from China, Xiaotian Liu came to Wellington several years ago, when her parents suggested that she move to the ‘coolest little capital’.

“I was just a regular student, focusing on my study, when my parents suggested that I move here, as they thought it would be a nice place for me. And I love it here. The weather is nice, the landscape is so beautiful, and the people are very helpful,” she says.

A Bachelor of Science graduate, Xiaotian pursued a double major in Computer Science and Information Systems.

“I enjoyed learning to code, learning new computer languages, and fixing bugs. I especially liked fixing bugs—I could spend three days on one problem and when I fixed it, it was a wonderful feeling.

“One of my courses in the final year was about website and application development. I really enjoyed this course because I got to do everything myself—right from building the structure, filling the gaps, fixing the bugs, and building the design. The sense of satisfaction when I’d built an entire page was quite something.”

Xiaotian hopes to pursue a career in IT consulting, which is where she believes her decision to combine these two majors will play a role. “Computer Science has helped me understand the technology aspect, while Information Systems has helped me understand how to communicate to others what we do, from a technology perspective.”

Working independently and in groups across different courses was valuable. “Being completely in charge of projects is a really good experience and it helps us prepare for the industry.”

Xiaotian has also explored other opportunities during her time at the University. She joined Wellington University International’s leadership programme and the International Buddy programme.

“Through the leadership programme, I volunteered for some events. This helped me overcome my shyness and talk to people I hadn’t met before. I was the Vic buddy for an international student. My buddy was from Iran, and it was a great opportunity for me to learn something completely new from her.”
ELECTRONIC AND COMPUTER SYSTEMS

Learn the maths and physics that lie at the heart of electronics and mechatronics. Find out why electronic components act the way they do, and study the programming and computer science that sit behind electronic and mechatronic tools such as robots and medical devices such as heart sensors.

Combine Statistics with Communication or Signal Processing to design next-generation telecommunications systems or sonar devices, or Digital Electronics with Computer Science and specialise in the design of next-generation microprocessor chips.

If you are interested in a career in electronic manufacturing, testing, or troubleshooting, the BSc in Electronic and Computer Systems (ELCO) will teach you the strong fundamentals in electronics you will need.

This is a flexible degree, and you may choose to combine it with study in another major or choose courses that will allow you to delve into, and explore, related cutting-edge research that exists in other fields in science—and beyond—to create a programme of study that will meet your interests and future ambitions.

For example, you could combine EEEN’s electronics subjects with Physics to embark on a career in semiconductor devices, or you could mix Chemistry and Control Engineering for a career in chemical or pharmaceutical manufacturing.

The first-year programme consists of core foundation courses in Computer Programming, Mathematics, and Physics:

- COMP 102 Introduction to Computer Program Design (or COMP 112 Introduction to Computer Science)
- ENGR 121 Engineering Mathematics Foundations and ENGR 122 Engineering Mathematics with Calculus (or MATH 142 Calculus 1B and MATH 151 Algebra)
- ENGR 141 Engineering Science and ENGR 142 Engineering Physics for Electronic and Computer Systems (or PHYS 114 Physics 1A and PHYS 115 Physics 1B).

If you are interested in advanced Mathematics courses in later years, you can substitute MATH 142 Calculus 1B and MATH 151 Algebra for ENGR 121 Engineering Mathematics Foundations and ENGR 122 Engineering Mathematics with Calculus. Similarly, if you are interested in advanced Physics courses in later years, you can substitute PHYS 114 Physics 1A and PHYS 115 Physics 1B for ENGR 141 Engineering Science and ENGR 142 Engineering Physics for Electronic and Computer Systems.

In later years in the programme, you can choose to focus on robotics, renewable energy systems, practical electronics, or fundamentals in communication, control engineering, or signal processing.
Wellingtonian Bradley Leuw followed his passion for YouTube physics and rocket science all the way to a BSc(Hons) in Electronics and Computer Systems. “I actually started with a major in Physics. But the first-year Physics courses can lead to second-year Engineering courses—and they looked really cool. I decided to try them, and ended up completely switching to an Electronics and Computer Systems major.”

It’s the same passion for creative engineering projects that led Bradley to take on an additional Honours year after completing the three-year BSc. “If I want to get into an engineering-based job, an Honours year would definitely help. And if I could push myself, why not?”

Majoring in Electronics and Computer Systems gave Bradley the opportunity to work at the Wellington Faculty of Engineering’s Robinson Research Institute, and this sparked his interest in superconductivity. “There’s a YouTube channel called BPS Space, where they make model rockets. I want to do that.”

Through his project, which involved building a control system for a superconducting magnet, he was thrilled to have been part of their formative space research. “It’s a great project—and practical experience like this is really crucial as it helps us understand how advanced physics and engineering theories can be applied.”

Pursuing Electronics and Computer Systems gave Bradley the opportunity to undertake hands-on engineering research. He’s been passionate about the project-based learning approach in his courses. “You get to use a huge range of what you’ve learnt—and it’s a good reminder that you’ve actually learnt a lot, even if it takes a while to figure out the little details.”

Bradley now knows that the sky is the limit. “I’m going to be like RocketLab, only better.”
New energy technologies are rapidly becoming affordable, and it is well accepted that these will be immensely disruptive to our traditional mode of centralised energy generation and its transmission and distribution. Additionally, most of the world’s population is becoming aware of the severe climate (and other) impacts of many traditional energy sources. What society requires are the skills and knowledge appropriate to develop the future of renewable and sustainable energy systems.

Expertise in renewable energy systems can be found not only in the energy generation, transmission, and distribution industries, but also in various governmental bodies, not-for-profit organisations, energy retailers, and Māori and Pacific community-based entities. Your programme will therefore be broad, covering a range of engineering, sustainability, and scientific principles. During the first year of study in Renewable Energy Systems (RESY), you will learn engineering and sustainability science fundamentals while developing sound foundations in Computer Science, Mathematics, Physics, and Renewable Energy.

During the later years of the programme, you will further develop your analytical skills as you study various topics within the field such as renewable energy generation, conversion and storage technologies, energy-economic analysis, sustainability modelling techniques, and policy development. As the programme progresses, you will be able to concentrate on areas of the curriculum that particularly interest you.

The programme uses an interdisciplinary approach by working with research and teaching expertise from many areas in the University and engaging with partners across society in transdisciplinary ways. The BSc in RESY then gives you a great deal of flexibility to delve into intersecting fields of inquiry and the cutting-edge research that exists in many fields of emerging technology systems.

There are many careers available to graduates of the RESY programme. Whatever field you decide to pursue, your studies will provide you with the tools for a career of solving real-world problems.

### All first-year RESY students should take these 100-level Part One courses

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<tr>
<th>Trimester 1</th>
<th>Trimester 2</th>
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<tr>
<td>ENGR 121 Engineering Mathematics Foundations</td>
<td>RESE 111 Introduction to Renewable Energy Systems</td>
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<tr>
<td>ENGR 141 Engineering Science (Physics and Chemistry)</td>
<td>ENGR 123 Engineering Mathematics with Logic and Statistics or STAT 193 Statistics in Practice</td>
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You can then choose four courses at 100 level from any other major that will complement your RESY major.
Professor Alan Brent says he was halfway through an undergraduate degree in chemical engineering when he realised he wanted to use his knowledge to make a meaningful difference.

“And so, I started my journey in engineering—but with a focus on the environmental impacts of economic activities, the sustainable management of those activities, and now the transformation of our energy system, which is vital to sustain our livelihoods.”

Professor Brent joined the University in 2017 and led the development of a new academic programme in Renewable Energy Systems.

“The new subject is a unique opportunity for anyone who wants to be part of our transition to a resilient, low-carbon society, and is an excellent option to double-up with another field of study such as environmental studies, commerce, or law.

“We recommend our students look seriously at that path, because we can’t solve our real-world problems by working in silos—we can create solutions only by working across academic disciplines and with society more widely.”

To support this approach, the programme Professor Brent designed has students engage with experts in industry and different government spheres to understand the real-world context of their studies.

“We also engage with communities, because practical solutions are needed on the ground, and we need a more holistic understanding if we are to avoid the unintended consequences that some solutions might bring about. For example, electric cars seem like an obvious green route—but where and how are the batteries manufactured, and are they recyclable at the end of their life?

“That’s the essence of the academic programme, which positions you to play a vital role in the public or private sector: planning, designing, and managing sustainable systems, with a focus on the energy component of those systems.”
ADMISSION

There are various ways you can gain admission to Victoria University of Wellington. Find all our admission and enrolment requirements online.

www.wgtn.ac.nz/apply

CAREERS

The world of work is changing at an exceptional pace and increasingly requires curious and agile lifelong learners. Employers look for well-rounded, adaptable graduates who demonstrate the ability to communicate, work collaboratively, think creatively, and solve problems. Graduates who can demonstrate employability skills from both academic learning and extracurricular experiences will have a competitive edge when applying for jobs.

Careers and Employment

The Careers and Employment team connects you with employers and the community, and prepares you for future employment. We can help you explore your study and work options, apply for jobs and internships, and establish a career path by providing advice for ongoing career development.

We have services at both the Kelburn and Pipitea campuses where you can attend one-to-one appointments, drop-in sessions for CV checks, and workshops on a range of career topics, including networking and interview preparation.

You also have access to our employability development programmes and comprehensive resources, job vacancy listings, and career events.

All current students can participate in the Wellington Plus service and leadership programme, the GrowMe employability programme, and our Alumni as Mentors programme that connects final-year students with the University’s alumni.
Jobs on CareerHub

CareerHub has everything you need to keep your career on track:

- search for a range of jobs, from internships, voluntary, and part-time work to graduate positions
- be the first to hear about careers expos, employer information sessions, and seminars
- find resources to assist with your job search, CV, and interview preparation
- book for career advice appointments, workshops, and events.

www.wgtn.ac.nz/careerhub

Develop your skills and experience and launch your career with confidence.

CAREERS AND EMPLOYMENT

Room HU120, Hunter Building, Kelburn Campus

04 463 5393
careers-service@vuw.ac.nz
www.wgtn.ac.nz/careers
Victoria University of Wellington strives to create an environment that values diversity. If you are Deaf, have an impairment, mental distress, injury, medical condition, or specific learning disability that affects your learning, participation, or enjoyment at university, you can get tailored assistance.

We can help you with individualised coaching and planning, exam support, liaising with academic staff, adaptive technology, sign-language interpreting, note-taking assistance, mobility parking, access to ergonomic equipment, and quiet spaces to rest and study.

Contact Disability Services as early as possible before you start study.

DISABILITY SERVICES
Level 1, Robert Stout Building, Kelburn Campus

📞 04 463 6070
✉️ disability@vuw.ac.nz
🌐 www.wgtn.ac.nz/disability
PUBLICATIONS

The University has a range of guides to help you find out what Victoria University of Wellington has to offer. Download a copy from our website or request a hardcopy by contacting Student Recruitment and Orientation (0800 04 04 04).

- *Your Introduction to Victoria University of Wellington* (February) gives a brief overview to the University’s degrees and student life.
- *Guide for Parents* (May) answers questions parents have about sending their children to university.
- *Accommodation Guide* (May) gives information about each hall of residence and how to apply, as well as details about other accommodation options.
- *Guide to Undergraduate Study* (July) includes everything students need to plan their first year of study, including information on subjects and degrees, student life, and how to apply to enrol.

Once you are fully enrolled, look out for our set of new student publications, *Student Guide, Getting Started*, and *New Students’ Orientation Guide*, for advice on how to settle in to student life at university and in Wellington, and how to make the most of Orientation.

[www.wgtn.ac.nz/a-z-publications](http://www.wgtn.ac.nz/a-z-publications)

SCHOLARSHIPS

Victoria University of Wellington is committed to supporting and encouraging students who embody and display the key attributes of excellence, leadership, and commitment to community, and helping remove the barriers to university study that exist for students facing hardship or disadvantage.

We offer a range of scholarships for all levels of study, from awards for school leavers and undergraduates, to postgraduate and doctoral scholarships to support you in your studies.

[www.wgtn.ac.nz/scholarships](http://www.wgtn.ac.nz/scholarships)
WHO TO CONTACT

FACULTY STUDENT AND ACADEMIC SERVICES OFFICE
Your faculty office is your first point of contact for support with anything from enrolment to graduation. Get help choosing your degree, planning your courses, or changing your degree programme.

Room CO144, Level 1, Cotton Building, Kelburn Campus
Ξ 04 463 5101
✉ engineering-faculty@vuw.ac.nz
✓ www.wgtn.ac.nz/engineering

ACCOMMODATION
Contact University Accommodation Wellington for advice on applying for halls of residence, renting, and other accommodation options.
✓ www.wgtn.ac.nz/accommodation

ADMISSION AND ENROLMENT
Prospective and current students can visit the Enrolment Office for admission and enrolment information, advice, and support.
✓ www.wgtn.ac.nz/apply
✓ www.wgtn.ac.nz/re-enrol

COUNSELLING SUPPORT
Student Counselling provides professional, confidential counselling appointments across all campuses for any issue that is impacting on your personal or academic success.
✓ www.wgtn.ac.nz/counselling

FEES AND FINANCIAL ADVICE
Get information and advice about fees, payments, student levies, and dealing with StudyLink. Meet with a student finance adviser for all money matters and how to apply for the Hardship Fund.
✓ www.wgtn.ac.nz/money

INFORMATION TECHNOLOGY
Get help with computers, printing, and access to your digital tools, as well as basic support and diagnosis for personal laptop issues.
✓ www.wgtn.ac.nz/its

RAINBOW STUDENTS’ SUPPORT
We offer a range of services and resources for students who identify with diverse sexual orientations and sex and gender identities.
✓ www.wgtn.ac.nz/rainbow

STUDENTS’ ASSOCIATION
Victoria University of Wellington Students’ Association (VUWSA) is a student-led, student-run organisation, providing advice, advocacy, events, and support for all students.
✓ www.vuwsa.org.nz