ELECTRONICS

Otago

UNIVERSITY of OTAGO
SAPERE AUDE
Te Whare Wānanga o Otāgo

what is electronics?

Electronics is the technology that puts the 'e' into e-verything – e-mail, e-commerce and more. It's at the core of many of the appliances and equipment we take for granted – computers, television, cell phones, cars, cameras, watches, and electronic games – and plays a vital role in the control and monitoring of industrial, commercial, scientific and medical equipment and processes.

Electronics is a rapidly changing area, and is a major growth industry worldwide. It typically involves using low cost, miniature components, plus skill and know-how, to build hi-tech, high value devices and products to make our lives more efficient and interesting.

By studying Electronics, you'll learn about the design, development and application of equipment that makes familiar electronic services possible. You'll gain an understanding of the basic building blocks of electronic devices, electronic communications technologies such as radio and lasers, large-scale integrated Electronics systems, and the software that governs the application of this technology.

The Electronics industry is vast, and is one that rewards creativity and expertise. There will always be plenty of business opportunities waiting to be explored. To prepare you to make the most of these opportunities, Otago's BAppSc in Electronics also includes a range of commerce papers that focus on innovation and entrepreneurship.

some reasons for studying **electronics**

- A career in Electronics provides huge opportunities to use your initiative and be creative, and rewards people who can come up with practical, fun and innovative ideas.
- Changing technology means you will always be facing new challenges and problems.
- Electronics is a growth industry with a promising future worldwide. When you are ready, you might even take your own product to the market, and launch your own business.
- You'll get to study at Otago. Studying there is fun, and it helps you gain the independence, initiative and drive that employers want.

CAREER **OPPORTUNITIES**

There really are countless career opportunities both in New Zealand and overseas for graduates with both technical expertise and sound business knowledge.

While Electronics has particularly strong links with telecommunications and software engineering, Electronics specialists are now being called upon to work in an increasing number of industries. You might become involved in communications (radio and optical systems), commercial or industrial control systems, consumer goods, entertainment products, computers and their peripheral devices, scientific and medical equipment, wireless applications or research and development.

These roles could see you employed for a large organisation, or equally, you could work for a consultancy firm, taking on a range of projects or several clients. This kind of work tends to have plenty of variety, not to mention opportunities for travel.

With a BAppSc in Electronics from Otago, you will be especially well qualified to work in the design and development of Electronics circuits for niche applications. This could include researching the needs of the market, conducting feasibility studies to see if your ideas will be profitable, developing new Electronics systems, testing prototypes, manufacturing and providing customer service. You may well find yourself setting up your own innovative Electronics company!

BACKGROUND REQUIRED

To enter MATH 160, you should have obtained 60% or more in Bursary Maths with Calculus.
For PHSI 131, you will need to have obtained 65% or more in Bursary Physics.

WHAT IS THE **BACHELOR OF APPLIED SCIENCE?**

The Bachelor of Applied Science is a degree linking the excitement of science and technology with the challenges of business. It will give you scientific skills, technological knowledge, and the know-how to apply what you have learnt to the success of any organisation you work for. More than this, the programme encourages innovation, entrepreneurial spirit, and real-world business awareness, meaning you will be in a strong position to take the initiative if you decide to start a business of your own.

The Bachelor of Applied Science is an active and innovative four-year degree, awarded with honours, taking students right through to graduate-level courses. As well as learning theory in lectures, you'll gain hands-on experience in practical classes, computer labs or field trips. Most courses also include research projects in year four, so you are likely to find yourself working on a business or industry-based problem. Entry to the second year is gained on the basis of first-year marks.

IF YOU WISH TO MAJOR IN **ELECTRONICS** FOR A BAppSc, YOU MUST STUDY:

First Year

42 points minimum (seven papers), including:

MATH 160	Mathematics 1
MATH 170	Mathematics 2
One 100-level Physics paper	(PHSI 131 recommended)

It is also recommended that you take:

COMP 103	Computer Programming

Plus

Within the four year course, you must also include the following business papers:

MANT 111	Introduction to Business Management
MART 101	Principles of Marketing
MANV 201	Understanding Markets
MANV 202	Business Control and Capital

It is also recommended that in the course of the degree you include:

MANV 301	Managing Innovation and Growth
MANV 302	Innovation and New Product Development
TELE 201	Introduction to Telecommunications
TELE 202	Computer Networking

NB: Details of first-year papers are in the *Prospectus,* and papers at higher level are in the *Guide to Enrolment* published with enrolment material in September.

Second Year and beyond…

From second-year onwards, you'll explore both analogue and digital Electronics. In second-year, you'll take papers in introductory Electronics and digital Electronics, covering topics including digital logic circuits, large-scale integrated systems, programmable logic devices and microprocessor architecture. And because so much of applied Electronics involves radio and opto-electronics systems, such as lasers, you'll also gain an important understanding of the principles – such as electromagnetism and optics – which underpin these subjects.

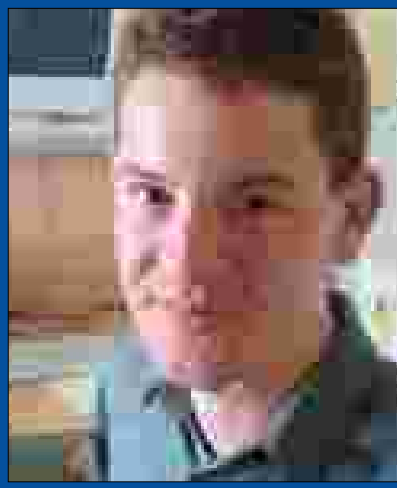
In third year, you'll expand your understanding of semiconductor devices as well as Electronic systems, including television and radio, and both electronic and computer-aided design. You'll also look at radio communication, lasers and opto-electronics. These themes are further developed in fourth year, along with topics such as digital signal processing, and instrumental techniques.

All courses involve a mixture of lectures and practical laboratories, so you'll have plenty of opportunities to gain hands-on experience in problem solving. There will also be some scope for you to choose additional papers, which will allow you to develop extra skills in a particular area, such as computer science and telecommunications.

Work experience is a requirement for the BAppSc in Electronics. At the end of your second and third years, the University endeavours to help you obtain work in the Electronics industry.

In your fourth year, you'll carry out a major investigative project. Students are encouraged to do a project in conjunction with an external company, who – with luck – may offer financial support for your research.

MALCOLM **FRASER** profile



Malcolm Fraser discovered, after graduating from the University of Otago in 1998, that holding an MSc in Electronics meant an exceptionally wide range of career opportunities was open to him.

He worked for a few years providing computer support at the University of Otago, and then took up a position as a research fellow in broadband communications, working with high-speed data networks and multimedia systems.

But the ever-expanding world of computer systems beckoned, and now, Malcolm has the title of Senior UNIX Engineer for the Christchurch firm Computer Concepts. His role involves developing and supporting high-powered business computer solutions, using the UNIX operating system.

It's a "busy and challenging job", says Malcolm, and one that his Electronics background has been essential for. "If something ever goes wrong with a system," he explains, "it's vital that I have a firm grasp of what's going on at a very basic level. That way I can make a quick diagnosis and come up with an effective solution plan. That's what our clients demand of us."

Malcolm says the systems he develops are often integral to the day-to-day running of a business, so it is important they run smoothly at all times. "This means being prepared to carry out maintenance work at very odd hours of the day!" he says. "And implementing new systems can take months of forethought and planning."

He describes one project where a large manufacturer wanted to set up a new computer system that could run 24 hours a day, seven days a week. This required establishing a complex relationship between two computers, so one could provide back-up if the other ever failed. This client told Malcolm that if their main computer went down, the new system would pay for itself in only one hour of trading.

It's successes like this that give Malcolm his job satisfaction. "When the pieces fit together, and everything works right, I get a very good feeling," he says.

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