THE UNIVERSITY OF MELBOURNE

MELBOURNE SCHOOL OF ENGINEERING

Engineering & IT

Undergraduate Study Guide

2013

www.eng.unimelb.edu.au

Contents

About Engineering and IT at Melbourne

The University of Melbourne is ranked number one in Australia for engineering and technology. We offer engineering and IT programs that will provide you with professional accreditation through Engineers Australia and in Europe via the EUR-ACE® and Euro-Inf® labels. This unique dual accreditation ensures that our graduates can pursue professional careers in many countries around the world.

Melbourne creates engineers and IT specialists with advanced technical and communication skills that are prized by employers. Exposure to real-world projects helps develop problem-solving and team work skills that are crucial in the engineering and IT industries.

Our reputation

In 2011, the University of Melbourne was the highest-ranked Australian university in the disciplines of engineering and IT across three major international rankings:

- Times Higher Education (THE)
- Shanghai Jiao Tong
- Quacquarelli Symonds (QS).

We are internationally recognised for our vibrant community of scholars and students, our leading research and innovative curriculum.

Our research

The University of Melbourne is a world leader in engineering and technology research, including iconic research endeavours such as:

- the bionic eye
- global water resource management
- carbon capture and storage
- nanotechnology-based drug delivery and
- next generation internet technologies.

Our researchers work in important new multi-disciplinary organisations including the IBM Global Research and Development Lab, the Institute for a Broadband Enabled Society, the Melbourne Materials Institute, the Centre for Energy Efficient Telecommunications (with Bell Labs, Alcatel-Lucent), the Melbourne Sustainable Society Institute and Bionic Vision Australia.

Our people

Our staff includes nationally and internationally respected academics across a range of disciplines, many of whom are leaders in their field. As well as undertaking front line research, these are the people who design and teach our courses, transferring their knowledge to you.

Our facilities

Our facilities include new learning spaces customised for problem-based learning, computer laboratories, and an Engineering Learning Centre, with comfortable, modern spaces for students to socialise and collaborate.

Our programs

Our five-year engineering program is unique in Australia and better aligned with industry needs. We offer a graduate school model of education, in which professional, internationally-recognised qualifications are gained at the Masters level following a three year undergraduate degree. This model offers:

- a breadth of cross-disciplinary experience during the undergraduate course
- increased technical specialisation during the Masters
- entry to the engineering profession at an advanced level
- potential for more rapid advancement to managerial positions.

Our links with industry

We have strong links with industry in research and teaching. Access to leading industry practitioners and internships means students learn how to apply theory to practice and can be assured that their studies are relevant, contemporary and well-regarded by employers.

Our scholarships

A generous range of engineering and IT specific scholarships is available for students at all levels from undergraduate to PhD. These scholarships have been made possible thanks to the generous contributions of our donors. See page 47 for details or visit www.eng.unimelb.edu.au/scholarships/.

Our professional accreditation

Our Master of Engineering programs are provisionally accredited by Engineers Australia, a signatory to the Washington Accord, which allows graduates to work as professional engineers in 12 of the world's leading economies, including the US, UK, Canada and Singapore. Our suite of professional Master of Engineering programs are also the only Australian engineering programs to have received European accreditation, having been awarded the EUR-ACE® label. This European accreditation will open up further exciting career opportunities in Europe for our graduates, and confirms that our programs meet high European and international professional standards. Our IT Masters programs and our undergraduate major in Computing and Software Systems are accredited by the Australian Computer Society. Other professional bodies accrediting our engineering and IT programs include the Royal Institute of Chartered Surveyors and IChemE.

Our graduates

Employers are seeking graduates with strong business, technical, analytical and interpersonal skills, in order to meet today's commercial, environmental and technical challenges.

Engineering and IT at Melbourne will provide you with skills in:

- engineering, IT and science fundamentals
- problem identification and solution
- analytical and creative problem solving
- communication
- teamwork and collaboration
- business understanding and risk management
- design innovation and project management
- research.

You will enter the workforce with the ability to lead projects and teams, and the creativity to analyse problems in ways that provide innovative solutions. You will be recognised for your professionalism, understanding of global issues and strong communication skills. You will have a wide range of career opportunities in locations that range from regional Australia to corporate offices and cutting-edge research programs around the world.

Studies in Engineering

Our programs have been designed to respond to the needs of industry and to provide students with an internationally competitive qualification. To become a professionally-accredited engineer, students complete five years of study, starting with an engineering major or sequence of subjects in a three-year undergraduate degree, followed by a two-year Master of Engineering.

Engineering majors are available in the:

- Bachelor of Biomedicine
- Bachelor of Commerce (breadth sequence in Engineering)
- Bachelor of Environments
- Bachelor of Science

These undergraduate degrees provide a broad base of skills and flexibility with course options to suit individual interests.

Engineering starts from day one, with foundation subjects in first year introducing a multi-disciplinary approach to engineering fundamentals. Participation in workshops and projects explore engineering problem-solving. Second and third year studies introduce the range of engineering disciplines that are offered in the Master of Engineering.

Following graduation from these degrees, students enter the two-year Master of Engineering program, continuing and intensifying study in their chosen discipline.

Master of Engineering disciplines include:

- biomedical engineering
- biomolecular engineering
- chemical engineering
- civil engineering
- electrical engineering
- environmental engineering
- geomatics
- mechanical engineering
- mechatronics
- software engineering
- structural engineering.

The Master of Engineering is also available to students who have completed their undergraduate degree at other universities; Australian and international. Prerequisite studies in mathematics and science are required, see entry requirements on page 45 for more details.

Students graduate with a Bachelor and a Masters degree, dual professional accreditation, and a combination of technical, analytical, and interpersonal skills, which will make them highly-valued in the work place.

SCHOOL LEAVERS

Melbourne Model Degrees (3 years)

Bachelor of Biomedicine	Bachelor of Environments	Bachelor of Commerce	Bachelor of Science
Majors include:	Majors include:	Majors include:	Majors include:
Bioengineering Systems	Civil Systems	Bioengineering Systems*	Bioengineering Systems
	Geomatics	Chemical Systems*	Chemical Systems
	Environmental Engineering Systems	Civil Systems	Civil Systems
		Computing and Software Systems	Computing and Software Systems
		Electrical Systems	Electrical Systems
		Mechanical Systems	Geomatics
		Environmental Engineering Systems	Mechanical Systems

EXIT TO EMPLOYMENT

Master of Engineering (2 years)

Specialisations:

Biomedical	Civil	Geomatics	Software
Biomolecular	Electrical	Mechanical	Structural
Chemical	Environmental	Mechatronics	

EXIT TO EMPLOYMENT WITH PROFESSIONAL ACCREDITATION

SCHOOL LEAVERS

Any Bachelor Degree

Must include Linear Algebra and Calculus 2 or equivalents, along with science relevant to intended specialisation.

Note: Duration of Master of Engineering will vary from 2–3 years depending on amount of credit obtained from prior study.

First year engineering subjects

Engineering Systems Design 1 and 2

Engineering Systems Design (ESD) 1 and 2 are key engineering subjects for first year students in the Bachelor of Science, Environments, Commerce, and Biomedicine and can be taken as breadth subjects by Arts, Commerce and Music students.

If you are thinking about further study in engineering, ESD 1 and 2 introduce you to the discipline with hands-on lectures, workshops and team design projects. You will discover how creativity has led to amazing developments by engineers. You will begin to think like an engineer in approaching and solving problems, using technical knowledge to devise creative solutions in project teams. ESD 1 develops knowledge of the engineering method, the importance of engineering in society, how to analyse possible alternative approaches to engineering design challenges and the skills of project planning in a team.

ESD 2 builds directly on ESD 1 by further developing knowledge of the engineering method through projects from digital circuits, programming and mechanics. Design challenges are completed in the workshop classes through a series of hands on projects that include design, analysis and simulation.

These subjects also demonstrate how the engineering disciplines work together to solve a problem or create a product. For example, at least four types of engineers help make an MP3 player. Do you know who they are?

Examples of the types of projects you can undertake in ESD 1 and 2 include the following:

- **Designing a digital decoder**

  In this project, you will learn what it means for things to be described as being 'digital' and how to encode digital data for storage and/or transmission. You will be exposed to the complexities of digital circuit design, source coding and error correction. The goal of this project is to build an audio decoder using a hardware development board to correctly reproduce a passage of music corrupted by errors.

- **Modelling of a catapult**

  The study of mechanics involves investigating the forces on mechanical systems such as levers, beams, truss bridges, and springs which are ever present in the real world. Dynamical systems, such as the motion of a projectile through the air, are also equally important in the study of mechanics. This project involves teams combining knowledge in these two realms to build a computer simulation model for the firing of a catapult. The goal is to develop an accurate model of a real catapult, select the correct launch parameters to hit a target, simulate with computer software and finally demonstrate success by firing a real catapult.

Structural Environments

Structural Environments introduces Bachelor of Environments students to the world of engineering and construction. This subject will allow you to pursue majors in Civil Systems and Environmental Engineering Systems, as well as Construction within the Bachelor of Environments.

Through a series of design projects, interactive workshops, lectures, model building and laboratory sessions, students gain real-work engineering experience and foundation knowledge in how the built environment interacts with the natural environment.

Students will explore the fundamentals of structural analysis and commonly used construction materials, construction methods and systems. You will learn to identify the basic properties and behavior of structural materials and manufacturing processes.

A strong focus of the subject is sustainability in structural design and students will learn to evaluate the sustainability implications of alternative construction materials and the environmental impacts of conventional structural materials and manufacturing process. You will write basic MATLAB programs to evaluate structural systems, and you will compare and contrast the benefits of alternative structural designs using quantitative models.

The subject is the first step of the Bachelor of Environments undergraduate pathway to the Civil, Structural and Environmental streams of the internationally-accredited Master of Engineering.

Mapping Environments

Mapping Environments examines how information is used to help make decisions in urban and rural environments. You will learn about methods of data collection, mapping, and communicating information through visualisation and decision-support systems. Specific topics covered include: methods of determining position; map projections and the shape of the Earth; the development of cartography from paper maps to GIS and 3D visualisation; the development and use of GPS technology; data structures for managing information; methods of measuring built environments and monuments; and the development of mapping from aerial photographs to high-resolution satellite imagery.

Practical work and group projects will give you hands-on experience with a range of measurement, geographic information, image analysis and virtual reality technologies, including the following:

- **Mapping basics**

  The University of Melbourne is undertaking a hypothetical project to determine its carbon footprint, and your task is to map the size and location of all rubbish bins on campus. This exercise guides you through the steps involved in building a map, including collecting, processing and displaying information. You will be introduced to tools including PDAs, ArcPAD and ArcGIS, and will start thinking about how places and objects can be represented on a map.

- **Modern maps**

  By asking you to map the University's octagonal observatory, this project will introduce you to the process of measuring, mapping and visualising in 3D, as well as the use of surveying, imaging and modelling tools such as Disto, digital compasses, digital cameras, GIMP, site plans, floor plans, section plans and Google Sketchup. You will also start thinking critically about 3D computer-based models and their application in managing real-world environments.

Engineering via the Bachelor of Biomedicine

ENGINEERING MAJOR AVAILABLE:
- BIOENGINEERING SYSTEMS

DURATION: 3 YEARS FULL-TIME (24 SUBJECTS)

FEE TYPE: CSP AND INTERNATIONAL FEE

CAMPUS: PARKVILLE

Biomedicine is concerned with the processes and systems that create, sustain and threaten life. Advances in biomedical science have increased our understanding of health and disease, creating opportunities for further research and development of therapeutic strategies and clinical practice in acute care and community settings. Health, ageing and the management of chronic diseases present major challenges for modern societies. Graduates of the Bachelor of Biomedicine will play leading roles in tackling these challenges and providing innovative healthcare solutions.

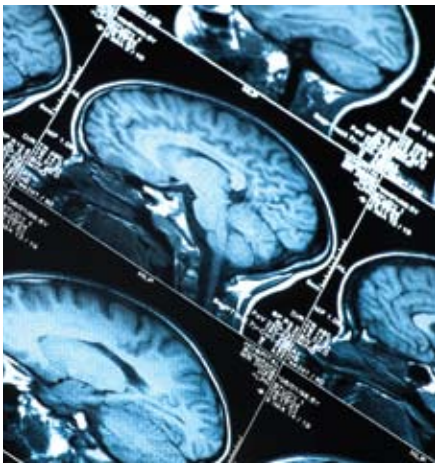
Developing a specialisation

Students develop a specialisation within a particular biomedical discipline by completing a major sequence of study at third-year level. Students who have undertaken a major in Bioengineering systems can then complete a Master of Engineering (Biomedical) to become an accredited engineer. This pathway into engineering is ideal for students looking to complement their technical skills with medical knowledge and take up a career in the challenging field of biomedical engineering. Students will need a 65% average in their final two years of study to be accepted into the Master of Engineering.

Commonwealth supported places are available in the Master of Engineering program and a generous scholarship program exists for both local and international students.

More information

Find out more about the Bachelor of Biomedicine at www.bbiomed.unimelb.edu.au

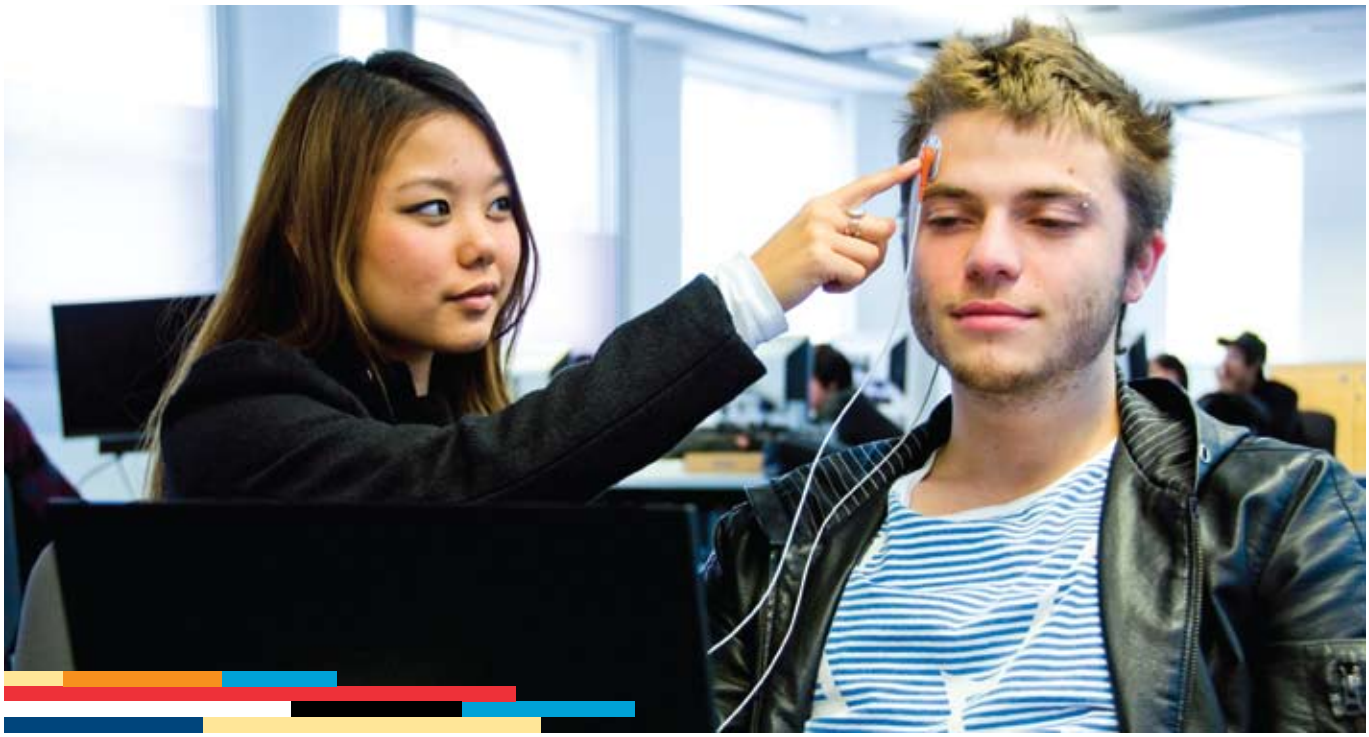


Sample course plan – Bachelor of Biomedicine (Bioengineering systems)[1]

Year 1	Semester 1	Chemistry for Biomedicine	Calculus 2	Biomedicine subject	Breadth subject
Year 1	Semester 2	Engineering Systems Design 2	Linear Algebra	Biomedicine subject	Breadth subject
Year 2	Semester 1	Engineering Computation	Biomedicine subject	Biomedicine subject	Breadth subject
Year 2	Semester 2	Engineering Mathematics	Biomedicine subject	Biomedicine subject	Breadth subject
Year 3	Semester 1	Biomechanics and Biotransport	Fundamentals of Biosignals	Biomedicine subject	Breadth subject
Year 3	Semester 2	Biocellular Systems Engineering	Biosystems Design	Biomedicine subject	Breadth subject

Bioengineering subjects | Biomedicine subject | Breadth subjects

[1] This example is provided as a guide only. Subject availability will vary from year to year and there is no guarantee that the listed subjects will be available in future years. This information is for students with VCE Units 3 and 4 Specialist Mathematics. Students who have not completed these subjects should consult a course advisor.



Engineering via the Bachelor of Commerce

Engineering through breadth sequences

The Bachelor of Commerce is made up of a core program and a breadth component. For students wishing to study engineering via the Bachelor of Commerce the breadth subject allocation will be used to complete an engineering subject sequence. Students who have completed an engineering sequence of breadth subjects will be eligible for the two year Master of Engineering which leads to professional accreditation as an engineer.[1]

Commonwealth supported places are available in the Master of Engineering program and a generous scholarship program exists for both local and international students.

More information

Find out more about the Bachelor of Commerce at www.bcom.unimelb.edu.au

1 Please note that students undertaking sequences in Bioengineering or Chemical systems will take a 2.5 year Masters of Engineering.

ENGINEERING BREADTH SEQUENCES AVAILABLE:

- BIOENGINEERING SYSTEMS
- CHEMICAL SYSTEMS
- CIVIL SYSTEMS
- ELECTRICAL SYSTEMS
- COMPUTING AND SOFTWARE SYSTEMS
- MECHANICAL SYSTEMS

DURATION: 3 YEARS FULL-TIME (24 SUBJECTS)

FEE TYPE: CSP AND INTERNATIONAL FEE

CAMPUS: PARKVILLE

Bachelor of Commerce with a sequence of subjects for Civil Systems[1]

Year 1	Semester 1	Commerce subject	Commerce subject	Commerce subject	Calculus 2
Year 1	Semester 2	Commerce subject	Commerce subject	Engineering Systems Design 2	Linear Algebra
Year 2	Semester 1	Commerce subject	Commerce subject	Commerce subject	Engineering Mathematics
Year 2	Semester 2	Commerce subject	Commerce subject	Engineering Materials	Engineering Mechanics
Year 3	Semester 1	Commerce subject	Commerce subject	Commerce subject	Fluid Mechanics and Thermodynamics
Year 3	Semester 2	Commerce subject	Commerce subject	Structural Theory and Design	Earth Processes for Engineering

Commerce subjects | Civil Systems subjects

[1] This example is provided as a guide only. Subject availability will vary from year to year and there is no guarantee that the listed subjects will be available in future years. This information is for students with VCE Units 3 and 4 Specialist Mathematics. Students who have not completed these subjects should consult a course advisor.

Engineering via the Bachelor of Environments

ENGINEERING MAJORS AVAILABLE:
- CIVIL SYSTEMS
- GEOMATICS
- ENVIRONMENTAL ENGINEERING SYSTEMS

DURATION: 3 YEARS FULL-TIME (24 SUBJECTS)

FEE TYPE: CSP AND INTERNATIONAL FEE

CAMPUS: PARKVILLE

The Bachelor of Environments is a unique program that brings together science, technology, design and the social sciences to offer comprehensive studies in built and natural environments. The Bachelor of Environments will give you a broad understanding of the issues and challenges that shape diverse environments, while providing you with the opportunity to focus on an area of specialisation.

Developing a specialisation

The Bachelor of Environments offers three engineering specialisations: civil systems environmental engineering systems and geomatics, which will lead to the two year Master of Engineering and professional accreditation as an engineer. Students with a 65% average in their final two years of study will be eligible for a place in the Master of Engineering. Bachelor of Environments students will be eligible for Master of Engineering programs in four disciplines: civil, structural, environmental or geomatics.

More information

Find out more about the Bachelor of Environments at www.benvs.unimelb.edu.au

Sample course plan – Bachelor of Environments (Geomatics)[1]

Year 1	Semester 1	Reshaping Environments	Mapping Environments	Environments elective	Calculus 2
Year 1	Semester 2	Natural Environments	Environments elective	Environments elective	Linear Algebra
Year 2	Semester 1	Applications of GIS	Engineering Computation	Environments elective	Breadth subject
Year 2	Semester 2	Surveying and Mapping	Environmental Politics and Management	Environments elective (2nd year level)	Breadth subject
Year 3	Semester 1	Risk Analysis	Imaging the Environment	Environments elective (3rd year level)	Breadth subject
Year 3	Semester 2	Integrated Spatial Systems	Land Administration Systems	Environments elective (3rd year level)	Breadth subject

Geomatic subjects | Environments subjects | Breadth subjects

[1] This example is provided as a guide only. Subject availability will vary from year to year and there is no guarantee that the listed subjects will be available in future years. This information is for students with VCE Units 3 and 4 Specialist Mathematics. Students who have not completed these subjects should consult a course advisor.

Engineering via the Bachelor of Science

For students interested in engineering or technology, the Bachelor of Science is the most flexible option, offering the greatest range of subject and discipline choice. It also gives students a greater scientific context for their engineering studies.

Developing a specialisation

Students with a 65% average in their final two years of study, who complete an engineering systems major, will be eligible to enter the two year Master of Engineering, which leads to professional accreditation as an engineer. Commonwealth supported places are available in the Master of Engineering program and a generous scholarship program exists for both local and international students.

More information

Find out more about the Bachelor of Science at www.bsc.unimelb.edu.au

ENGINEERING MAJORS AVAILABLE:

- BIOENGINEERING SYSTEMS
- CHEMICAL SYSTEMS
- CIVIL SYSTEMS
- COMPUTING AND SOFTWARE SYSTEMS
- ELECTRICAL SYSTEMS
- GEOMATICS
- MECHANICAL SYSTEMS

DURATION: 3 YEARS FULL-TIME

FEE TYPE: CSP AND INTERNATIONAL FEE

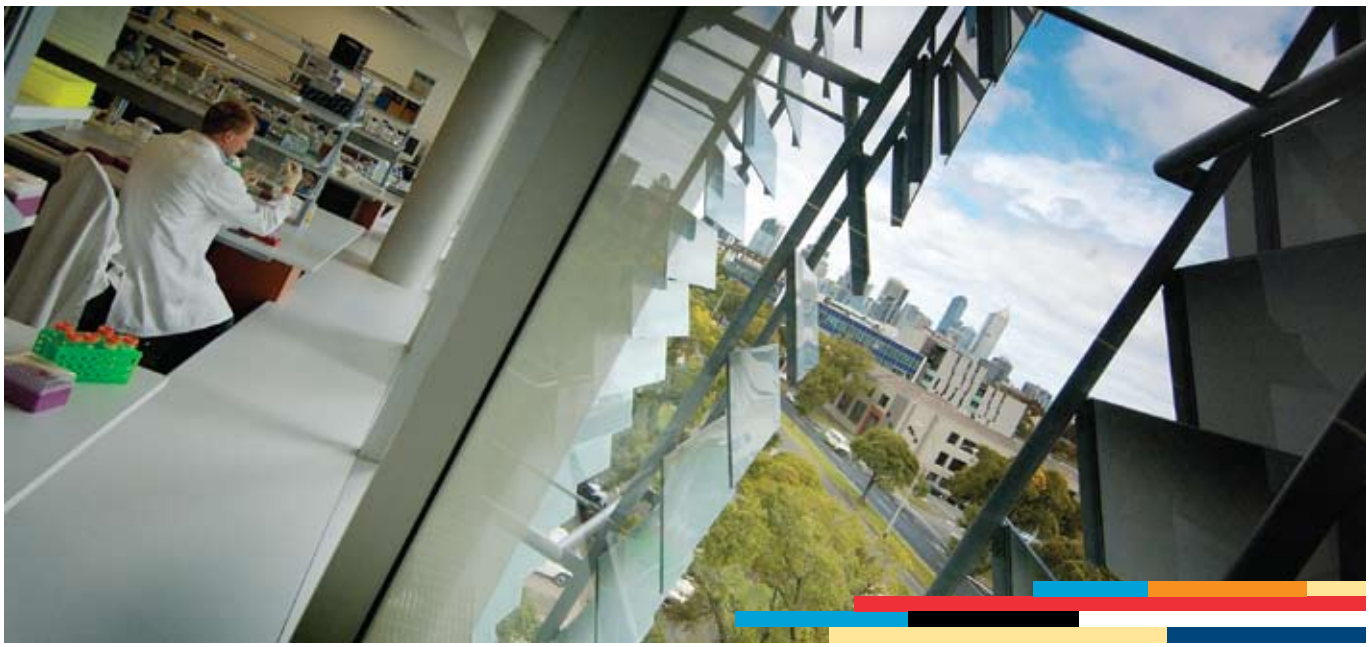
CAMPUS: PARKVILLE

Sample course plan – Bachelor of Science (Mechanical Systems)[1]

Year 1	Semester 1	Engineering Systems Design 1	Calculus 2	Physics 1	Breadth subject
Year 1	Semester 2	Engineering Systems Design 2	Linear Algebra	Physics 2: Physical Science & Technology	Breadth subject
Year 2	Semester 1	Engineering Computation	Engineering Mathematics	Science subject	Breadth subject
Year 2	Semester 2	Foundations of Electrical Networks	Engineering Mechanics	Science subject	Breadth subject
Year 3	Semester 1	Mechanical Dynamics	Mechanics & Materials	Science subject	Breadth subject
Year 3	Semester 2	Mechanical Design	Thermodynamics Fluid Mechanics	Science subject	Breadth subject

Mechanical Systems subjects | Science subjects | Breadth subjects

[1] This example is provided as a guide only. Subject availability will vary from year to year and there is no guarantee that the listed subjects will be available in future years. This information is for students with VCE Units 3 and 4 Specialist Mathematics. Students who have not completed these subjects should consult a course advisor.



Engineering Disciplines

Biomedical Engineering

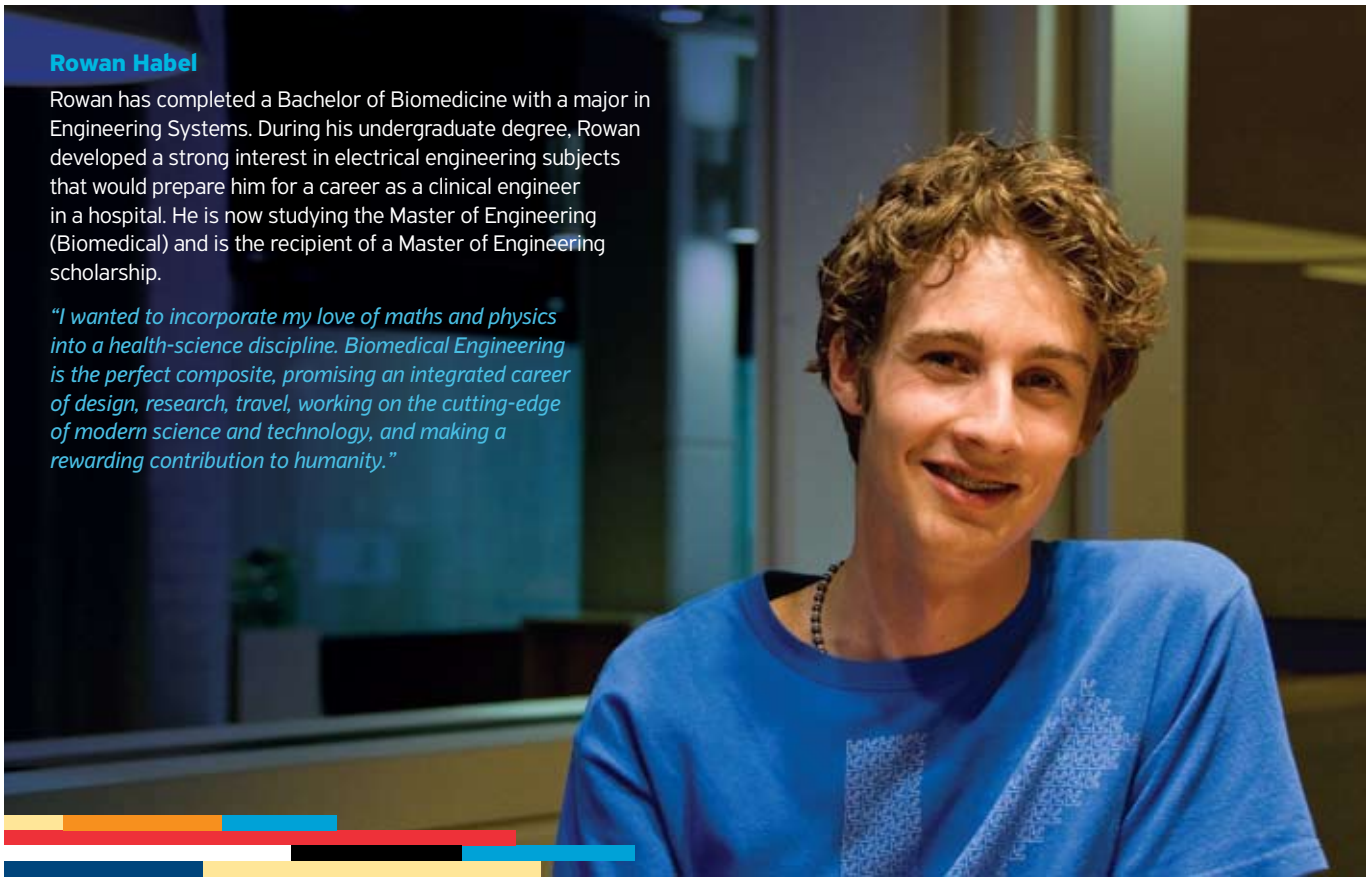
Biomedical engineering focuses on human systems, the design and operation of devices and processes and the application of engineering skills to new medical treatments, instruments and machines. This discipline integrates an in-depth understanding of the fundamentals of biomedical science and the physical sciences with specialist studies in engineering modelling, measurement, research and design, which enables biomedical engineers to address healthcare specific problems from a unique perspective.

These courses are available to students pursuing a career as a professionally accredited biomedical engineer.

- Bachelor of Science with a major in Bioengineering Systems, followed by the two-year Master of Engineering (Biomedical).
- Bachelor of Biomedicine with a major in Bioengineering Systems, followed by the two-year Master of Engineering (Biomedical).
- Bachelor of Commerce with a specified sequence of subjects in Bioengineering Systems, followed by a 2.5 year Master of Engineering (Biomedical).

Biomedical engineering students will focus on areas such as biomechanical engineering, bioengineering, bio-informatics, bio-cellular engineering, biosignals, neuro-engineering or clinical engineering in the Master of Engineering program. Students will benefit from learning from leaders in biomedical innovation, in projects such as the development of the bionic ear, the bionic eye and the management of epilepsy.

Graduates can expect to work in the biotechnology, biomedical or pharmaceutical industries, in research and innovation, in the health services or in government and consulting. Graduates may work for companies such as Cochlear, Aventis, Cell Therapies or GlaxoSmithKline, or for research organisations such as CSIRO or Bio21.



Rowan Habel

Rowan has completed a Bachelor of Biomedicine with a major in Engineering Systems. During his undergraduate degree, Rowan developed a strong interest in electrical engineering subjects that would prepare him for a career as a clinical engineer in a hospital. He is now studying the Master of Engineering (Biomedical) and is the recipient of a Master of Engineering scholarship.

"I wanted to incorporate my love of maths and physics into a health-science discipline. Biomedical Engineering is the perfect composite, promising an integrated career of design, research, travel, working on the cutting-edge of modern science and technology, and making a rewarding contribution to humanity."

Sample course plan – Bachelor of Science (Bioengineering Systems)[1]

Year 1	Semester 1	Engineering Systems Design 1	Calculus 2	Biology of Cells and Organisms	Breadth subject
Year 1	Semester 2	Engineering Systems Design 2	Linear Algebra	Genetics and the Evolution of Life	Breadth subject
Year 2	Semester 1	Engineering Computation	Engineering Mathematics	Science elective	Breadth subject
Year 2	Semester 2	Chemistry 1	Engineering Mechanics	Science elective	Breadth subject
Year 3	Semester 1	Biomechanics and Biotransport	Fundamentals of Biosignals	Science elective	Breadth subject
Year 3	Semester 2	Biocellular Systems Engineering	Biosystems Design	Science elective	Breadth subject

Followed by a two year Master of Engineering (Biomedical)[1]

Year 4	Semester 1	Probability and Random Models	Control Systems	Bioengineering elective	Bioengineering elective
Year 4	Semester 2	Biomaterials	Bioengineering elective	Bioengineering elective	Approved elective
Year 5	Semester 1	Research/Industry Project	Biomedical Design and Regulation	Biomedical Engineering Management	Approved elective
Year 5	Semester 2	Research/Industry Project	Biomedical Engineering Design Project	Biomedical Engineering Design Project	Approved elective

Bioengineering systems subjects | Electives | Breadth subjects

[1] This example is provided as a guide only. Subject availability will vary from year to year and there is no guarantee that the listed subjects will be available in future years. This information is for students with VCE Units 3 and 4 Specialist Mathematics. Students who have not completed these subjects should consult a course advisor.

Biomolecular Engineering

Biomolecular engineers explore the development of large-scale processes using microbial, plant or animal cells. This can include industrial processes as diverse as the brewing of beer, the production of drugs using recombinant bacteria, biological waste treatment, the production of food additives by plant cell culture and artificial skin production. Developments in bionanotechnology have prompted the creation of this specialised degree program.

This course is available to students pursuing a career as a professionally accredited biomolecular engineer.

- Bachelor of Science with a major in Chemical Systems, followed by a two-year Master of Engineering (Biomolecular).

In the ME (Biomolecular), students develop the ability to design novel bioproducts and bioprocesses, under the guidance of staff known internationally for their research in areas such as dairy manufacturing innovation and the production of biofuels. Throughout the course, students will benefit from interaction with industry representatives and will have the option to choose an industry or research project. Career opportunities for biomolecular engineers exist in the food, and pharmaceutical industries and in wastewater treatment and environmental engineering. Biomolecular engineering graduates can also work in traditional chemical engineering fields such as petrochemicals, minerals and energy.

Our graduates are employed in a diverse range of sectors, for companies including: CSL Limited, GlaxoSmithKline, National Foods, Tatura Milk, Nestle, Kraft and Fosters Group.

Professor Sandra Kentish

Professor Sandra Kentish is Deputy Head of the Department of Chemical and Biomolecular Engineering. Professor Kentish has ten years of industry experience across the petrochemical, photographic and pulp and paper industries. She conducts leading research in the area of separations technology, including desalination and dairy membrane operations.

"It's a really exciting field right now, and it will be over the next 20 years. The key world problems in the next 10 to 15 years are energy, food and water. Chemical and biomolecular engineering are really centred on addressing these problems.

Chemical and biomolecular engineering is the key to creating the solutions of some of the world's most pressing problems, like the energy crisis, limited water resources and how to provide food to the masses."

Professor Kentish is the Academic Program Coordinator for the Master of Engineering (Biomolecular) and the Master of Engineering (Chemical) programs.

Sample course plan – Bachelor of Science (Chemical Systems)[1,2]

Year 1	Semester 1	Engineering Systems Design 1	Calculus 2	Chemistry 1	Physics 1
Year 1	Semester 2	Engineering Systems Design 2	Linear Algebra	Chemistry 2	Physics 2
Year 2	Semester 1	Chemical Process Analysis 1	Engineering Mathematics	Reactions and Synthesis	Breadth subject
Year 2	Semester 2	Chemical Process Analysis 2	Transport Processes	Science elective	Breadth subject
Year 3	Semester 1	Reactor Engineering	Heat & Mass Transport Processes	Science elective	Breadth subject
Year 3	Semester 2	Fluid Mechanics	Process Engineering and Case Studies	Science elective	Breadth subject

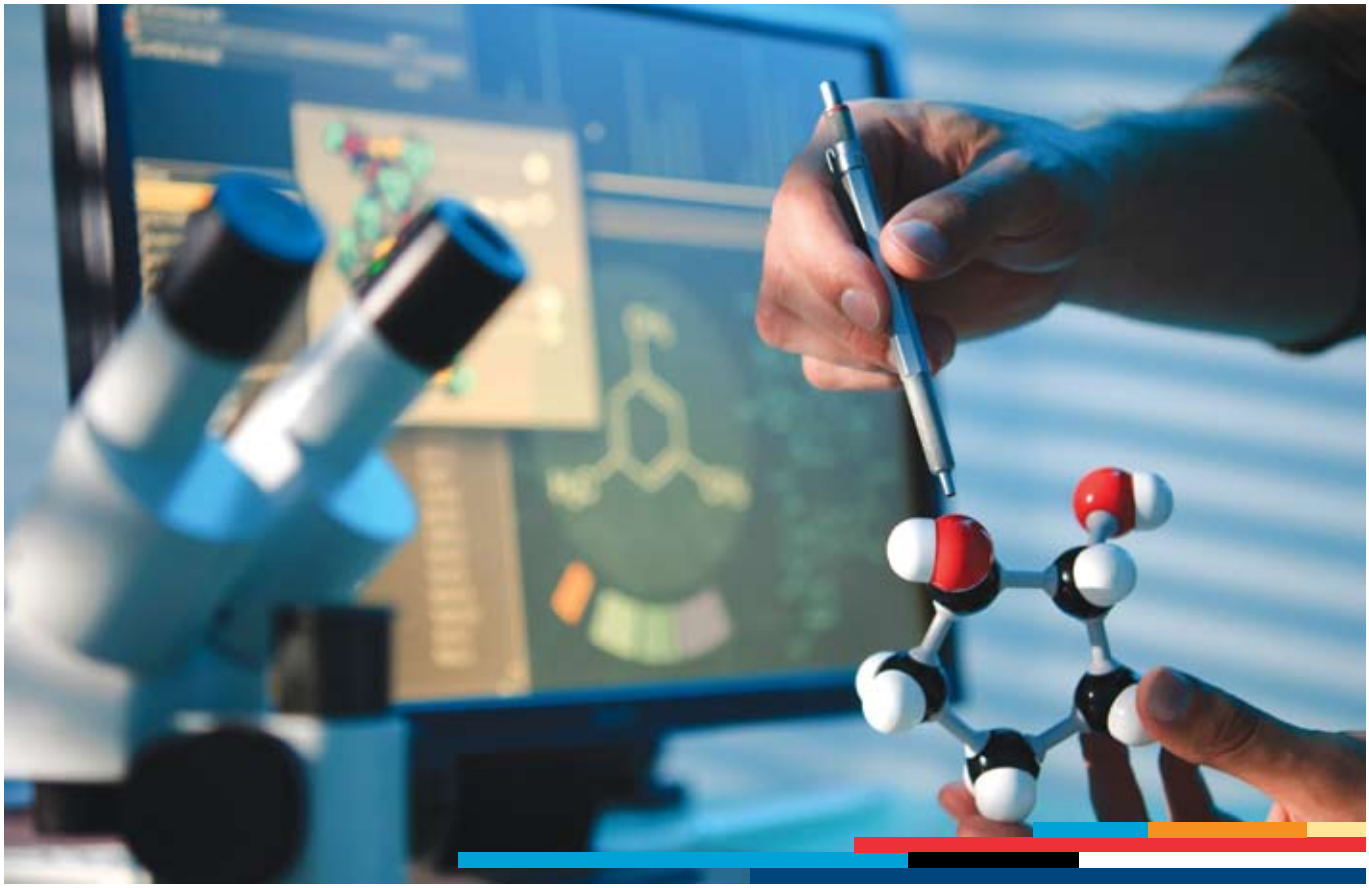
Sample course plan – Master of Engineering (Biomolecular)[1]

Year 4	Semester 1	Chemical Engineering Management	Biology for Engineers	Particles Mechanics & Processing	Approved elective
Year 4	Semester 2	Metabolic Engineering	Process Dynamics and Control	Biomolecular Engineering Research Project/ Industry Project	
Year 5	Semester 1	Process Equipment Design	Process Engineering	Fermentation Processes	Chemical Engineering elective
Year 5	Semester 2	Biomolecular Engineering Design Project		Chemical Engineering elective	Chemical Engineering elective

Chemical systems subjects | Electives | Breadth subjects

[1] This example is provided as a guide only. Subject availability will vary from year to year and there is no guarantee that the listed subjects will be available in future years. This information is for students with VCE Units 3 and 4 Specialist Mathematics. Students who have not completed these subjects should consult a course advisor.

[2] Students must complete four breadth subjects within their Science degree. Taking Physics in the first year allows for a greater range of major options, including electrical and mechanical engineering.



Chemical Engineering

Chemical engineering involves industrial-scale processes in which materials undergo chemical or physical changes to produce things we need for everyday life. Chemical engineers invent, design and implement these processes to produce pharmaceuticals, metals, fuels, plastics, paper, fabric and biochemical processes. They also make a difference to our wider environment by developing methods for cleaner production, air pollution control, environmental bioremediation, sustainable development and waste treatment by chemical and biological processes.

These courses are available to students pursuing a career as a professionally accredited chemical engineer.

- Bachelor of Science with a major in Chemical Systems, followed by the two-year Master of Engineering (Chemical)
- Bachelor of Commerce with a specified sequence of subjects in Chemical Systems, followed by the 2.5 year Master of Engineering (Chemical)

The Chemical Engineering specialisation promotes development of practical, laboratory-based skills, combined with expertise in computing and simulation. Students have the opportunity to complete a project with an industry partner. Career opportunities in the field are extensive and exist in petrochemicals, mining, food, energy, the environment, pharmaceutical and chemical industries. Our graduates are employed in a diverse range of sectors, for companies including: Exxon Mobil, BP, PETRONAS, Schlumberger, Nyrstar, BHP Billiton, GHD, Mars and Unilever.

Stephanie Lynch

Stephanie Lynch has completed her Bachelor of Science, majoring in Chemical Systems, and is in her second year of the Master of Engineering (Chemical). Stephanie was drawn to engineering because she saw it as a way to apply her science skills in the business world, and she felt that chemical engineering offered her many different career options.

"The good thing about chemical engineering is you've got a lot of flexibility in your degree and what you do afterwards. You might start off working in one area, but if you show interest in another, you can probably transfer there. It doesn't matter if you don't have a very clear idea to begin with, as it's not too hard to move about once you're in. Plus there seems to be a push towards the development of renewable energy. There is the opportunity to work in roles where you're making plants more efficient and using less energy. Chemical Engineers definitely could play a part in helping the planet."

Sample course plan – Bachelor of Commerce with a sequence of subjects in Chemical Systems[1]

Year 1	Semester 1	Commerce subject	Commerce subject	Commerce subject	Calculus 2
Year 1	Semester 2	Commerce subject	Commerce subject	Chemistry 1	Linear Algebra
Year 2	Semester 1	Commerce subject	Commerce subject	Commerce subject	Chemical Process Analysis 1
Year 2	Semester 2	Commerce subject	Commerce subject	Chemistry 2	Chemical Process Analysis 2
Year 3	Semester 1	Commerce subject	Commerce subject	Commerce subject	Reactor Engineering
Year 3	Semester 2	Commerce subject	Commerce subject	Commerce subject	Transport Processes

Followed by a two-and-a-half year Master of Engineering (Chemical)[1]

Year 4	Semester 1	Reactions and Synthesis	Engineering Mathematics	Fluid Mechanics	Heat and Mass Transport Processes
Year 4	Semester 2	Process Engineering Case Studies	Advanced Thermo and Reactor Engineering	Process Dynamics and Control	Chemical Engineering elective
Year 5	Semester 1	Chemical Engineering Management	Bioprocess Engineering	Process Equipment Design	Process Engineering
Year 5	Semester 2	Chemical Engineering Design Project		Chemical Engineering elective	Chemical Engineering elective
Year 6	Semester 1	Chemical Engineering Research Project		Advanced Heat & Mass Transport Processes	Particle Mechanics & Processing

Chemical systems subjects | Commerce subjects

[1] This example is provided as a guide only. Subject availability will vary from year to year and there is no guarantee that the listed subjects will be available in future years. This information is for students with VCE Units 3 and 4 Specialist Mathematics. Students who have not completed these subjects should consult a course advisor.

Civil Engineering

Civil engineering involves the planning, design and construction of the built environment and the provision of essential services and infrastructure. Civil engineers use their sophisticated understanding of these concepts to create solutions to improve the quality of life. Construction of the built environment, which includes structures such as buildings, bridges and tunnels, requires engineers at the forefront of technology with a breadth of knowledge and experience. Similarly, our transport systems, water supply, drainage systems, ports and harbours are all examples of essential services where civil engineers are vital in providing the most effective way of interacting with the natural environment.

These courses are available to students pursuing a career as a professionally accredited civil engineer.

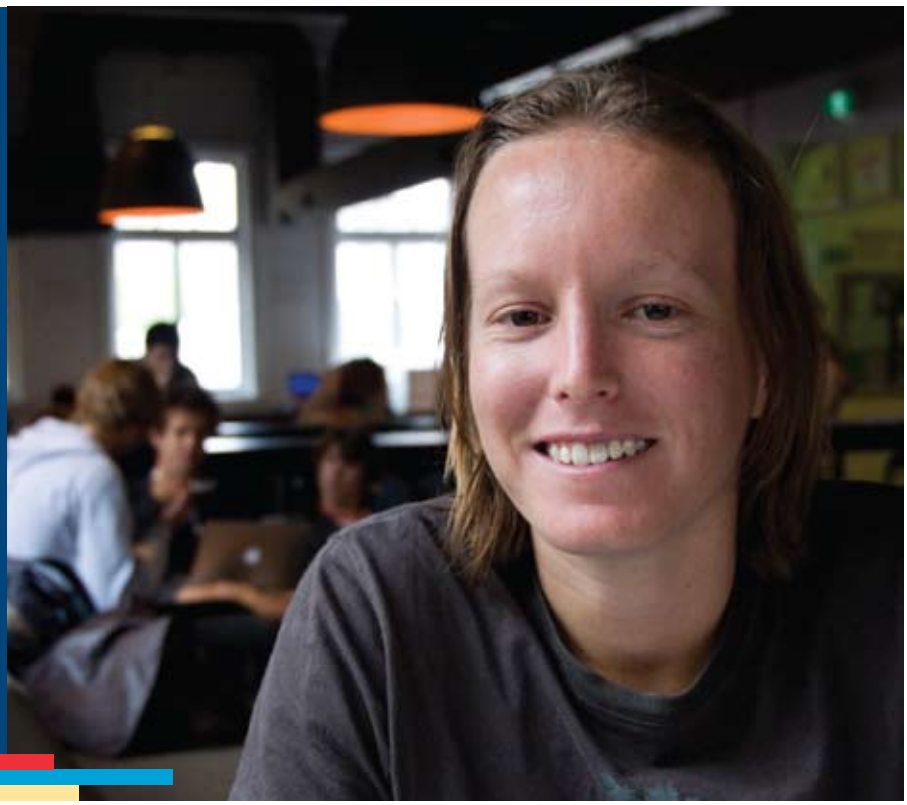
- Bachelor of Science with a major in Civil Systems, followed by the two-year Master of Engineering (Civil) or (Structural)
- Bachelor of Environments with a major in Civil Systems, followed by the two-year Master of Engineering (Civil) or (Structural)
- Bachelor of Commerce with a specified sequence of subjects in Civil Systems, followed by the two-year Master of Engineering (Civil) or (Structural)

This specialisation offers considerable scope, with students gaining knowledge of a number of sub-disciplines including sustainability, environmental processes, geotechnical and hydraulic engineering, transport and project management. Interaction with industry professionals is available through guest lectures, field and project work. Many career opportunities exist in government, construction, property, infrastructure, consulting, mining, land, water, and waste. Graduates are highly employable and work as professional engineers, both locally and internationally, with companies such as John Holland, SKM, Connell-Wagner, Multiplex, and others.

Sarah Godwin

Sarah came to Civil Engineering after studying a Bachelor of Biomedical Science at Griffith University and working in laboratories in the UK for a number of years. She is undertaking the Master of Engineering (Civil), which she balances with a career in the Australian Defence Force Reserves. Dual accreditation of the Master of Engineering is an added bonus for Sarah, who is considering an overseas career in engineering when she graduates.

"I decided there was more to life than working in labs. I wanted something with a bit more variety and engineering gives you a lot of options, especially within civil. You can work at a desk, in the field, or a mixture of both and within civil, you have transport, water, bridges, rail, so many options – that's what attracted me."



Sample course plan – Bachelor of Science (Civil Systems)[1]

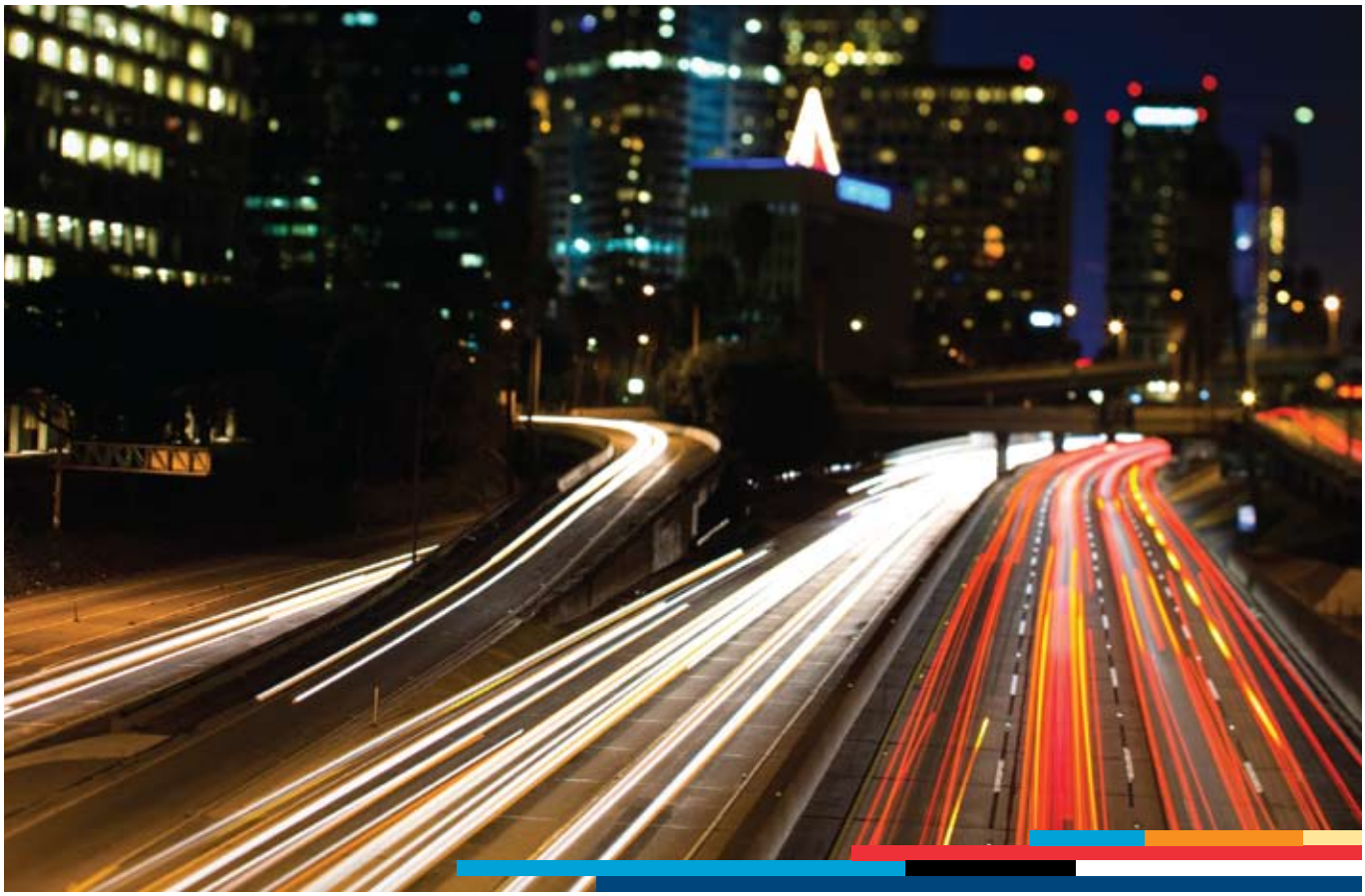
Year 1	Semester 1	Engineering Systems Design 1	Calculus 2	Science elective	Breadth
Year 1	Semester 2	Engineering Systems Design 2	Linear Algebra	Science elective	Breadth
Year 2	Semester 1	Engineering Mechanics	Engineering Mathematics	Science elective	Breadth
Year 2	Semester 2	Engineering Materials	Earth Processes for Engineering	Science elective	Breadth
Year 3	Semester 1	Fluid Mechanics and Thermodynamics	Risk Analysis	Science elective	Breadth
Year 3	Semester 2	Systems Modelling & Design	Structural Theory & Design	Science elective	Breadth

Followed by a two-year Master of Engineering (Civil)[1]

Year 4	Semester 1	Geotechnical Engineering	Engineering Site Characterisation	Sustainable Infrastructure Systems	Structural Theory and Design 2
Year 4	Semester 2	Engineering Project Implementation	Civil Hydraulics	Transport Systems	Civil Engineering elective
Year 5	Semester 1	IE Research Project 1	Integrated Design	Civil Engineering elective	Civil Engineering elective
Year 5	Semester 2	IE Research Project 1	Integrated Design	Civil Engineering elective	Civil Engineering elective

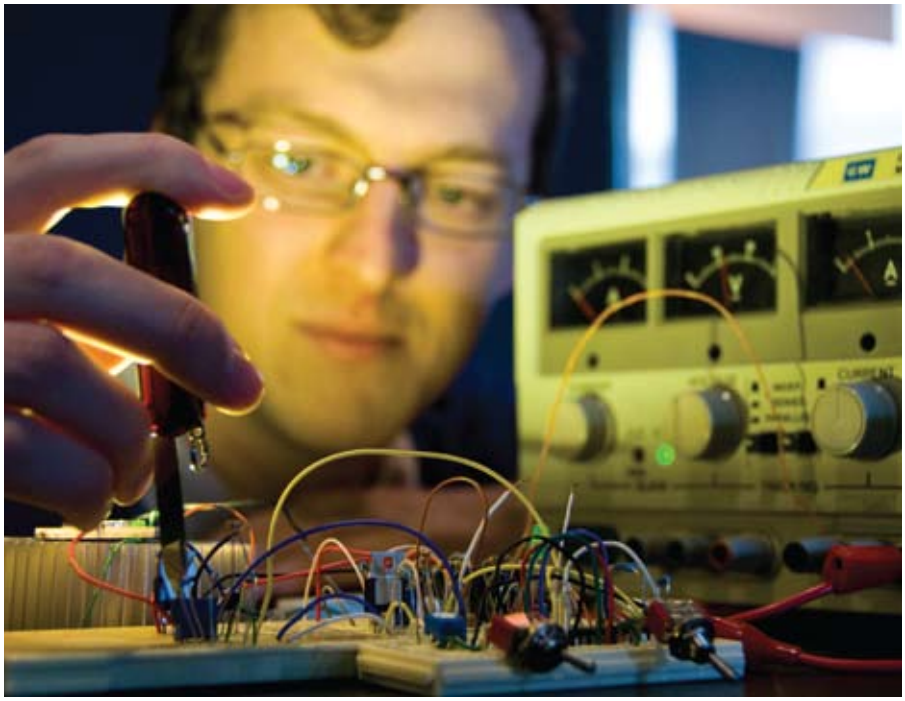
Civil systems subjects | Electives | Breadth subjects

[1] This example is provided as a guide only. Subject availability will vary from year to year and there is no guarantee that the listed subjects will be available in future years. This information is for students with VCE Units 3 and 4 Specialist Mathematics. Students who have not completed these subjects should consult a course advisor.



Electrical Engineering

Electrical engineers design and build electrical and electronic devices on all scales, from transmitters smaller than the head of a pin, to large-scale projects, such as building a national power grid. Electrical engineers also design electrical systems for high technology applications such as spacecraft and satellites. In addition to being the central discipline involved in communications, electrical engineering also has an ongoing impact in the medical field, developing systems and instrumentation for bionic vision and hearing technology, heart pacemakers and life support systems.



These courses are available to students pursuing a career as a professionally accredited electrical engineer.

- Bachelor of Science with a major in Electrical Systems, followed by the two-year Master of Engineering (Electrical)
- Bachelor of Commerce with a specified sequence of subjects in Electrical Systems, followed by the two-year Master of Engineering (Electrical)

Electrical engineering students are taught by staff who work in research with collaborative partners such as NASA, IBM and Bionic Vision Australia. Each subject offered includes a practical laboratory component, combined with theory and practice. On completion, graduates may practice as electrical engineers with companies such as Telstra, Siemens, Australian Aerospace, Holden and BHP Billiton. Graduates may also work in research and development-related roles. Equally, they may apply their strengths in analysis and mathematics to fields such as management, finance and banking.

Nigel Ang

Nigel Ang completed a Bachelor of Science, majoring in Electrical Systems, and is now in the second year of a Master of Engineering (Electrical). Nigel is a member of one of the winning teams of the 2012 Melbourne Accelerator Program (MAP).

MAP helps engineering and IT students and recent alumni to turn their ideas into commercial reality, with access to entrepreneurial fellowships, resources and mentoring to maximize their start-up's chance of success.

Nigel and the UniSquare.me team are working on an internet social platform for University students, which is aimed at improving students' experience of going to university, by providing them with relevant information that is tailored to their individual needs.

"UniSquare.me will bring the most important things to students during their time at uni on to a single online platform that is easy to organise and personalise," Nigel said.

"The Melbourne School of Engineering's MAP initiative is a wonderful opportunity for students with start-up ideas. We are benefitting, not only from the financial support, but from the opportunity to talk to experienced people in industry about how to get our business started. This is a very exciting opportunity for us."

Sample course plan – Bachelor of Science (Electrical Systems)[1]

Year 1	Semester 1	Engineering Systems Design 1	Calculus 2	Physics 1	Breadth subject
Year 1	Semester 2	Engineering Systems Design 2	Linear Algebra	Physics 2: Physical Science & Technology	Breadth subject
Year 2	Semester 1	Engineering Computation	Engineering Mathematics	Science elective	Breadth subject
Year 2	Semester 2	Foundations of Electrical Networks	Engineering Mechanics	Science elective	Breadth subject
Year 3	Semester 1	Digital Systems Design	Electrical Network Analysis & Design	Science elective	Breadth subject
Year 3	Semester 2	Electrical Device Modelling	Signals & Systems	Science elective	Breadth subject

Followed by a two-year Master of Engineering (Electrical)[1]

Year 4	Semester 1	Probability and Random Models	Control Systems	Electronic Circuit Design	Approved elective
Year 4	Semester 2	Communication Systems	Signal Processing	Embedded System Design	Approved elective
Year 5	Semester 1	Electrical engineering elective	Electrical engineering elective	Electrical engineering capstone project	Approved elective
Year 5	Semester 2	Electrical engineering elective	Electrical engineering elective	Electrical engineering capstone project	Approved elective

Electrical systems subjects | Electives | Breadth subjects

[1] This example is provided as a guide only. Subject availability will vary from year to year and there is no guarantee that the listed subjects will be available in future years. This information is for students with VCE Units 3 and 4 Specialist Mathematics. Students who have not completed these subjects should consult a course advisor.

Environmental Engineering

Environmental Engineering involves the planning, design and management of the natural environment. Environmental engineers are working to solve the world's critical environmental problems, such as limited water and energy resources and climate change. They also clean up environmental problems caused by pollution, such as contaminated industrial land sites and polluted waterways, predict environmental problems caused by accidents like oil spills, and design ways to conserve the natural environment and to safely treat and dispose of waste material.

Environmental engineers find exciting jobs across a range of private and government enterprises with a high demand for graduates in the local and international sectors. As an environmental engineer you may find yourself addressing policy makers in Canberra one day, using computers to model contaminant movement the next and then heading into the field to measure groundwater levels. It is an exciting job for anyone with an interest in the environment, understanding complex environmental systems, or developing the technical, management and policy solutions for some of the most pressing issues facing society over the coming decades.

Some examples of typical tasks that you may conduct as an environmental engineer include:

- Using flood models to develop predictions for flooding and designing mitigation measures
- Designing water supply infrastructure for small communities, including storage reservoirs, water treatment facilities and distribution networks.
- Assessing the impacts on marine flora and fauna of treated waste from ocean outfalls
- Assessing the compliance of hazardous waste from industrial facilities
- Designing soil remediation processes.
- Collecting and analysing air pollution data.
- Designing noise barriers for facilities, such as car parks and freeways
- Analysing energy data and calculating carbon footprints
- Conducting energy and emission life cycle assessments in the built environment.

Students can pursue the following pathways to build a career as a professionally accredited environmental engineer:

- Bachelor of Commerce with a specified sequence of subjects in Environmental Engineering Systems, followed by the two-year Master of Engineering (Environmental) – for students who wish to establish strong business, management and commercial foundations for practicing environmental engineering in the business world.
- Bachelor of Environments with a major in Environmental Engineering Systems, followed by the two-year Master of Engineering (Environmental) – for students with a passion for environmental policy and planning.
- Bachelor of Science with a major in Civil Systems, followed by the two-year Master of Engineering (Environmental) – for students wishing to develop deep technical expertise in environmental engineering.

Please note, Bachelor of Science students with any major, who wish to switch their specialisation to environmental engineering, may be eligible to do so and should consult with the Academic Program Coordinator.

Environmental engineering students learn from staff active in research areas such as hydrology, irrigation and water management, energy, and waste management. The course has a strong focus on sustainability and project management. Guest lectures and seminars by industry professionals are available to students, along with community project work and site visits that combine theory with practice.

Environmental engineering is a rapidly growing field and qualified environmental engineers are in demand. Graduates typically have several employment offers to choose from, after completion of their course. Career opportunities exist in consulting firms, conservation and natural resource management agencies, environmental protection agencies, catchment management authorities, local, state and federal government, mining companies, research and academic organisations. Environmental engineering graduates may find work with companies, such as GHD, SKM, Golder Associates, Alluvium, Worley Parsons, Hays Engineering, Arup, and many more.

Penny Rogers

Recent graduate Penny Rogers is an environmental engineer specialising in river health. She spends her time in the field collecting samples, assessing river conditions and understanding their ecology. Penny works for GHD, one of the world's leading engineering, architecture and environmental consulting companies.

She recently completed some exciting field work in the outback around Alice Springs, an experience she counts in her career highlights:

"It was a great trip and I am lucky to be able to work in such amazing and diverse environments."

Recalling her time as a student, Penny said that she particularly enjoyed the field trips and peer networking opportunities.

"The field trips where we experienced the natural environment for ourselves enabled us to put into practice what we had learned in the lecture theatre. I am also lucky to have developed a great network of peers from my time at Melbourne, which has been handy in the workforce."

Sample course plan – Bachelor of Environments (Environmental Engineering Systems)[1]

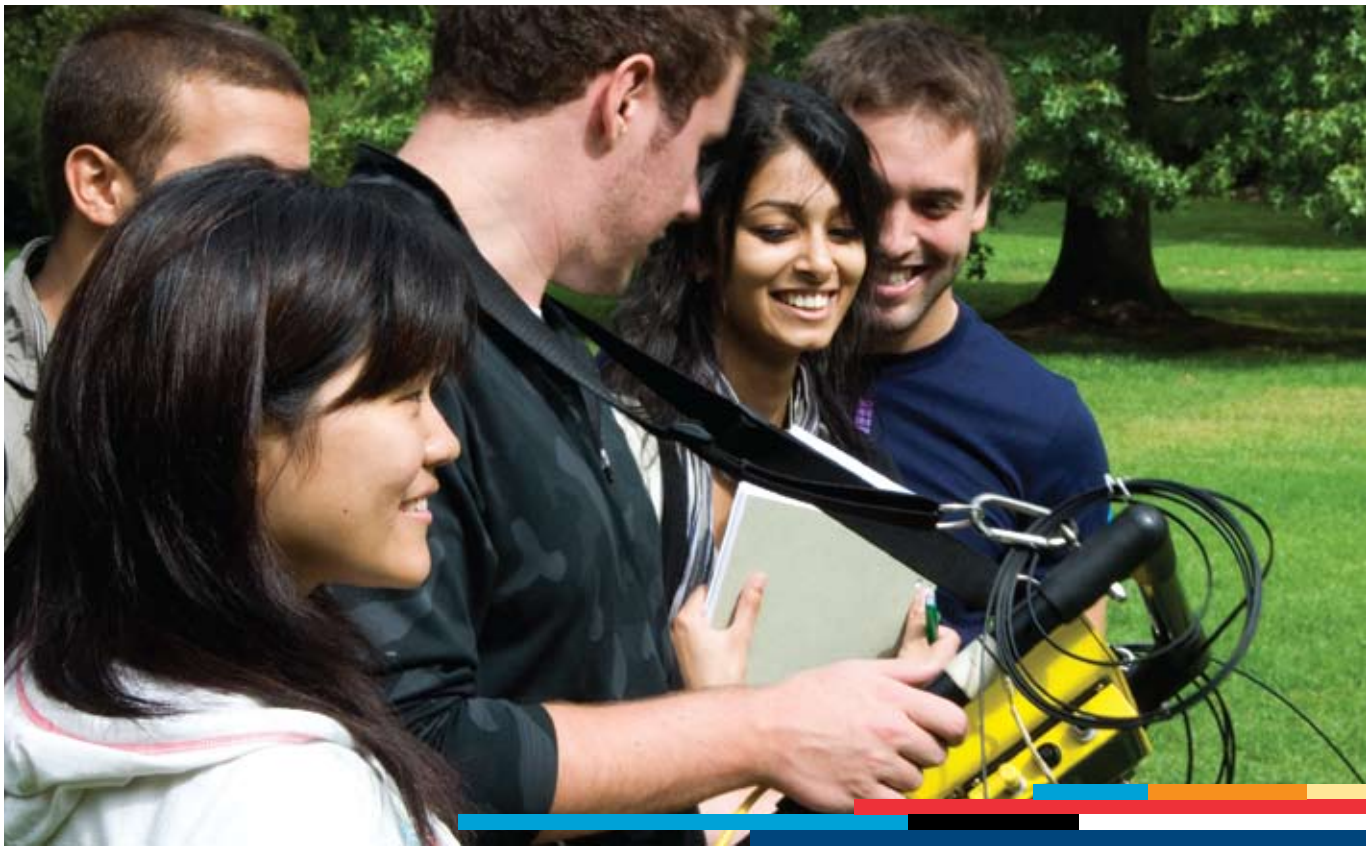
Year 1	Semester 1	Reshaping Environments	Urban Environments	Environments elective	Calculus 2
Year 1	Semester 2	Natural Environments	Structural Environments	Environments elective	Linear Algebra
Year 2	Semester 1	Engineering Mechanics	Environments elective	Environments elective	Breadth subject
Year 2	Semester 2	Engineering Materials	Earth Processes for Engineering	Engineering Mathematics	Breadth subject
Year 3	Semester 1	Risk Analysis	Environmental engineering systems major (level 2 or 3 elective)	Fluid Mechanics and Thermodynamics	Breadth subject
Year 3	Semester 2	Systems Modelling & Design	Environmental engineering systems major (level 2 or 3 elective)	Environments elective	Breadth subject

Followed by a two-year Master of Engineering (Environmental)[1]

Year 4	Semester 1	Quantitative Environmental Modelling	Engineering Site Characterisation	Sustainable Infrastructure Systems	Approved elective
Year 4	Semester 2	Engineering Project Implementation	Civil Hydraulics	Environmental Analysis Tools	Monitoring Environmental Impacts
Year 5	Semester 1	IE Research Project 1	Integrated Design	Environmental Engineering elective	Environmental Engineering elective
Year 5	Semester 2	IE Research Project 1	Integrated Design	Environmental Engineering elective	Environmental Engineering elective

Environmental engineering systems subjects	Electives	Breadth subjects

[1] This example is provided as a guide only. Subject availability will vary from year to year and there is no guarantee that the listed subjects will be available in future years. This information is for students with VCE Units 3 and 4 Specialist Mathematics. Students who have not completed these subjects should consult a course advisor.



Geomatics

Geomatic engineering is the study of the science and technology of 3D measurement, mapping and visualisation. It is concerned with capturing, analysing, managing and presenting spatial information. The course provides students with the opportunity to acquire skills in modern, sophisticated technologies such as the global positioning system (GPS), three dimensional computer visualisations, geographic information systems (GIS), satellite and photographic image processing and surveying. You will develop the skills necessary to solve problems facing our built, natural and social environments using spatial technology.

These courses are available to students pursuing a career as a professionally accredited geomatic engineer.

- Bachelor of Science with a major in Geomatics, followed by the two-year Master of Engineering (Geomatics)
- Bachelor of Environments with a major in Geomatics, followed by the two-year Master of Engineering (Geomatics)

This specialisation emphasises team-based project work, problem-solving and industry interaction, with internship opportunities available to students from selected firms and government departments. Students gain practical skills and highly sought-after technical knowledge to prepare for careers in land and/or asset management

for government, as surveyors in mining, construction and land agencies and in banks or property firms, among others.

Geomatic engineers work on satellite and photographic image processing, three dimensional computer visualisations and global positioning systems, in roles working on land tenure systems, environmental modelling, food production, disaster management, health and artificial intelligence. Spatial information experts advise governments on information flow during bushfires. They also document cultural heritage in 3D databases and design mobile location-based games and devices. Our recent graduates have been employed by organisations such as Yarra Water, The Office of the Surveyor-General, Reeds Consulting and Geoscience Australia.

Joanne Bull

Joanne has completed a Bachelor of Environments, majoring in Geomatics, and is studying the Master of Spatial Information Science.

Throughout her undergraduate course, Joanne enjoyed working on fascinating assignments such as a GPS scavenger hunt using Google Maps, 3D modelling of projected water levels after flooding and a week-long surveying camp at the University's Dookie campus.

"Every industry that exists will at one time or another need a spatial expert; whether an organisation needs to conduct a survey of their property or investigate soil health or water quality. Spatial experts can end up in all sorts of places, from working in the middle of a forest doing management resources, to working in a mine or surveying.

I don't think I could do one thing forever. This is why I like geomatics, because I know there are so many different ways I can apply my skills."

Sample course plan – Bachelor of Environments (Geomatics)[1]

Year 1	Semester 1	Reshaping Environments	Mapping Environments	Environments elective	Calculus 2
Year 1	Semester 2	Natural Environments	Environments elective	Environments elective	Linear Algebra
Year 2	Semester 1	Applications of GIS	Engineering Computation	Environments elective	Breadth subject
Year 2	Semester 2	Surveying and Mapping	Environmental Politics and Management	Environments elective	Breadth subject
Year 3	Semester 1	Risk Analysis	Imaging the Environment	Environments elective	Breadth subject
Year 3	Semester 2	Integrated Spatial Systems	Land Administration Systems	Environments elective	Breadth subject

Followed by a two-year Master of Engineering (Geomatics)[1]

Year 4	Semester 1	Property Law	Cadastral Surveying	Management of Technological Enterprises	Geomatics elective
Year 4	Semester 2	*Winter Semester Advanced Surveying & Mapping	Adjustment Theory and Practice	Satellite Positioning	Geomatics or approved engineering elective
Year 5	Semester 1	IE Research Project 1	Residential Land Development	Advanced Imaging	Geomatics or approved engineering elective
Year 5	Semester 2	IE Research Project 1	Engineering Project Implementation	Spatial Data Infrastructure	Geomatics elective or a approved engineering elective

Geomatics subjects | Electives | Breadth subjects

[1] This example is provided as a guide only. Subject availability will vary from year to year and there is no guarantee that the listed subjects will be available in future years. This information is for students with VCE Units 3 and 4 Specialist Mathematics. Students who have not completed these subjects should consult a course advisor.

Mechanical Engineering

Mechanical engineering involves understanding the design, construction, operation and maintenance of machines, or anything with moving parts. Mechanical engineers focus on turning energy into power and motion. They develop and design new products, such as mobile phones, gaming consoles, air conditioners, cars and aircraft. They manage the systems, people and technical facilities needed to produce goods and services, like power stations and manufacturing systems and are concerned with the generation and harnessing of energy, including solar heating and wind turbines.

These courses are available to students pursuing a career as a professionally accredited mechanical engineer.

- Bachelor of Science with a major in Mechanical Systems, followed by the two-year Master of Engineering (Mechanical)
- Bachelor of Commerce with a specified sequence of subjects in Mechanical Systems, followed by the two-year Master of Engineering (Mechanical)

The 2011 SAE Formula 1 team, with the car they designed and built.

Developing low cost prosthetics

A combination of land mines in recent war-afflicted regions, industrial and environmental accidents, terrorist attacks and poor quality public health in developing nations has resulted in a growing need for low-cost artificial limbs.

Associate Professor Peter Lee, from the Biomechanical Engineering research group in the Department of Mechanical Engineering, is working on research into low-cost prosthetics, which are helping people in developing countries. Each year he takes a team of engineering students on a field trip to areas of need, such as Cambodia or Vietnam. The discoveries that are made in the field inform the next round of research and development, which are later tested back in the field.

"Our research teams are benefitting the people of Cambodia and beyond. Users of the prosthetics are gaining access to devices of greater durability, lower weight and less cost. The need for amputees to visit often distant rehabilitation clinics is reduced, which costs them less in time, money and anxiety," Associate Professor Lee said.



Photographs by Jian Ming Chan – a student member of the 2010 low-cost prosthetics team.

Sample course plan – Bachelor of Commerce with a sequence of subjects in Mechanical Systems[1]

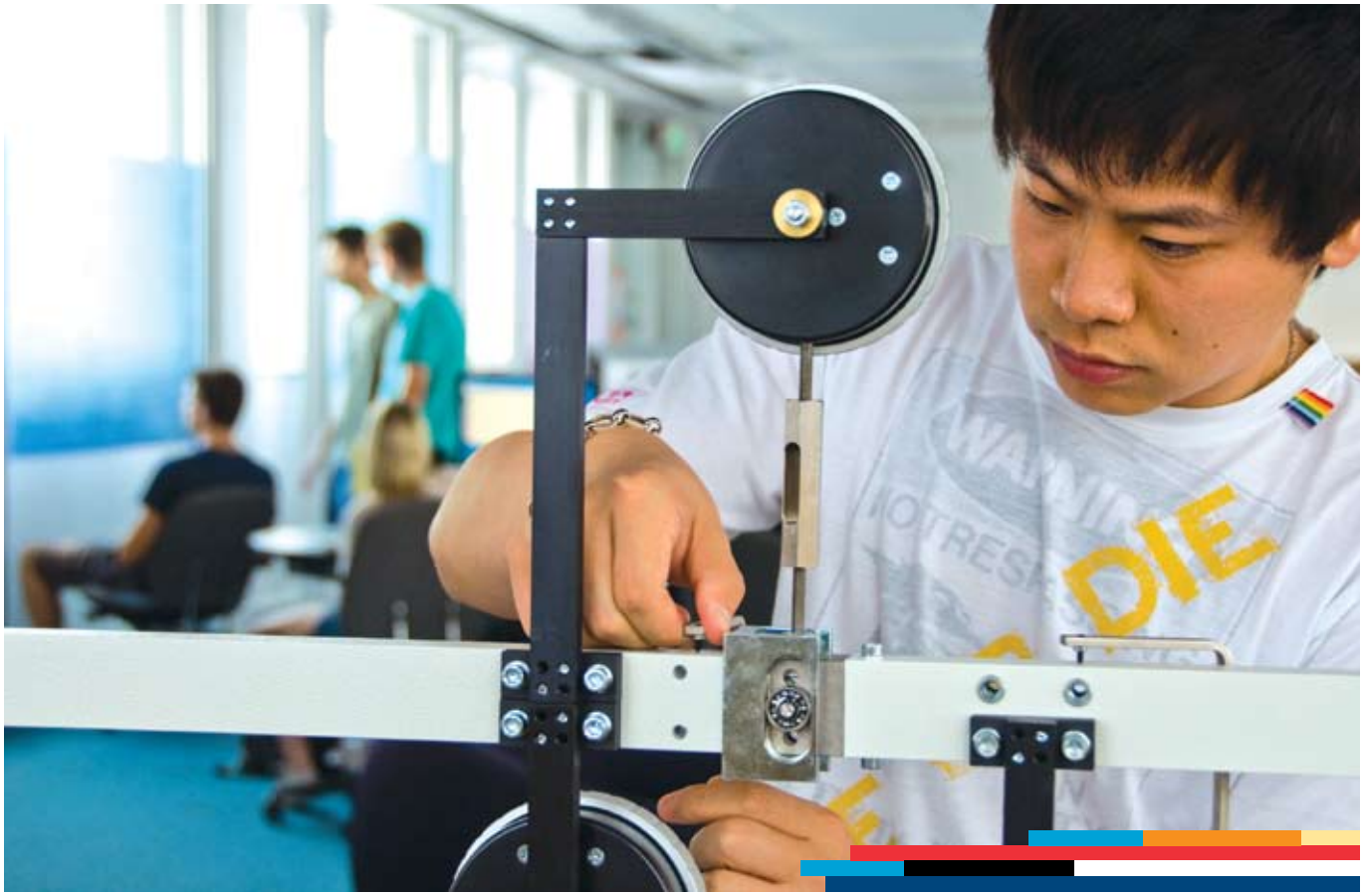
Year 1	Semester 1	Commerce subject	Commerce subject	Commerce subject	Calculus 2
Year 1	Semester 2	Commerce subject	Commerce subject	Engineering Systems Design 2	Linear Algebra
Year 2	Semester 1	Commerce subject	Commerce subject	Commerce subject	Engineering Mathematics
Year 2	Semester 2	Commerce subject	Commerce subject	Foundation of Electrical Networks	Engineering Mechanics
Year 3	Semester 1	Commerce subject	Commerce subject	Engineering Computation	Mechanics and Materials
Year 3	Semester 2	Commerce subject	Commerce subject	Commerce subject	Mechanical Design

Followed by a two-year Master of Engineering (Mechanical)[1]

Year 4	Semester 1	Materials	Design and Manufacturing 1	Fluid Mechanics & Thermodynamics	Mechanical Dynamics
Year 4	Semester 2	Dynamics of Machines	Solid Mechanics	Fluid Dynamics	Design and Manufacturing 2
Year 5	Semester 1	Capstone Project	Control Systems	Thermodynamics	Mechanical Engineering elective
Year 5	Semester 2	Capstone Project	Mechanical Engineering elective	Mechanical Engineering elective	Mechanical Engineering elective

Mechanical subjects | Electives

[1] This example is provided as a guide only. Subject availability will vary from year to year and there is no guarantee that the listed subjects will be available in future years. This information is for students with VCE Units 3 and 4 Specialist Mathematics. Students who have not completed these subjects should consult a course advisor.



Mechatronics

Mechatronics is the discipline concerned with the integration of mechanical, electronic and software engineering. A detailed understanding of how these areas interact enables the development of 'smart' products and systems such as computer-controlled robots, washing machines, automotive equipment, medical imaging systems, wind and wave generators, advanced CNC machines and hybrid and electric vehicles. Mechatronics has applications in a range of fields, including robotics, medical and assistive technology, human-machine interaction, manufacturing, unmanned aerial vehicles and education.

These courses are available to students pursuing a career as a professionally accredited mechatronic engineer.

- Bachelor of Science with a major in either Mechanical Systems, or Electrical Systems or Computing and Software Systems, with preparatory subjects in Mechatronics, followed by the two-year Master of Engineering (Mechatronics)

This course emphasises industry interaction, featuring guest lectures in the areas of project management, intellectual property, ethics and patenting. In their final year, students undertake an industry-focused project, where they will exercise their technical knowledge and research skills with access to state-of-the-art facilities. Graduates are well-equipped to take advantage of the wealth of job opportunities available to mechatronic engineers, in fields such as aerospace and advanced manufacturing.

Andrew George
Aeronautical Engineer, BAE systems

Andrew George studied mechanical engineering during his undergraduate degree at the University of Melbourne, but soon found that the broad foundation of his studies meant his skills were also highly applicable in the areas of mechatronics and aeronautical engineering.

He secured his role as an Aeronautical Engineer at BAE systems, working on cutting edge technology, thanks to a final year project he undertook at BAE, which gave him access to a graduate role.

"It's good to have the breadth of knowledge you get at Melbourne. It means it's easier to go into the mining industry, the aerospace industry or the finance industry and apply that knowledge to whichever application interests you. Any field seems approachable and your skills are applicable.

You need a very broad understanding of a number of systems, mechanical and electrical to be effective in the workplace. As we move into the future, more and more applications will be integrating mechanical and electronic systems together."

Sample course plan – Bachelor of Science (Electrical Systems)[1]

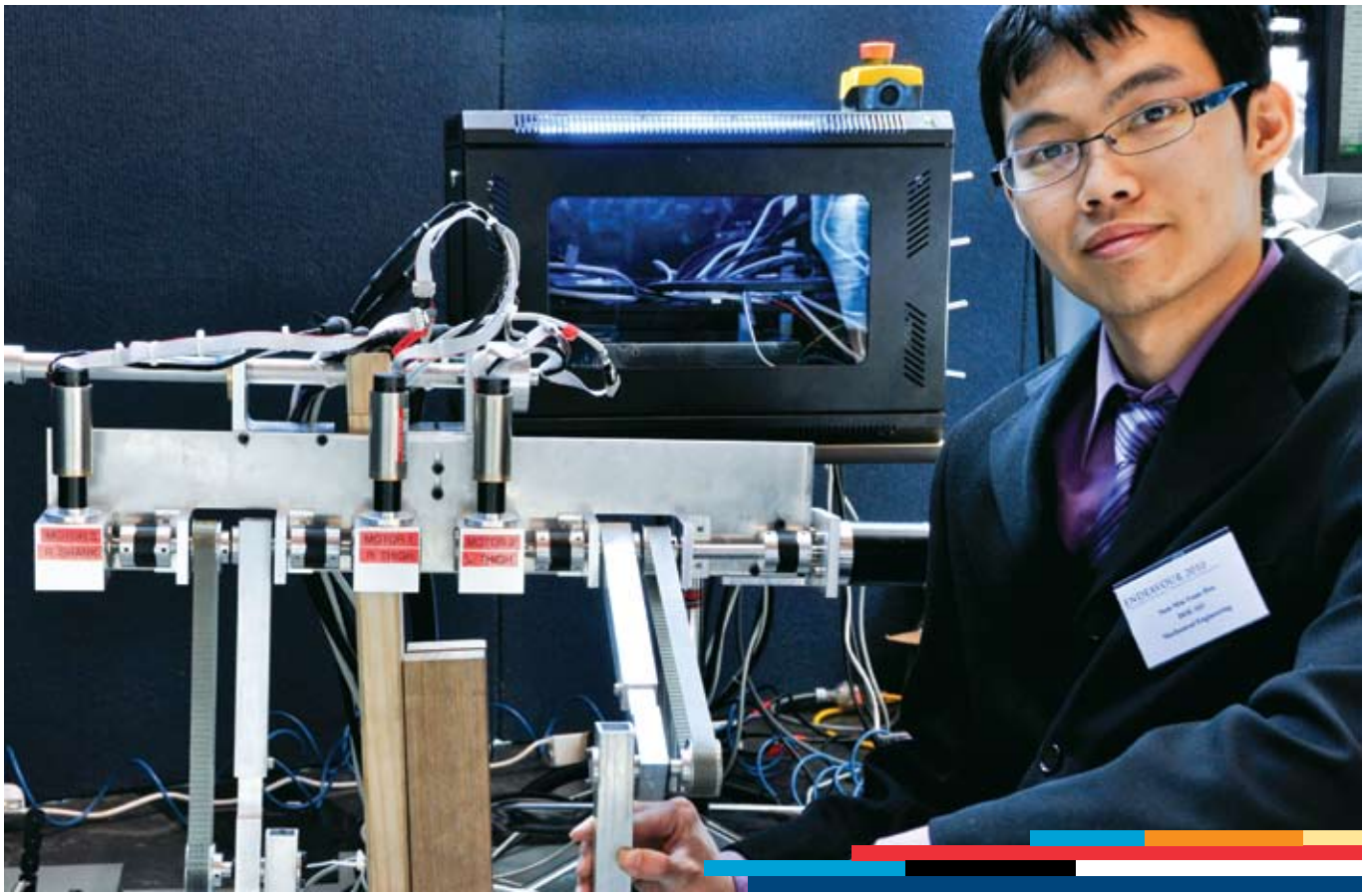
Year 1	Semester 1	Engineering Systems Design 1	Calculus 2	Physics 1	Breadth subject
Year 1	Semester 2	Engineering Systems Design 2	Linear Algebra	Physics 2	Breadth subject
Year 2	Semester 1	Engineering Computation	Engineering Mathematics	Science elective	Breadth subject
Year 2	Semester 2	Foundations of Electrical Networks	Engineering Mechanics	Programming the Machine	Breadth subject
Year 3	Semester 1	Electrical Network Analysis and Design	Digital Systems Design	Algorithms and Data Structures	Breadth subject
Year 3	Semester 2	Electrical Device Modelling	Signals and Systems	Object Oriented Software Development	Breadth subject

Followed by a two-year Master of Engineering (Mechatronics)[1]

Year 4	Semester 1	Mechanics and Materials	Software Modelling & Design	Mechanical Dynamics	Control Systems
Year 4	Semester 2	Mechatronics Design	Fluid Mechanics and Thermodynamics	Dynamics of Machines	Advanced Control Systems
Year 5	Semester 1	Manufacturing Systems	Thermodynamics	Mechatronics elective	Capstone Project
Year 5	Semester 2	Advanced Motion Control	Embedded Systems Design	Mechatronics elective	Capstone Project

Mechanical Systems subjects | Electives | Breadth subjects

[1] This example is provided as a guide only. Subject availability will vary from year to year and there is no guarantee that the listed subjects will be available in future years. This information is for students with VCE Units 3 and 4 Specialist Mathematics. Students who have not completed these subjects should consult a course advisor.

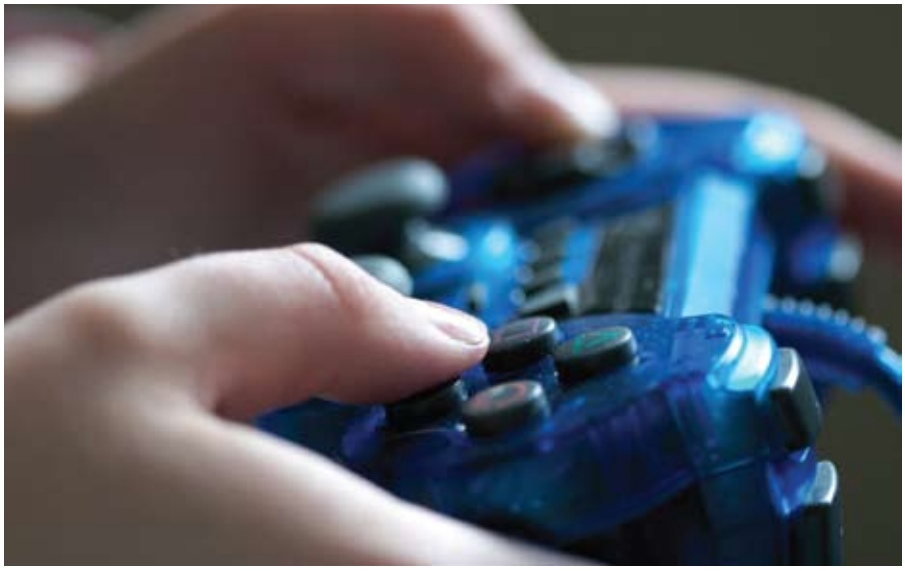


Software Engineering

Software engineering is the application of engineering principles to the development and maintenance of high quality software. Software engineers use an understanding of computer science, design, engineering, management, mathematics and psychology to enable team production of large software systems.

These courses are available to students pursuing a career as a professionally accredited software engineer.

- Bachelor of Science with a major in Computing and Software Systems, followed by the two-year Master of Engineering (Software)
- Bachelor of Commerce with a specified sequence of subjects in Computing and Software Systems, followed by the two-year Master of Engineering (Software)



The Masters course focuses on team-based projects, in which students must conceive, design, implement and operate software engineering solutions. You will develop technical skills and the ability to apply engineering principles to solving real world problems. A year-long industry project provides the opportunity to work closely with IT professionals. The IT industry in Australia is experiencing a critical skills shortage, and highly-trained graduates are in strong demand.

The Master of Engineering (Software) is accredited by the Australian Computer Society, Engineers Australia and has recently received European accreditation, having been awarded the EUR-ACE® label. This level of accreditation creates career opportunities in many countries around the world.

Alan Cutter

Alan Cutter is studying the Master of Engineering (Software) following an undergraduate degree in computer science. A keen gamer and game developer, in high school Alan developed Flash and GameMaker games like Pac Man and Asteroids for fun, and experimented with SDL programming and Cellular Automata. By the end of Year 12, Alan had decided on computer programming as a career path.

"It's very easy in theory to do programming. It's not like other engineering fields where you need materials and you need to spend money to create, and then you've got the physical difficulty of building it.

Programming is really just pressing buttons and you don't have the drawbacks of costs. It's all in your head. You can play with the abstract concepts and actually see them play out visually."

Sample course plan – Bachelor of Science (Computing and Software Systems)[1]

Without programming experience[2] (see page 34 for a sample plan for those with programming experience).

Year 1	Semester 1	Foundations of Computing	Calculus 1[3]	Engineering Systems Design 1	Breadth subject
Year 1	Semester 2	Foundations of Algorithms	Calculus 2	Engineering Systems Design 2	Breadth subject
Year 2	Semester 1	Design of Algorithms	Database Systems	Science subject[4]	Breadth subject
Year 2	Semester 2	Object Oriented Software Development	IT or Science subject	Science subject	Breadth subject
Year 3	Semester 1	Software Modelling and Design	CIS elective	IT or Science subject	Breadth subject
Year 3	Semester 2	IT Project	CIS elective	IT or Science subject	Breadth subject

Required IT subjects	Other Science subjects, and/ or IT elective subjects	Breadth subjects

[1] This example is provided as a guide only. Subject availability will vary from year to year and there is no guarantee that the listed subjects will be available in future years.

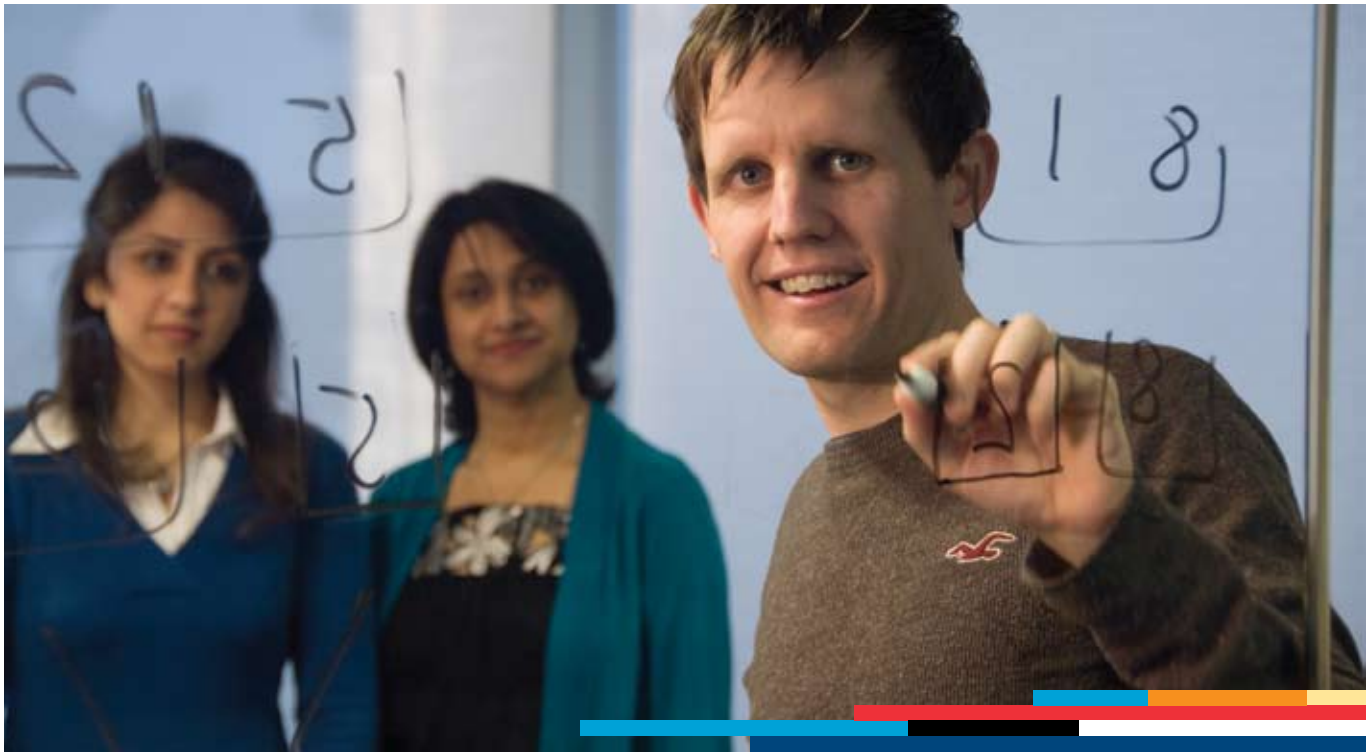
[2] This sample plan is general and based on a student having no programming experience. The Department of Computing and Information Systems offers a programming proficiency test. Student who pass this test may follow a different course plan.

[3] Students who have completed VCE Units 3 and 4 Specialist Maths can go straight into Calculus 2 and do an extra Science elective.

[4] Students wishing to pursue ME (Mechatronics) should take Engineering Mechanics instead of a Science elective.

Followed by a two-year Master of Engineering (Software)[1]

Year 4	Semester 1	Software Requirements Analysis	IT Project and Change Management	Modelling Complex Software Systems	CIS elective
Year 4	Semester 2	Masters Software Engineering Project	Software Engineering Methods	CIS elective	CIS elective
Year 5	Semester 1	Masters Advanced Software Project	Software Engineering Advanced elective	Approved elective	CIS Advanced elective
Year 5	Semester 2	Masters Advanced Software Project	Software Engineering Advanced elective	Approved elective	CIS Advanced elective



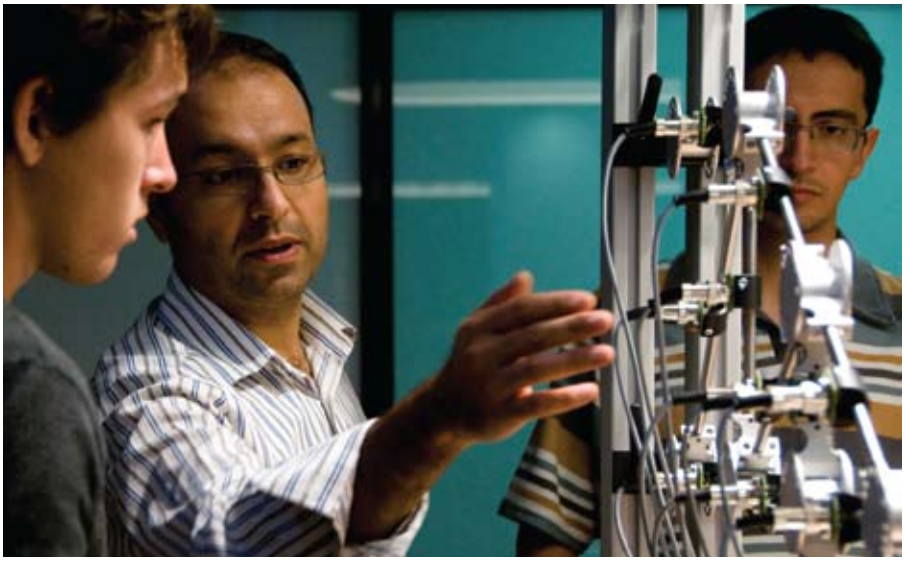
Structural Engineering

Structural engineers apply mathematical and scientific principles to the design, development and evaluation of materials and systems used in building load-bearing structures like roads, buildings, rail lines, dams and offshore platforms. They perform roles related to the design of these structures, their longevity, and their ability to withstand extremes such as earthquake, high winds, blast or fire.

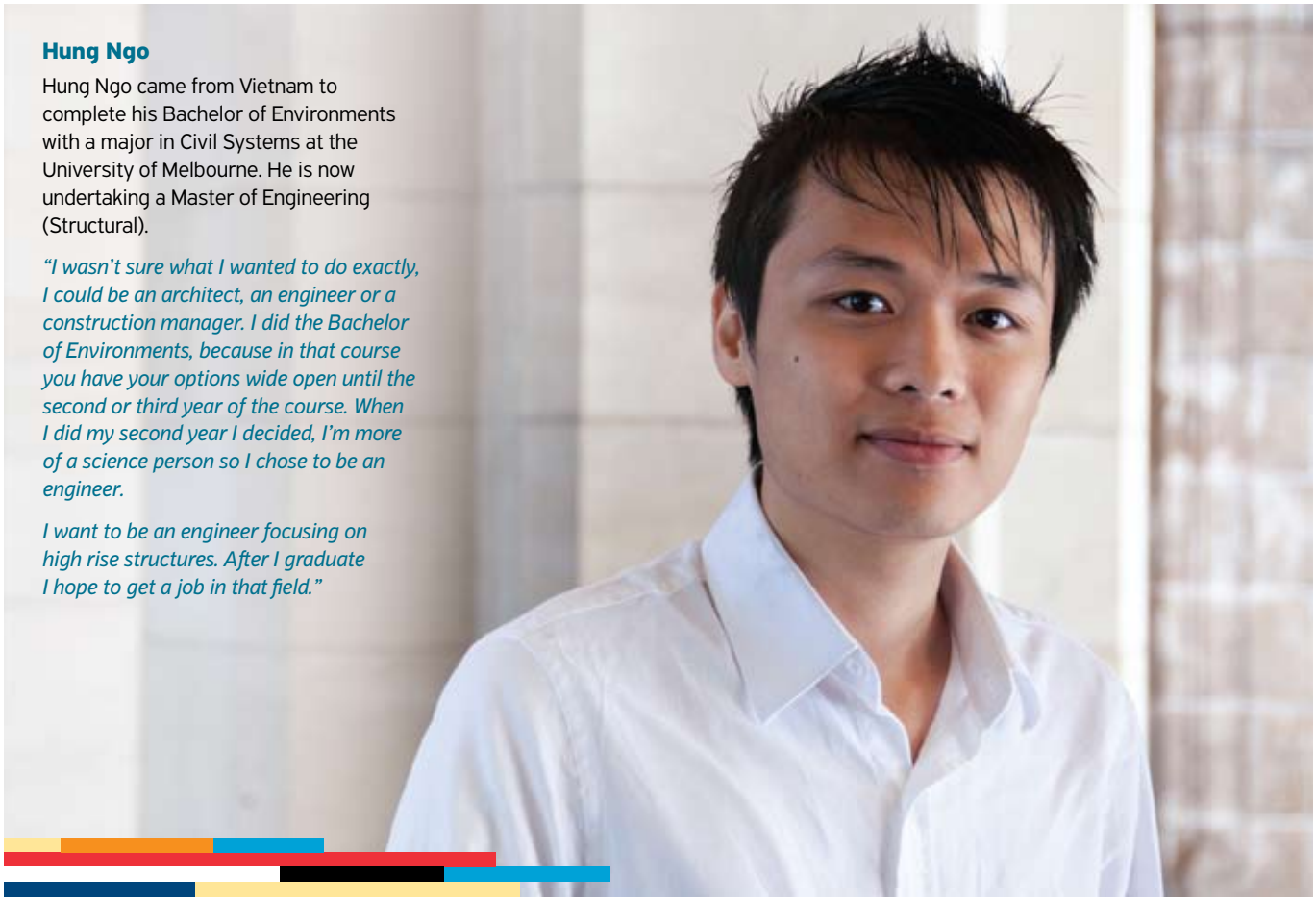
These courses are available to students pursuing a career as a professionally accredited structural engineer.

- Bachelor of Science with a major in Civil Systems, followed by the two-year Master of Engineering (Civil) or (Structural)
- Bachelor of Environments with a major in Civil Systems, followed by the two-year Master of Engineering (Civil) or (Structural)
- Bachelor of Commerce with a specified sequence of subjects in Civil, followed by the two-year Master of Engineering (Civil) or (Structural)

Structural engineering students learn from researchers recognised internationally for their expertise in high-rise structures, and earthquake and blast resistant technologies.



Design seminars, fieldwork and workshops also provide students with opportunities to work with industry professionals in their final year. Employment opportunities include work as structural engineering design consultants in companies ranging from international firms to small private practices, as well as other areas such as government departments associated with public works and infrastructure, construction companies, and research organisations and universities. Structural engineers can find employment with national and global companies such as Reed Construction, Arup, Bonacci Group, AECOM, Parsons Brinckerhoff and Coffey International Ltd.



Hung Ngo

Hung Ngo came from Vietnam to complete his Bachelor of Environments with a major in Civil Systems at the University of Melbourne. He is now undertaking a Master of Engineering (Structural).

"I wasn't sure what I wanted to do exactly, I could be an architect, an engineer or a construction manager. I did the Bachelor of Environments, because in that course you have your options wide open until the second or third year of the course. When I did my second year I decided, I'm more of a science person so I chose to be an engineer.

I want to be an engineer focusing on high rise structures. After I graduate I hope to get a job in that field."

Sample course plan – Bachelor of Environments (Civil Systems)[1]

Year 1	Semester 1	Reshaping Environments	Constructing Environments	Environments elective	Calculus 2
Year 1	Semester 2	Natural Environments	Environments elective	Environments elective	Linear Algebra
Year 2	Semester 1	Engineering Mechanics	Engineering Mathematics	Environments elective	Breadth subject
Year 2	Semester 2	Engineering Materials	Earth Processes for Engineering	Environments elective	Breadth subject
Year 3	Semester 1	Risk Analysis	Fluid Mechanics & Thermodynamics	Environments elective	Breadth subject
Year 3	Semester 2	Systems Modelling and Design	Structural Theory & Design	Civil systems major	Breadth subject

Followed by a two-year Master of Engineering (Structural)[1]

Year 4	Semester 1	Structural Theory and Design 2	Engineering Site Characterisation	Sustainable Infrastructure Systems	Structural elective
Year 4	Semester 2	Engineering Project Implementation	Structural Theory and Design 3	Structural elective	Structural elective
Year 5	Semester 1	Integrated Design	IE Research Project 1	Geotechnical Engineering	Structural elective
Year 5	Semester 2	Integrated Design	IE Research Project 1	Approved elective*	Structural elective**

Civil systems subjects | Electives | Breadth subjects

[1] This example is provided as a guide only. Subject availability will vary from year to year and there is no guarantee that the listed subjects will be available in future years. This information is for students with VCE Units 3 and 4 Specialist Mathematics. Students who have not completed these subjects should consult a course advisor.

*Students are encouraged to take Concrete Design and Technology.

** Students are encouraged to take Sustainable Buildings.

Hayden Jackson
Structural Engineering graduate

Hayden is a recent graduate of the Master of Engineering Structures program, who now works as a Structural Engineer for international advisory and design consultancy, Hyder Consulting. Designing megastructures and project managing iconic international engineering initiatives are some of the highlights of Hayden's work.

"I have been fortunate, to be involved in some big projects including the Victorian Desalination Project, Dubai Fountain, Nakheel Tall Tower, M1 Upgrade (West Gate Freeway Alliance) and a major Coal Seam Gas facility."

Hayden counts the significant contribution he made to the design and coordination of Dubai Fountain as one of his greatest career highlights to date.

During his studies, Hayden developed technical expertise in structural dynamics, earthquake engineering, concrete technology, and particularly enjoyed the insights into engineering contracts and procurement.

Studying IT at Melbourne

Computing and information technologies are everywhere: smartphones, MP3 players, gaming, file-sharing, and social networking, and these are just a few of the most widespread applications. We interact with computers and software in every aspect of our lives. Information Technology is central to modern society and is one of the drivers of the knowledge-based economy. The University of Melbourne has established an international reputation in IT with outstanding researchers and world-class facilities. Our researchers are looking at how the computing environment of the future will support and enhance all aspects of human endeavour. Australia is experiencing an IT skills shortage with graduates sought after in all industries.

Information Technology is offered through three undergraduate majors: computing and software systems, geomatics and informatics.

Computing and Software Systems major

The Computing and Software Systems major is designed for technically focused students who want to develop strong professional capabilities in programming and software development. In this major you will:

- develop high-level technical expertise
- build proficiency and expertise with a variety of programming platforms
- understand the systematic processes underpinning software development
- appreciate the principles of computing.

You will be able to find jobs in a wide variety of industries, applying your understanding of computer science, design, engineering, management, mathematics and psychology as part of a team producing large software systems.

The Computing and Software Systems major provides a pathway to the following graduate programs:

- Master of Engineering (Software) and Master of Engineering (Mechatronics) – two year programs
- Master of Information Systems
- Master of Science (Bioinformatics)
- Master of Science (Computer Science)
- Master of Spatial Information Science.
- Master of Information Technology (Computing)
- Master of Information Technology (Distributed)
- Master of Information Technology (Health)
- Master of Information Technology (Spatial)

Geomatics major

Geomatics is the science and technology that captures, manages, analyses and provides spatial information about the natural, built and social environments. Geomatics lies behind search and rescue efforts, GPS, Google Earth and mobile location-based services, and transparent and accountable governance to fight poverty or corruption.

Why Study IT at Melbourne?

At Melbourne, you will be set up for a career, not just your first job.

- Melbourne is ranked top in Australia and 25th in the world in IT and Engineering (Times Higher Education World University Rankings, 2011–12).
- Melbourne is the most exciting technology hub in the country, home to many of the brightest teaching and research minds in the field.
- IT at Melbourne is grounded in both science and engineering, brought to life through creative thinking and practical application.

Studying IT at Melbourne will provide you with:

- skills and knowledge that are globally portable, adaptable across industries and environments, and will not be outdated by changes in technology
- deep foundations that create highly valued, in-demand employees and researchers
- the flexibility to pursue your passions and to work on exciting projects with other high-performing students.
- the ability to work across fields, contributing to the advancement of science, business, health and more.

In this major, you will learn about:

- mapping sciences
- geographical information systems
- remote sensing
- land administration
- surveying.

You will be able to pursue global careers in surveying, geographical information systems (GIS), environmental management and computing in business and government organisations.

This major provides a pathway to the following graduate programs:

- Master of Engineering (Geomatics) – two year program
- Master of Information Systems
- Master of Spatial Information Science
- Master of Information Technology (Spatial)

The Geomatics major is also available in the Bachelor of Environments.

Informatics major

Informatics is about using computers to work with digital information – gathering, using, storing, retrieving, and visualising information and data. Informatics integrates knowledge and concepts from computing, information modelling, human-computer interaction and graphics to unlock the power of information in all types of settings, including health, finance and economics, biology, health, engineering and communications.

In the Informatics major you will:

- learn tools and technologies to solve information-related problems in a range of application areas
- develop programming skills
- design web-based solutions
- develop the skills to work effectively in multi-disciplinary teams.

You will be able to work in finance, economics, biology, geology, chemistry, engineering, health, communications and social media settings.

This major also provides a pathway to the following graduate programs:

- Master of Information Systems
- Master of Information Technology (Computing)
- Master of Information Technology (Distributed)
- Master of Information Technology (Health)
- Master of Information Technology (Spatial)
- Master of Spatial Information Science
- Master of Science (Bioinformatics)

First year IT subjects

Foundations of Computing

Foundations of Computing teaches students how to conceptualise and solve real world problems through computation, using the simple, yet powerful Python programming language. This subject can lead to a major in Computing and Software Systems or Informatics, a Diploma in Informatics or further breadth studies in IT.

If you are looking to pursue IT studies but don't have a programming background, Foundations of Computing offers a solid introduction to the basic concepts starting from scratch. Or if you have limited programming experience which you are seeking to consolidate, Foundations of Computing rapidly moves through the basics of programming into challenging, hands-on computational problem solving, and includes optional advanced lectures to excite, entice and challenge. Foundations of Computing makes use of interactive worksheets and courseware developed specifically for this subject by the academics that will be teaching you. Guest lectures are held every second week, in which experts from across the IT spectrum present specialised topics, such as text mining over Twitter, cryptography and electronic voting, spatial analytics over social media data, algorithms for interactive eye testing, and a bioinformatics session that examines how to efficiently search for genes within the human genome.

Examples of the types of projects you will undertake as part of Foundations of Computing include:

- **Movie recommender system**

  You will build a movie recommendation engine, similar to those used by Amazon and IMDB. The system will allow you to predict whether or not a user will like a particular movie, based on real user data. The project will also enable you to use data presentation techniques to visualise your results.

- **Artificial Intelligence (AI) player for a card or board game**

  Innovate your own AI player for a card or board game and play off against other students and the teaching staff.

In the advanced lectures, students will be walked through topics such as the development of a web crawler and search engine, and advanced recommender systems, each in a single lecture.

Foundations of Algorithms

Foundations of Algorithms teaches students the foundations of algorithms and data structures, as well as the underpinnings of scalable software development, using the C programming language. Algorithms are right at the heart of computing, and the ability to create them, reason about them, apply them, and improve them, is a critically important skill in the process of software development. Building on Foundations of Computing, this subject enhances understanding of computational efficiency, memory management and the inner workings of programming languages. It provides the next stepping stone in the Computing and Software Systems major, or alternatively significantly reinforces programming skills in IT breadth studies or within the Diploma in Informatics.

The subject introduces students to the study of algorithms, that is methods for solving particular problem types. These include sorting large data sets of numbers, or finding words or sequences in large files. In doing so, it teaches students to analyse the efficiency of different algorithmic approaches, and consider different options for structuring data to speed up computation. At the same time, it moves towards a production environment for software development and migrates students to the highly-popular C programming language. Students are taught to design software to both leverage different components of hardware and also work within its constraints.

IT via the Bachelor of Science

IT MAJORS AVAILABLE:

- COMPUTING AND SOFTWARE SYSTEMS (ALSO AN ENGINEERING MAJOR)
- GEOMATICS (ALSO AN ENGINEERING MAJOR)
- INFORMATICS

DURATION: 3 YEARS FULL-TIME

FEE TYPE: CSP AND INTERNATIONAL FEE

CAMPUS: PARKVILLE

Developing a specialisation

Students with a 65% average in their final two years of study, who complete a Computing and Software Systems major, will be eligible to enter the two year Master of Engineering (Software), which leads to professional accreditation as an engineer. This major is also a pathway to the research training entry Master of Science (Computer Science). Graduates with a management orientation may also consider the Master of Information Systems. Commonwealth supported places (CSP) are available in all three Masters programs and a generous scholarship program exists for both local and international students.

Students undertaking a geomatics major with a 65% average in the final two years of study will be eligible to enter the two year Master of Engineering (Geomatics), which leads to professional accreditation as an engineer. Scholarship and CSP opportunities apply.

Students undertaking an Informatics major through the Bachelor of Science may wish to continue developing their IT expertise through study of the Master of Information Systems or the Master of Information Technology, which is offered in the 4 streams of Computing, Distributed, Health and Spatial.

More information

Find out more about the Bachelor of Science at www.bsc.unimelb.edu.au

Sample course plan – Bachelor of Science (Computing and Software Systems)[1]

With programming experience/pass in programming proficiency test

See page 29 for a sample course plan for students without programming experience.

Year 1	Semester 1	Engineering Systems Design 1	Foundations of Algorithms	Calculus 1	Breadth subject
Year 1	Semester 2	Engineering Systems Design 2	Algorithms and Data Structures	Calculus 2	Breadth subject
Year 2	Semester 1	Database Systems	Science elective	Science elective	Breadth subject
Year 2	Semester 2	Object Oriented Software Development	Knowledge Technologies	Theoretical Computer Science	Breadth subject
Year 3	Semester 1	Software Modelling and Design	CIS elective	Science elective	Breadth subject
Year 3	Semester 2	IT Project	CIS elective	Science elective	Breadth subject

Required IT subjects | Other Science subjects, and/or IT elective subjects | Breadth subjects

[1] This example is provided as a guide only. Subject availability will vary from year to year and there is no guarantee that the listed subjects will be available in future years.

Sam Stewart

Sam Stewart is in the final year of his Bachelor of Science, majoring in Informatics. Sam has recently returned from Silicon Valley, as part of the Advance Program, supporting young Australian innovators. He has launched his own start-up company, Nightfly Services, a social media mobile app that allows users to plan their nightlife by recommending nearby venues. Sam has also been accepted into a graduate role as an Information Security Consultant with PricewaterhouseCoopers.

"A couple of years ago as Social Secretary for my college, my job was to organise the social lives for over 130 people. When I kept getting the same questions over and over again, such as "Hey... where should I go... what's good... what's cheap tonight?" I knew there had to be a better way. I'm a massive nerd, I major in Informatics and I knew that I could hack something together that would answer these questions."

"The trip to Silicon Valley was an amazing learning experience for me. I was surrounded by the smartest people I've ever had the privilege of meeting. There are some crazy geniuses over there. As a result, Nightfly received some valuable critical feedback."

IT as Breadth

The Melbourne Model lets you enhance your career opportunities by taking IT subjects as breadth studies alongside your core degree.

You can select from these sequences of 3-6 subjects:

Computing

Explore the technical foundations of IT, including computer programming and the design and implementation of software systems.

Information and the Web

Gain skills for managing, manipulating, and sharing information on the web, as well as designing human-centric information systems.

Information Technology in Organisations

Learn the foundations of IT management with a focus on the role of IT in achieving business and organisational goals.

Logic, Meaning and Computation

Explore issues relating to logic, meaning and computation from a multidisciplinary perspective.

Human Centred Computing

Explore the interactions between the Internet, rich visualisations and people, leading to practical skills in presentation and human-centred design tasks.

Working with Information

Gain skills and knowledge about how to structure, manipulate, visualise and analyse both simple and complex data.

Students enrolled in the Bachelor of Arts, Commerce, Environments and Music may take any of these breadth tracks. Students enrolled in the Bachelors of Biomedicine or Science may only take the Information Technology in Organisations breadth track.

IT via the Diploma in Informatics

Complement your major studies with the Diploma in Informatics to equip yourself with the IT knowledge that employers seek.

In this Diploma you will:

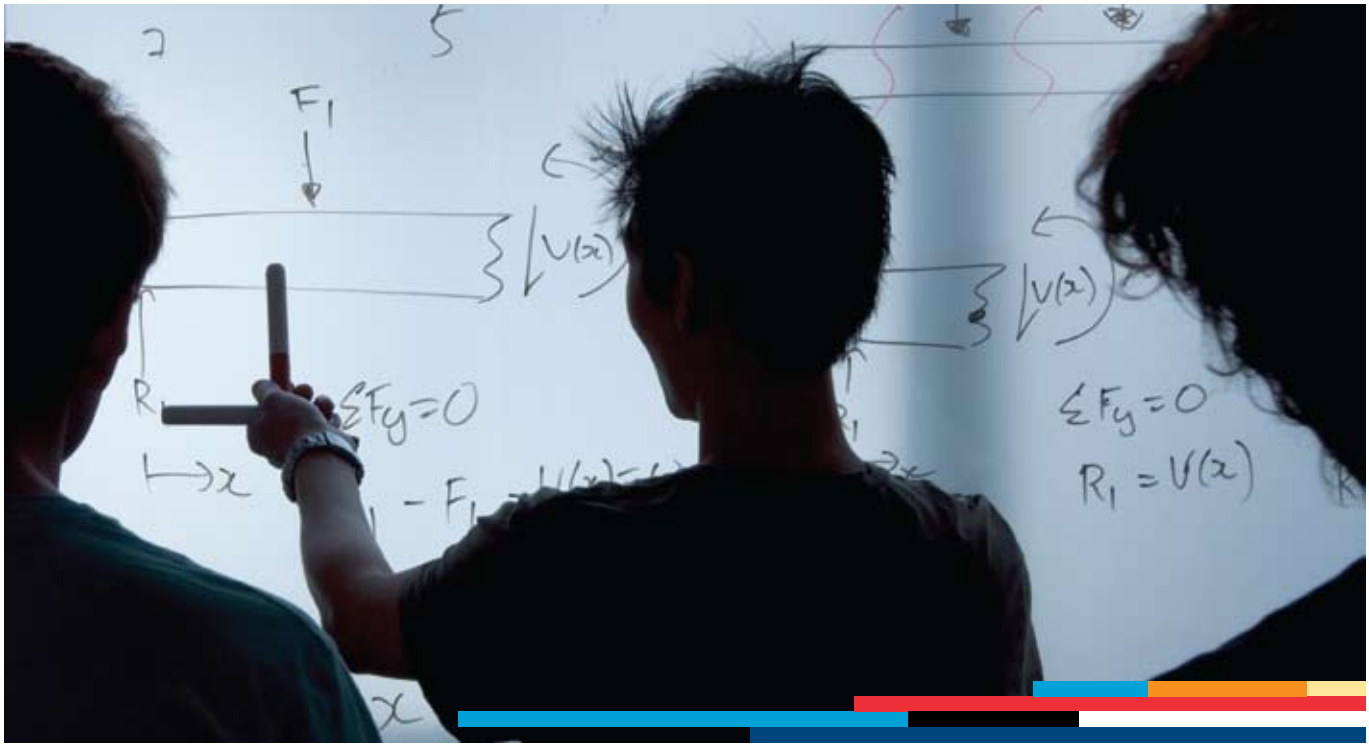
- learn tools and technologies to solve information-related problems in a range of application areas
- develop programming skills
- design web-based solutions
- develop the skills necessary to work effectively with people in other disciplines.

Informatics opens up career opportunities in finance, economics, biology, geology, chemistry, engineering, health, communications and social media.

The Diploma adds one semester to a normal three-year degree, allowing you to graduate with a degree and diploma in 3.5 years.

The Diploma in Informatics provides a pathway to the following graduate programs:

- Master of Engineering (Software)
- Master of Information Systems
- Master of Information Technology (Computing)
- Master of Information Technology (Distributed)
- Master of Information Technology (Health)
- Master of Information Technology (Spatial)
- Master of Science (Bioinformatics)
- Master of Spatial Information Science.



Graduate study in IT

Graduate study in IT at Melbourne will make you an information technology professional. It will deepen your knowledge, expand your career options and enable you to make discoveries that benefit society. You can enter graduate study directly from an undergraduate pathway or after a period in the workforce.

As a graduate student, you will:

- be taught in small classes with more flexible study options
- benefit from professionally-focused and specialist programs that are regularly updated to adapt to new applications
- gain exposure to industry through guest lectures, industry based projects and internships
- engage with staff who are well-connected to international research communities.

There is strong demand for our creative, adaptable and technically-adept graduates to work both locally and globally.

Graduate study options include:

UNDERGRADUATE STUDY

MAJORS

Computing and Software Systems

Learn to develop algorithms and software.

Available in Bachelor of Science

Geomatics

Capture, analyse and apply spatial information in natural, built and social environments.

Available in Bachelor of Science, Environments

Informatics

Use IT to capture and make sense of information and data in areas ranging from biology to social networking.

Available in Bachelor of Science

DIPLOMA

Diploma in Informatics

Complement your major studies with a range of data manipulation and presentation techniques. Study eight informatics subjects alongside your degree and graduate with a bachelors degree and a diploma in 3.5 years.

Available in Bachelor of Arts, Biomedicine, Commerce, Environments, Music, Science*

*Not available to students doing the Computing and Software Systems or Informatics majors.

BREADTH

Breadth tracks

Enhance your major with a 3-6 subject sequence in:

- Computer Science
- Information and the Web
- IT in Organisations
- Logic, Meaning, and Computation
- Working with Information.

Available in Bachelor of Arts, Biomedicine*, Commerce, Environments, Music, Science*

*IT in Organisations only

3 YEARS

GRADUATE COURSEWORK

- Master of Engineering
  - Geomatics
  - Software
  - Mechatronics
- Master of Information Systems
- Master of Information Technology
  - Computing
  - Distributed
  - Health
  - Spatial
- Master of Science
  - Bioinformatics
  - Computer Science
- Master of Spatial Information Science

2 YEARS

EMPLOYMENT

- Work in organisations like Google, IBM and Ernst & Young, or in a small business or startup.
- Create software, build and manage information systems and make our interaction with technology more intuitive and accessible.
- Develop complex software systems for fields as diverse as medical research, disaster management, smarter cities and cybersecurity, or create applications for iOS and Android devices.
- Support, manage and change business processes through information systems and technologies in major international consulting firms, or independent business consultancies.
- Help organisations manage their business and assets and make sense of their data through information systems.
- Make information and data useful and usable, leading to scientific discoveries or new business opportunities.

RESEARCH HIGHER DEGREES

Master of Philosophy (MPhil)
Doctor of Philosophy (PhD)

Research Areas:

- complex and intelligent systems
- distributed and cloud computing
- health and bioinformatics
- interaction design
- knowledge discovery
- optimisation and programming languages
- organisational information systems
- spatial information science
- spatial data infrastructure and land administration

2-4 YEARS

Master of Information Systems (MIS)

The MIS is a premier professional degree for aspiring and current practitioners who aim to be IS/IT leaders. It is available to mid-career or start-of-career graduates from any study background. The program covers skills areas of critical importance to IT employers, such as project and change management, emerging technologies, IT strategy and governance and compliance, security and service provision.

The MIS is:

- a program designed in consultation with leading IT decision-makers, making it among the most industry-relevant graduate Information Technology programs in Australia.
- a one-year, 18-month or a two-year full-time program depending on your work experience and undergraduate qualification. Part-time study is available, as are two pathway programs
- accredited by the Australian Computer Society and qualifies graduates for international membership of the Association for Computing Machinery and the Association for Information Systems.

In this program you will:

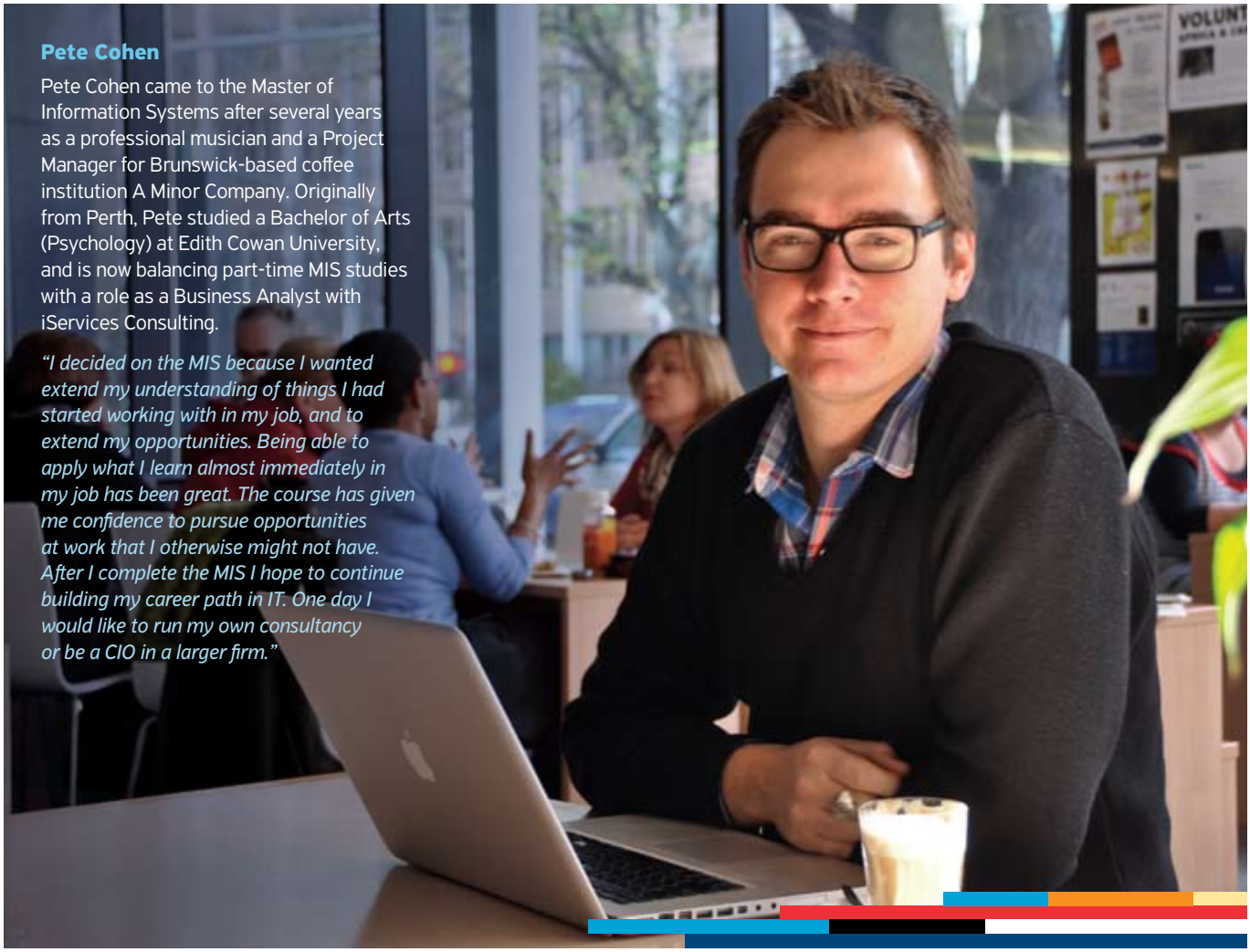
- develop abilities in supporting, managing and changing business processes through information and communications technology and information systems
- gain transferrable skills in solving business problems, collaboration, project management and application of models, frameworks and management theory
- have the opportunity to tailor your electives to your career priorities.

Career outcomes

MIS Graduates are highly-regarded by top firms and government agencies searching for tomorrow's digital business thinkers and leaders. Graduate jobs include roles such as management consultant, systems analyst/ designer, IT infrastructure manager, business analyst and data architect.

Entry requirements

- An undergraduate degree in any discipline with at least 65% average (or University of Melbourne equivalent) in the final year of study or equivalent is required for entry to the 200 point program.
- An undergraduate degree in any discipline with at least 65% average (or University of Melbourne equivalent) in the final year of study and at least one year documented relevant work experience; or
- A Graduate Certificate in Information Systems with at least 65% average (or University of Melbourne equivalent) in the Graduate Certificate or equivalent for entry to the 150 point program.



Pete Cohen

Pete Cohen came to the Master of Information Systems after several years as a professional musician and a Project Manager for Brunswick-based coffee institution A Minor Company. Originally from Perth, Pete studied a Bachelor of Arts (Psychology) at Edith Cowan University, and is now balancing part-time MIS studies with a role as a Business Analyst with iServices Consulting.

"I decided on the MIS because I wanted extend my understanding of things I had started working with in my job, and to extend my opportunities. Being able to apply what I learn almost immediately in my job has been great. The course has given me confidence to pursue opportunities at work that I otherwise might not have. After I complete the MIS I hope to continue building my career path in IT. One day I would like to run my own consultancy or be a CIO in a larger firm."

Course structure

The following course structures apply for the three MIS point programs:

Subjects (200 point program)

Foundation subjects (choose 4 from):

- Fundamentals of Information Systems
- Programming and Software Development
- Database Systems and Information Modelling
- Accounting for Decision Making
- Managerial Economics
- Information Processes & Control

First 4 core subjects:

- Information Technology Infrastructure
- Business Analysis Modelling and Design
- Professional IS Consulting
- IS Project and Change Management

Second 4 core subjects:

- Emerging Technologies and Issues
- Enterprise Applications and Architectures
- IS Strategy and Governance
- Impact of Digitisation

Elective subjects (choose 4 from):

- IS Projects: People, Process and Politics
- Managing Change for IS Professionals
- Managing Large Projects
- Managing IT Outsourcing
- Enterprise Systems
- Business to Business Electronic Commerce
- Managing IT Services
- Service Science
- Information Security Consulting
- Data Warehousing
- Business Analysis & Decision Making
- Business Intelligence
- Innovation and Entrepreneurship in IT
- Knowledge Management Systems
- Internet Software Development Principles
- Pervasive Computing
- Interaction Design and Usability
- eHealth and Biomedical Informatics Systems
- Management Competencies
- Managing for Value Creation
- Strategic Cost Management
- Financial & Performance Management
- Managing Information Technology
- Operations Management
- Internet Marketing
- Service Marketing
- Managing in Information Societies
- Cross Cultural Management and Teamwork
- Organisational Behaviour
- Marketing Management
- Research Methods in Information Systems
- Minor Research Project in IS (25 points)

Subject information is available at https://handbook.unimelb.edu.au/view/current/864AL

Master of Information Technology

The MIT will offer you the lifelong technical skills to devise solutions to the problems of today and those of tomorrow.

The Master of Information Technology (MIT) is a new program for creative students who are passionate about cutting edge technology and its applications in solving real world problems across all areas of business, government, health and society.

The program teaches the fundamental adaptable technical skills that are applicable across a range of IT platforms; skills that will not date, such as applied algorithmics, data mining, distributed computing and programming language design, allowing our graduates to evolve with and adapt to the swift pace of technology.

As industry continues to be transformed by IT, a new workforce with transferrable problem-solving skills is in high demand. The MIT is closely aligned with industry and includes competitive enrolment in a 25 point industry placement with a leading employer.

The MIT is available in four specialisations focused on areas of growing importance in technology, business and government:

- Computing
- Distributed
- Health
- Spatial

The Master of Information Technology caters equally to those with a limited IT background looking for in-depth technical and theoretical education and those with strong experience in the domain. Depending on your work experience and undergraduate qualification, the MIT is available as a:

- 2 year (200 point) program for graduates of any discipline, who have studied at least one programming subject as part of their undergraduate course
- 1.5 year (150 point) program for graduates with an IT major as part of their 3 year undergraduate degree
- 1 year (100 point) program for IT graduates with a four year degree in information technology and cognate studies or two years of relevant work experience in their area of specialisation.

Career outcomes

As critical skills shortages continue in the IT industry, MIT graduates will be well placed to secure exciting roles worldwide, whatever their specialisation. MIT graduates will possess the highly transferrable theoretical and technical skills that will make them globally-mobile and sought after by industry. A wealth of graduate careers is available in areas such as cloud computing, web and mobile app development, eHealth, and disaster management and GPS technology.

Entry requirements

Entry Level 1 (200 points) – 2 years full-time

- Any undergraduate degree, with a final year grade average of at least 65% (or University of Melbourne equivalent), and at least one technical subject focused on computer programming (taken at any year level).

Entry Level 2 (150 points) – 1.5 years full-time

- A three-year undergraduate degree with a major in Computer Science, Information Technology, Software Engineering or related discipline, with a final year grade average of at least 65% (or University of Melbourne equivalent).

Entry Level 3 (100 points) – 1 year full-time

- A four-year undergraduate degree in Computer Science, Information Technology, Software Engineering or related discipline, with a final year grade average of at least 65% (or University of Melbourne equivalent) and either: (a) studies in the area of specialisation at an advanced undergraduate level or higher; or (b) at least two years of documented work experience in the area of specialisation.

Master of Information Technology (contd)

Course structure

The length of the program will be determined by the extent of previous computing studies and work experience. There is provision for part-time study via afternoon and evening classes.

Students undertaking the 200 point program will take 4 foundation subjects, plus a subject in IT Project and Change Management and a 25 point project.

Subjects (200 point program)

4 Foundation subjects (standard across all streams)

- Programming and Software Development
- Algorithms and Complexity
- Internet Technologies
- Database Systems and Information Modelling

Sample course structure: MIT (Computing)

Choose 2 of the following:

- Engineering for Internet Applications
- Knowledge Technologies
- Distributed Systems
- Declarative Programming

Plus 25 points of any level-9 CIS subject or

- Discrete Structures
- Software Modelling and Design
- Theoretical Computer Science

Compulsory subjects

- IT Project and Change Management
- Computing Project (25 points)

Plus 62.5 points of electives chosen from:

- IT Industry Placement
- Cryptography and Security
- Advanced Database Systems
- Statistical and Evolutionary Learning
- Programming Language Implementation
- Program Analysis and Transformation
- Constraint Programming
- Software Agents
- Modelling Complex Software Systems
- Applied High Performance Computing

Subject choice details for the Master of Information Technology (Distributed/Health/Spatial) will be available from the University of Melbourne Handbook at https://handbook.unimelb.edu.au

You will select one of four specialisations in the MIT as follows:

Master of Information Technology (Computing)

The MIT with a specialisation in Computing offers students the most flexible option for attaining transferrable technical and problem-solving skills for a career at the leading edge of technological innovation.

You will work across disciplines and learn how to design, analyse, implement and evaluate IT projects and future needs in the changing context in the ICT industry.

Major strands of study include:

- IT project and change management
- Software development
- Programming languages
- Artificial intelligence
- Software design.

Graduates can pursue senior IT and network positions such as data analyst, business analyst, database developer, web developer, mobile app developer and system programmer.

Master of Information Technology (Distributed)

As the world experiences an exponential growth in high speed broadband and distributed storage and computation, and an increasing demand for cloud computing and the need to access large quantities of data quickly and efficiently, experts are required to manage these complex networks. The MIT (Distributed) is designed for graduates who will play a leading role in providing service-oriented large-scale computing systems and applications that will operate over wired and wireless networks.

You will develop cloud computing solutions, devise innovative broadband applications, and work on team projects applying distributed computing technologies to e-science and e-business.

Major strands of study include:

- Mobile computer systems programming
- Cloud computing
- High performance computing
- Distributed algorithms
- Parallel computing

Graduates find senior roles in web services, e-business, cloud computing, mobile systems programming and sensor networks, working as project leaders, network analysts, mobile applications developers and more.

Master of Information Technology (Health)

The MIT with a specialisation in Health is a program for students who want to use their technical expertise to create IT solutions in the healthcare and medical sphere. Every aspect of healthcare analysis is being driven by IT, yet the experts needed to innovate and drive these complex systems are in critically short supply.

As a MIT (Health) student, you will be in the midst of the most exciting health technology precinct in the southern hemisphere, alongside world-leading medical researchers and cutting edge technology such as Australia's greenest supercomputer, the IBM Blue Gene/Q.

Major strands of study include:

- eHealth and biomedical informatics
- Information systems in health
- Health record management
- Biomedical and clinical data and knowledge

Graduates are in high demand worldwide in the health sector and are able to secure senior roles in active patient monitoring, data and image processing for health care, information management and eResearch. They work as clinical analysts, systems analysts, business managers and IT project managers in healthcare.

Master of Information Technology (Spatial)

Spatial information is all around us; from GPS to Google Earth, to mobile location based social media applications such as Foursquare.

The MIT with a Spatial specialisation will prepare you for a career in the spatial information industry, one of the fastest-growing IT sectors in the world.

As a MIT (Spatial) student you will learn to analyse, communicate and visualise spatial information in all its forms.

Major strands of study are:

- Spatial databases
- Spatial programming
- Interaction with users of spatial services

Plus electives in:

- Satellite positioning
- Remote sensing, and more...

Current industry shortfalls in spatial information practitioners combined with a growing demand in Australia and internationally, ensure graduates a range of well-paid job opportunities. Graduates can find work as disaster management experts or as designers of mobile location based applications and games. Further graduate roles include working with GPS to manage transport and infrastructure challenges and working as policy advisors to governments and NGOs.

Master of Science (Computer Science)

The technologies covered in this program are changing the way we live our lives, especially in the health sciences, and in social infrastructures delivered by web-based tools.

The Master of Science (Computer Science) provides a research training experience across three core areas:

- distributed and parallel computing
- declarative languages
- knowledge technologies such as data mining, bioinformatics, language technology and web search.

The program includes a research project specialising in one of the core areas.

The MSc(CS) is:

- a pathway to PhD research and to exciting innovation roles in the IT industry
- a two-year full-time program, following on from a Computing and Software Systems major (or equivalent at other institutions). Part-time study is available
- accredited by EUR-INF®.

Career outcomes

Graduates are well prepared for careers in research and industry. Computer scientists find roles as data analysts, applications programmers, information architects, systems and network analysts, software designers and engineers, project managers, research engineers and computational researchers.

Entry requirements

Students must have studied at least 25 points (two subjects) of university level mathematics or statistics subjects as part of their undergraduate degree.

Study of COMP20004 Discrete Structures (or equivalent), and of Level 2 mathematics or statistics is also recommended.

Course Structure

You will study a combination of discipline and professional skills core subjects, as well as undertake a research project, for a total of 200 credit points of study.

Select one or two professional skills subjects from:

- Thinking and Reasoning with Data
- Systems Modelling and Simulation
- Statistics for Research Workers
- Science Communication
- Communication for Research Scientists.

Elective subjects

Students are required to select at least three elective subjects from one of the following three research themes:

Knowledge Systems theme:

- Advanced Database Systems
- Algorithms for Functional Genomics
- Computational Genomics
- Statistical and Evolutionary Learning
- Web Search and Text Analysis
- Cryptography and Security.

Programming Languages theme:

- Programming Analysis and Transformation
- Programming Language Implementation
- Software Agents
- Constraint Programming

Distributed Computing theme:

- Cluster and Grid Computing
- Parallel and Multicore Computing
- Sensor Networks and Applications
- Mobile Computing Systems Programming
- Distributed Algorithms.

You may choose from other research themes or undertake additional elective subjects if required, subject to course coordinator approval.

Master of Spatial Information Science (MSISc)

Spatial information is an essential part of our economic infrastructure, underpinning environmental management, land tenure systems, urban planning, public health and much more.

The MSISc allows students to apply spatial information to their undergraduate study in related disciplines such as:

- computing
- planning
- environments
- health
- geomatics.

Approximately 60% of the program comprises spatial information science subjects, with the remaining 40% from another discipline. There are wide-ranging elective choices.

The MSISc is:

- a two-year full-time program. Part-time study is available
- accredited by the Royal Institution for Chartered Surveyors and by EUR-ACE®, allowing graduates to work around the world as spatial experts.

Career outcomes

There is a growing demand for people with expertise in spatial information, along with a current labour shortage in Australia. Spatial information graduates enjoy a variety of well-paid employment options in areas such as economics, cognitive science, computer science, civil engineering, social science, public health and environments. They can work as policy advisors to government and industry, disaster and emergency management experts working with GPS or designers of mobile location-based games.

Entry requirements

A three year undergraduate degree in an appropriate discipline with an average 65% (or University of Melbourne equivalent).

Course structure

The Master of Spatial Information Science is a 200 points program, which can be completed in two years (four semesters) full-time or four years part-time. The program consists of eight spatial information subjects (six core and two electives), four approved electives from another discipline/(s) and an interdisciplinary research project of 50 points done in one semester or spread over a year.

Core subjects

- Foundations of Spatial Information
- Spatial Databases
- Advanced Topics in GIScience
- Spatial Visualisation
- Spatial Analysis
- Spatial Data Infrastructure

Spatial information electives:

- Internship
- Spatial Information Programming
- IT Project Management
- Remote Sensing
- Applications for Spatial Information
- Engineering Project Implementation

Subject information is available at: https://handbook.unimelb.edu.au/view/current/H04-AA.

Master of Geographic IT (MGIT)

The MGIT is designed for professionals working in engineering, surveying, geography, planning, environmental science, archaeology, agriculture and forestry.

It will also interest graduates who want an advanced understanding of the theory, technology and changing knowledge base in geographic/spatial information technologies.

- Graduates will find careers in GIS, remote sensing, computer-aided design (CAD) and mapping.
- The MGIT is a one year, full-time program. Part-time study is available.

Further study in engineering and IT

Upon completion of your studies, or at any time in the future, graduates can choose to undertake further research or graduate study in Engineering or IT via a range of graduate-level programs. Whether pursuing a research career, adding depth to an existing specialisation, or gaining new skills, the Melbourne School of Engineering will provide the expert tuition and first class facilities that you require.

Specialised Masters by Coursework degrees are popular with students keen to enhance or deepen their knowledge of a specialist area or to engage in new fields of study. Specialised coursework degrees consist of subject-based study, and some research project work may be incorporated. Programs can vary in duration from 1 to 2 years and are currently available in the following general areas: Energy Systems, Information Technology and Systems, Structural and Environmental Engineering, Engineering Management, Project Management and Nanoelectronics.

Masters by Research degrees are suitable for graduates who have a capacity for defining and managing a research project characterised by originality and independence. The training equips them for more sustained and original work at the doctoral level or for applied research positions in a wide variety of contexts.

PhD candidates are generally graduates who demonstrate academic leadership, independence, creativity and innovation in their research work. In addition, professional doctoral studies provide advanced training designed to enhance professional knowledge in a specialist area and encourage the acquisition of a wide range of advanced and transferrable skills.

Jing Fung Tan

Jing Fung Tan has received a Best PhD thesis in Engineering award for his chemical and biomolecular engineering research into star-shaped polymers and their variants.

"Research, in my view, is an individual's contribution to the collective knowledge of mankind. Regardless of whether an experiment results in success or failure, the outcome contributes to the knowledge pool and advances our society, be it increasing life expectancy or developing technologies that make living more comfortable. To all PhD students, my humble advice is to never give up. Self-belief is the key to success – if you believe your research can save (or improve) the world, someday, it will."

Entry requirements

Prerequisite subjects 2012

Course	VCE or Australian Year 12 ENTER	IB Diploma	GCE A Levels	Trinity Foundation
Bachelor of Biomedicine	A study score of at least 25 in English (any, except English as a Second Language where a study score of at least 30 is required), at least 25 in Chemistry and at least 25 in one of Mathematical Methods or Specialist Mathematics.	English, Chemistry and Mathematics. All prerequisites must be passed at least Grade 5 at Standard Level at to at least Grade 4 at Higher Level.	Chemistry and Mathematics, and at least grade C in an accepted AS Level English subject.	EAP (a score of at least 50%), English and Chemistry and one of Mathematics 1, or Mathematics 2.
Bachelor of Commerce	A study score of at least 25 in each of English (any, except English as a Second Language where a study score of at least 30 is required) and Mathematical Methods or Specialist Mathematics	English and Standard Mathematics.	Mathematics and at least grade C in an accepted AS Level English subject	EAP (a score of 50%), English, Mathematics 1 and History of Ideas. Prerequisites must be included in the 'Best 4' calculation. For specialisation in actuarial or engineering studies Mathematics 2 is also required.
Bachelor of Environments	A study score of at least 25 in English (any, except English as a Second Language where a study score of at least 30 is required). Note: For students intending to major in Architecture, Property and Construction or an Engineering discipline, knowledge equivalent to Units 3 & 4 VCE Mathematical Methods (either) will be assumed. Students without this knowledge will have to undertake bridging studies.	English. Note: For students intending to major in Architecture, Property and Construction or an Engineering discipline, knowledge equivalent to Mathematics Standard will be assumed. Students without this knowledge will have to undertake bridging studies.	At least grade C in an accepted AS Level English subject. Note: For students intending to major in Architecture, Property and Construction or an Engineering discipline, knowledge equivalent to GCE A Level Mathematics will be assumed. Students without this knowledge will have to undertake bridging studies.	EAP (a score of at least 50%) and English. Note: For students intending to major in Architecture, Property and Construction or an Engineering discipline, knowledge equivalent to Mathematics 1A or 1B will be assumed. Students without this knowledge will have to undertake bridging studies.
Bachelor of Science	A study score of at least 25 in English (any, except English as a Second Language where a study score of at least 30 is required), Mathematical Methods or Specialist Mathematics and in one of Biology, Chemistry or Physics.	English, Standard Mathematics and one of Biology, Chemistry or Physics.	Mathematics and one of Biology, Chemistry, Physics and at least grade C in an accepted AS Level English subject.	EAP (a score of at least 50%), English, Mathematics 1, and one of Biology, Chemistry or Physics.

A guideline to minimum entry scores 2012

Course	VCE or Australian Year 12 ATAR*	Guaranteed Entry for Access Melbourne applicants: Year 12 ATAR or notional ATAR	IB Diploma	GCE A Levels	Trinity Foundation
Bachelor of Biomedicine	96	92	37	ABB (14)	89
Bachelor of Commerce	93	88	35	ABC (12)	86
Bachelor of Environments	85	78	31	BCC (10)	80
Bachelor of Science	85	78	31	BCC (10)	80

Links to Further Information

- Fees information available at: www.futurestudents.unimelb.edu.au/fees
- How to apply information available at: www.futurestudents.unimelb.edu.au/admissions/applications
- Access Melbourne for disadvantaged students, information is available at: www.futurestudents.unimelb.edu.au/admissions/entry-requirements/other-entry-options/access-melbourne
- English language requirements – Information available at: www.futurestudents.unimelb.edu.au/admissions/entry-requirements/language-requirements

*Applicants who achieve the minimum ATAR for a course will be eligible for a place, provided prerequisite studies and any other course requirements are met. The Clearly-in-Rank may be higher depending on demand for the course and the number of places available. Only applicants eligible for special entry schemes, such as Access Melbourne, will be admitted below the minimum ATAR. Minimum ATARs are reviewed annually.

Your student experience

Facilities

As a student of the University of Melbourne, you'll be able to take advantage of our fantastic location in Parkville, just north of the city of Melbourne, on a campus noted for its great atmosphere, beautiful grounds and buildings and great facilities, such as:

- Sports and recreation facilities
- State of the art libraries
- Student centres for course and subject advice

At the Melbourne School of Engineering you will have access to:

- A great range of learning spaces, such as our design labs
- A student lounge, where you can relax and socialise
- Informal study areas for individual study and group work

Clubs & Societies

There are many student clubs and societies, which provide a diverse range of interests and activities throughout the year. It's a great way to make friends and create networks that will last a life time. Some of these clubs currently include:

- Engineers Without Borders (University of Melbourne chapter) www.ewb.org.au/explore/chapters/unimelb
- Melbourne University Young Engineers (M.U.Y.E) www.muye.eng.unimelb.edu.au
- Engineering Music Society (E.M.S) www.ems.org.au
- Melbourne University Engineering Student Club (MUESC) www.engclub.org
- Women in Science and Engineering (WISE) www.wise-unimelb.com
- International Engineering Students Society (I.E.S.S) www.iess.eng.unimelb.edu.au
- Information Technology Society – IT students can join the mailing list infotechsociety@gmail.com

Browse the full list at: www.eng. unimelb.edu.au/future/students_clubs.html

Student exchange opportunities

The University of Melbourne offers a range of scholarships, bursaries, and other funding options to help you complete part of your course at one of over 133 exchange partner institutions in 32 countries.

The Melbourne School of Engineering offers scholarships of up to $3,000 for a semester-long exchange for students in the Master of Engineering program. University of Melbourne undergraduate students on an engineering pathway are encouraged to apply in the final year of the undergraduate program to undertake an exchange during the Master of Engineering program.

For more information about study abroad and exchange visit www.mobility.unimelb.edu.au

Scholarships and Prizes

Melbourne University Scholarships

The Melbourne Scholarships Program is one of the most generous and comprehensive programs in Australia, which recognises the outstanding academic achievement of students from across Victoria, interstate and overseas. We also acknowledge a special responsibility to provide access to higher education to those students who might otherwise be excluded by socioeconomic, cultural, geographic or other disadvantages.

Scholarships available include:

- Melbourne National Scholarships
- Melbourne Access Scholarships
- Graduate Access Melbourne Bursaries
- Commonwealth Scholarships
- International Undergraduate Scholarships

More Information

Melbourne Scholarships Office
T: +61 3 8344 8747
F: +61 3 9349 1740
E: 13melb@unimelb.edu.au
W: www.services.unimelb.edu.au/scholarships

MSE Scholarships and Prizes

The Melbourne School of Engineering offers a range of scholarships for students at all levels from undergraduate to PhD. These scholarships have been made possible thanks to the generosity of our donors.

Undergraduate scholarship opportunities include:

- **The Loxton Aspiring Engineer Scholarship for Male Students** – $22,000 to be paid over two years for the final year of undergraduate engineering pathway study and the first year of the Master of Engineering.
- **Tewkesbury Aspiring Engineer Scholarship for Female Students** – $22,000 to be paid over two years for final year of undergraduate engineering pathway study and the first year of the Master of Engineering.
- **The Paterson Scholarship** – approx. $4,000 per year for 5 years. (3 year eng pathway degree + 2 year Master of Engineering).

Graduate Coursework Scholarship opportunities include:

- **MSE Foundation Scholarships** – based on academic merit and for students with access issues such as having experienced disadvantage in undergraduate studies, or coming from an under-represented group in engineering.
- **The John Balfour Memorial Scholarship**
- **JH Mirams Scholarship**

Please note, the Melbourne School of Engineering also offers generous prizes for academic achievement.

More Information about scholarships and prizes:
Rosa Nacli
Engineering Scholarships & Prizes Officer
T: +61 3 9035 4610
E: rnacli@unimelb.edu.au
W: www.eng.unimelb.edu.au/scholarships/

Fees and Funding support

Undergraduate Fees for local students

Information about undergraduate domestic fees including: student contribution amounts; fee brochures; scholarships, loans and grants; youth allowance, austudy and abstudy; and financial aid, is available at http://futurestudents.unimelb.edu.au/admissions/fees/undergraduate-domestic

Undergraduate Fees for international students

Information about undergraduate international fees including: how to calculate tuition fees; subject fees; scholarships and grants; international fee brochures; currency converters, the cost of living in Melbourne; and financial aid is available at http://futurestudents.unimelb.edu.au/admissions/fees/international

Commonwealth Supported Places

Australian undergraduate students are enrolled in Commonwealth supported places (CSPs), with tuition costs subsidised by the Australian Government. The Master of Engineering program is generously supported with many Commonwealth supported places for local students, and CSPs are also available in the Master of Information Systems, the Master of Spatial Information Science, the Master of Information Technology (4 streams) and the Master of Energy Systems programs.

HECS-HELP Loans

HECS-HELP is the Australian Government's Higher Education Loan Program. It lets you borrow the amount of your student contribution and then pay the loan back once you are in the workforce and earning more than a specified amount. Alternatively, under HECS-HELP, eligible students can receive a 10% discount when they pay $500 or more of their student contributions (for a study period) up-front.

HECS-HELP is available to eligible Australian citizens and permanent humanitarian visa holders who are enrolled in a CSP. For more information about CSPs, HECS-HELP, eligibility criteria, payment options, discounts and refund arrangements, visit http://studyassist.gov.au/sites/StudyAssist/

Women in Engineering

The Melbourne School of Engineering recognises women in engineering as an under-represented group and encourages applications through Graduate Access Melbourne. All local women applicants for the Master of Engineering will be automatically considered for a $10,000 Master of Engineering Access Scholarship. More information about Graduate Access Melbourne is available at http://futurestudents.unimelb.edu.au/admissions/entry-requirements/other-entry-options/access-melbourne

More information is available www.eng.unimelb.edu.au/study/scholarships.html


CLOCKS

More information

Melbourne School of Engineering

e: eng-info@unimelb.edu.au

w: www.eng.unimelb.edu.au

Melbourne University Contact Centre

t: 13Melb (13 6352)

+ 61 3 9035 5511

Engineering Undergraduate Study Guide

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THE UNIVERSITY OF MELBOURNE

MELBOURNE SCHOOL OF ENGINEERING