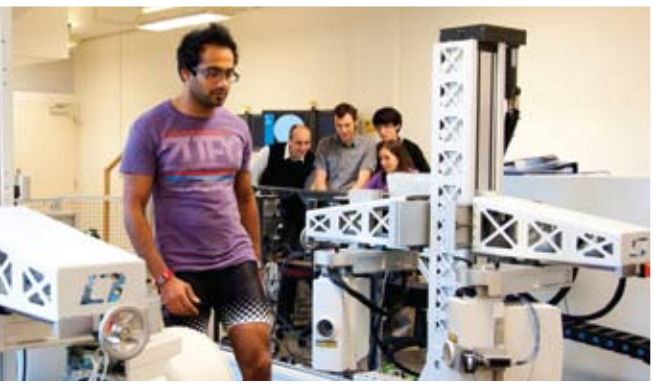
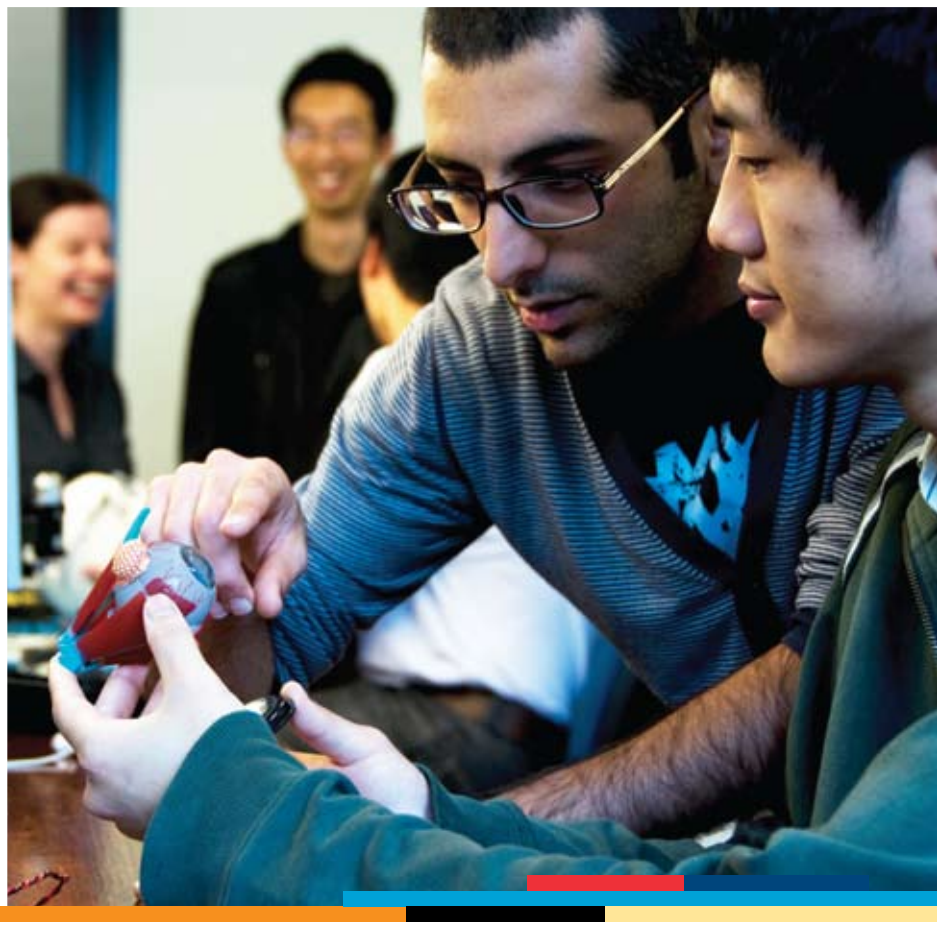
THE UNIVERSITY OF MELBOURNE

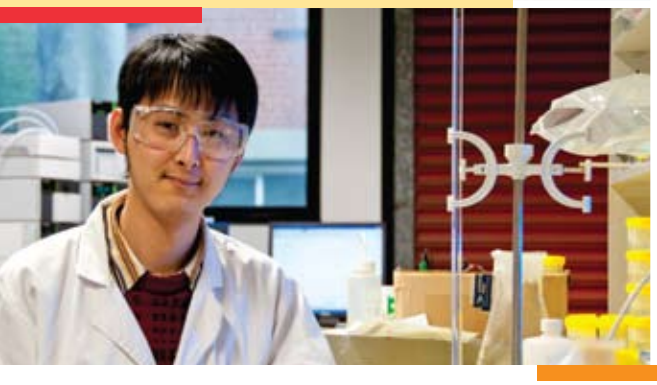
MELBOURNE SCHOOL OF ENGINEERING

Engineering & IT

2013 Course Guide







www.eng.unimelb.edu.au

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This publication should be used as a guide for prospective students seeking information about studying engineering and IT at the Melbourne School of Engineering. The information may change and prospective students are advised to refer to the University of Melbourne online Handbook at http://handbook.unimelb.edu.au.

Welcome to Australia's top Engineering & IT School

The Melbourne School of Engineering (MSE) has come a long way since 1861, when 15 students enrolled in the first engineering classes at Parkville. We are now Australia's leading provider of engineering and IT education and the highest-ranked Australian institution in engineering and IT across three major international rankings (Times Higher Education, Shanghai Jiao Tong and Quacquarelli Symonds).

Our engineering and information technology community is drawn from over 100 countries. It consists of 2,500 students in coursework programs (over 1,000 at the Masters level) and more than 500 students in research training, all supported by over 400 PhD qualified researchers and educators. Our network of nearly 25,000 alumni spans the globe.

The MSE offers an internationally recognised curriculum. The Master of Engineering suite of programs are the only Australian graduate engineering courses to be accredited by Engineers Australia, as well as having EUR-ACE® label European accreditation. Both accreditation systems ensure that our graduates can pursue professional engineering careers all around the world and that our courses are highly-regarded internationally.

Additionally, the Master of Information Systems is accredited by the Australian Computer Society and the accreditation process is underway for the new suite of Master of Information Technology programs.

The MSE offers depth, breadth and flexibility in a unique graduate-model program, with real world, problem-based learning, industry experience and a generous program of scholarships for both local and international students.

The School conducts cutting-edge interdisciplinary research and works with a range of partners from academia, government and leading industry names to address some of society's critical problems. For example, current key projects include the development of the bionic eye, the sustainable city, artificial skin and the green internet.

Whether you are interested in a professional qualification, a career change, expanding your technical skills or pursuing a new interest, a graduate degree from the Melbourne School of Engineering will broaden your horizons, enhance your employment prospects and give you a competitive edge.

We invite you to explore the Melbourne School of Engineering to realise your career goals and to see how you can share in the pursuit of engineering and information technology excellence in the service of humanity.

Welcome!

Professor Iven Mareels
FTSE, FIEEE, FIEAust, CPEng, EngExec
Dean
Melbourne School of Engineering
The University of Melbourne

About the University of Melbourne

Founded in 1853, the University of Melbourne is a top-ranking and high-achieving university, with a history of leadership in research, innovation, teaching and learning. The University's main campus in Parkville is a vibrant precinct, just minutes from the city centre of Melbourne. You will study in an atmosphere of intellectual rigour and benefit from a wealth of cultural, institutional and recreational opportunities.

Rankings

The most prestigious and highly-regarded international rankings of world universities rank the University of Melbourne as no. 1 in Australia*† and no. 37† in the world overall, and no. 4 in the world for graduate employability. #

*Academic Ranking of World Universities 2011.

†Times Higher Education World University Rankings 2011-2012.

#QS World University Rankings 2011.

Teaching

Students benefit from studying in an environment of intellectual achievement and excel through award-winning approaches to teaching and learning. Our ongoing pursuit of new teaching methodologies keeps us at the forefront of higher education. Our graduate professional degree programs and graduate schools provide more intensive and better supported professional and research training.

Research

Our researchers are at the forefront of international scholarship in a diverse range of fields. Our main campus in Parkville is recognised as the hub of Australia's premier knowledge precinct, and includes eight hospitals, many leading research institutes and a wide range of knowledge-based industries. As a University of Melbourne student, you will become part of a dynamic collegial environment in Australia's leading research university.

Campus life

- Our campus community of over 47,000 students, from over 120 countries around the world, is a vibrant multi-cultural environment in which to study and work.
- The University of Melbourne's central location ensures you are close to transport and every amenity possible, including fantastic cafes, arts and sports venues and accommodation.
- Our students are active in clubs and societies, sport, cultural activities and community service.
- More information is available at http://our.melbourne.edu

Student services

A comprehensive range of student support services are available including assistance with:

- Housing and accommodation
- Student financial aid
- Career services
- Health services
- Counselling
- Language and learning skills

Graduates

University of Melbourne graduates are prominent in political, cultural, academic and business arenas throughout the world. High-profile employers from Australia and overseas actively recruit our graduates, who are known for their problem-solving skills, capacity for independent critical thought and leadership potential.

About the Melbourne School of Engineering

Our reputation

The Melbourne School of Engineering attracts students and staff of outstanding ability from around the world and is acknowledged internationally for excellence in research and teaching. We are ranked no 1 in Australia and 25th in the world for engineering and technology according to the Times Higher Education University World Rankings for 2011-12.

Our people

The School has over 250 teaching and research staff, and teaches over 4,000 students. Our academic staff bring a global perspective to curricula and the School community with qualifications and experience from the world's leading universities, such as Cambridge, Oxford, Cornell and Stanford.

Many of our staff are the best in their field, which means you will learn from internationally recognised engineering leaders.

- Professor Frank Caruso is an international expert in advanced nanostructures and biomaterials for applications in biotechnology and medicine. He has been awarded two Federation Fellowships, prestigious appointments allowing researchers to focus on their groundbreaking work, as well as numerous prizes for scientific achievement. He is named in the top 20 materials scientists in the world.
- Laureate Professor Rod Tucker is an international leader in photonics and telecommunications research. Professor Tucker is a multi-award winning, ISI highly cited author, who has made a fundamental contribution to knowledge in his field. He is also the Director of the Institute for a Broadband Enabled Society and the Centre for Energy-Efficient Telecommunications.
- Professor Anthony Burkitt, is a leader in the field of neural engineering and is noted for research into cochlear implant speech processing and computational auditory neuroscience, visual stimulation paradigms for retinal implants and developing methods for detecting and predicting epileptic seizures. Professor Burkitt is the Director of Bionic Vision Australia.

Our research

The Melbourne School of Engineering is a major player in iconic research endeavours such as the bionic eye, global water resource management, renewable energy technologies, carbon capture and storage, nanotechnology-based drug delivery, and next-generation internet technologies. The School is home to many major research centres and institutes of international standing that represent joint ventures between universities, industry and government bodies in Australia. Our researchers are working in many important new multi-disciplinary organisations such as 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 scholarships

In addition to the scholarships offered by the University of Melbourne, the Melbourne School of Engineering offers a generous range of scholarships and prizes for students at all levels from undergraduate to PhD. See page 63 for more information.

Our innovations

In 2012, the Melbourne School of Engineering launched a new program supporting students and recent alumni to translate their bright ideas into commercial reality.

The Melbourne Accelerator Program (MAP) nurtures entrepreneurial ideas, accelerating the journey from idea to market.

More information about MAP is available at http://map.eng.unimelb.edu.au/index.html.

Links with industry

The Melbourne School of Engineering has strong links with industry in research and teaching and many Masters subjects are delivered with the assistance of industry partners in workplace projects. Students will work in teams, on problems assigned by some of Australia's leading companies, such as Google, Ford, Lend Lease Infrastructure and Newcrest, under the supervision of academic and industry professionals. Access to industry practitioners and internships means graduate students learn how to apply theory to practice and can be assured that their studies are relevant, contemporary and well-regarded by employers.

Graduate outcomes

We develop graduates with strong business, technical, analytical and interpersonal skills, in order to meet today's commercial, environmental and technical challenges. Our graduates are highly sought after by employers in Australia and around the world, building successful careers in the engineering and information technology professions, business and a range of other fields.

Our graduates excel in:

- engineering, IT and science fundamentals
- practical ingenuity and creativity
- engineering and IT principles and applications
- analytical and creative problem-solving
- communication, teamwork and collaboration
- business understanding and risk management
- design innovation and project management
- research

Critical skills shortages in the Engineering and IT sectors mean that our graduates are in increasing demand and can be assured of a range of interesting and well-paid employment opportunities. Additionally, they are ideal candidates for careers in business, government, research and management. Our graduates enter the workforce with the ability to lead projects and teams, and the creativity to analyse problems and provide innovative solutions. They are known for their professionalism, understanding of global issues and strong communication skills.

Professional accreditation

Engineers Australia (provisional until first students graduate)	Master of Engineering (in 11 specialisations)
EUR-ACE®	European accreditation of Master of Engineering (in 11 specialisations), Master of Spatial Information Science
Euro-Inf®	Master of Science (Computer Science)
The Australian Computer Society	Master of Engineering (Software), Master of Information Systems, Master of Information Technology (Computing/Distributed/Health/Spatial)*
Royal Institution of Chartered Surveyors (provisional until first students graduate)	Master of Engineering (Geomatics), Master of Spatial Information Science
Surveyors Registration Board of Victoria	Master of Engineering (Geomatics)
Australian Institute of Project Management	Master of Engineering Project Management
IChemE	Master of Engineering (Biomolecular), Master of Engineering (Chemical)

*new course in 2013, accreditation process is underway.

The City of Melbourne

The University of Melbourne is located a few kilometres from the centre of the city of Melbourne; a vibrant global centre of cultural, social, sporting and business life. It is also a short walk to cosmopolitan Lygon Street with its many cafés and restaurants, a stroll to iconic shopping strip, Brunswick Street in Fitzroy and a short tram ride to the multicultural hub of Sydney Road, to the north of the city, or St Kilda and its many attractions, to the south.

In 2012, Melbourne has been credited as the most liveable city in the world by the Economist Intelligence Unit, rising from second place in 2011. Melbourne is a safe place to live and study. It is the second largest city in Australia and a multicultural melting pot, home to students from many backgrounds and cultures.

Melbourne is the cultural capital of Australia, and is host to theatre, film, arts and comedy festivals. It is home to Australia's largest entertainment precinct, located near the Yarra River, including the National Gallery of Victoria, the Victorian Arts Centre, the Melbourne Theatre Company, the Australian Ballet, the Australian Centre for the Moving Image, the Australian Opera, the Australian Broadcasting Corporation and the Melbourne Symphony Orchestra.

Melbourne is also the sporting capital of Australia and is home to Australian Rules football, the Formula One Grand Prix, A-League Soccer and the Australian Tennis Open. Melbourne is also well known for the range and quality of food and cuisine available in its restaurants, cafes and markets. Many beautiful parks and gardens add another dimension to the attractions of the city.

Melbourne is a great place to live and study.

More information is available at:

- www.visitmelbourne.com.au
- www.thatsmelbourne.com.au

The Student Experience

Global Mobility Program (Exchange and Study Abroad)

Studying overseas for a semester or a year will enhance your degree and give you the opportunity to make friends from all over the world. The University has exchange partnerships with over 140 institutions in 37 countries across the world.

Studying overseas can be a truly eye opening experience and Engineering has a comprehensive support network to get you started. As an exchange and study abroad student you have the opportunity to:

- Spend a semester or a full year at one of our partner institutions from around the world
- Explore a new country and culture
- Gain credit towards your Melbourne School of Engineering degree
- Experience new and different teaching and learning styles
- Learn a new language.

Start planning early in your degree and find out as much possible. The Global Mobility website has a list of partner institutions, which you can search by discipline, to assist you in your choice.

Speak to as many people as you can about your exchange/study abroad plans, such as returned exchange students, academic course coordinators, your family and friends and the Global Mobility Program Coordinator located at the Engineering Student Centre.

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. For more information, please refer to the Student Mobility website at www.mobility.unimelb.edu.au or contact the Engineering Global Mobility Coordinator, eng-exchange@unimelb.edu.au.

Sporting facilities

The University of Melbourne's sporting facilities are among the best in Melbourne. The Beaurepaire Centre includes a 25-metre six-lane heated indoor lap pool, a large strength and fitness gym and it overlooks the athletic track and sports field. There are four dedicated group fitness studios, six squash courts and massage and physio services.

Whether you're a serious athlete or simply want to learn a new outdoor adventure skill, our sporting clubs deliver fun, friendship and fitness across many sports.

More information is available at www.sports.unimelb.edu.au.

Leadership and volunteering

There are a lot of leadership and volunteering opportunities at the University of Melbourne. Get involved, develop new skills and knowledge, and form new friendships, while you enhance your CV. More information is available at www.services.unimelb.edu.au/live.

Careers and employment service

The University of Melbourne Careers and Employment service offers a range of services to help you develop a career plan, understand your career options, search for work, complete a job application, prepare for an interview, or access the employment database. Information is available at www.careers.unimelb.edu.au.

In addition, the Melbourne School of Engineering offers a range of career support for students, which includes: a comprehensive series of industry career panels, in which companies share their insights about career pathways, recruitment processes and industry perspectives; a student-run Industry Night for students to network with industry; and access to a dedicated careers counsellor. More information about the Careers Program is available at www.eng.unimelb.edu.au/industry/students/careers-programs.html.

MSE Facilities and Services

The Melbourne School of Engineering has a range of new facilities for students including:

- a suite of new learning spaces
- a graduate lounge and informal study areas to promote team work, group study and networking
- a dedicated Student Services Centre
- access to computer laboratories.

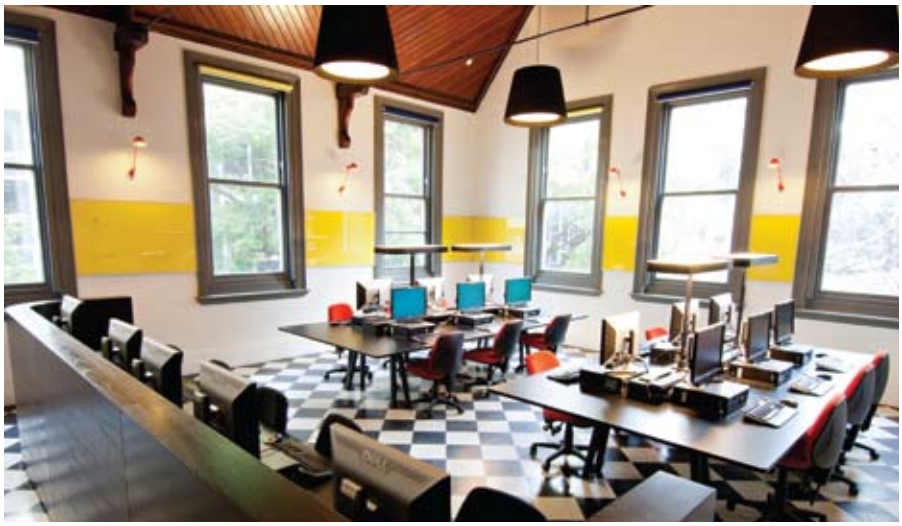
Services

The Melbourne School of Engineering offers many services and opportunities to enhance your campus experience and complement your studies, including:

- language and learning skills advisers based within the School
- an Engineering Scholarships and Prizes Officer
- a Careers Consultant
- a range of engineering student clubs and societies.

For more information about student services, visit www.services.unimelb.edu.au.

For more information about international student support services, visit www.services.unimelb.edu.au/international.



Clubs and societies

As an engineering student you will have access to some fantastic clubs and societies with a diverse range of interests and activities throughout the year. Some of these clubs currently include:

- Engineers Without Borders (University of Melbourne chapter) www.ewb.org.au/explore/chapters/unimelb
- Melbourne University Young Engineers (MUYE) www.muye.eng.unimelb.edu.au
- Engineering Music Society (EMS) ems.org.au
- Melbourne University Engineering Student Club (MUESC) www.engclub.org
- International Engineering Students Society (IESS) www.iess.eng.unimelb.edu.au
- Women in Science and Engineering (WISE) wise-unimelb.com
- IT students may be interested in joining the Information Technology Society mailing list: infotechsociety@gmail.com

Choosing a Graduate Program

The Melbourne School of Engineering offers a range of graduate degrees by coursework and research, in a vibrant and collegial environment.

Professional entry masters programs

Professional entry masters programs by coursework are designed to provide graduates with a formal qualification in engineering, information systems, information technology, and spatial information science at the masters level.

The Melbourne School of Engineering offers four professional entry masters programs: the Master of Engineering (in 11 streams), the Master of Information Systems the Master of Information Technology (in four streams) and the Master of Spatial Information Science.

Specialised masters programs

Our specialised masters by coursework are designed for qualified engineers and IT practitioners keen to deepen their knowledge of a specialist area or to engage in new fields of study. Coursework degrees are gained by subject-based study, but some research project work may be incorporated and entry pathways to research degrees are available.

In particular these masters programs will suit graduates who wish to:

- update their professional knowledge and skills
- enhance their career opportunities
- switch disciplines within their field.

Specialised masters by coursework are available in the fields of: Energy Systems; Engineering Management; Engineering Project Management; Engineering Structures; Environmental Engineering; Information and Communication Technology; Nanoelectronic Engineering; and Telecommunications Engineering.

Research degrees

Master of Philosophy (MPhil) – Engineering

The MPhil is an internationally recognised masters by research program that provides students with the opportunity to carry out an independent and sustained research project under supervision, throughout which they will develop advanced research skills and techniques, and present findings in a documented, scholarly format.

Doctor of Philosophy (PhD)

The PhD is designed for graduates to demonstrate academic leadership, independence, creativity and innovation in their research work. In addition, professional doctoral studies provide advanced training designed to build expertise in a specialist area, while encouraging the acquisition of a wide range of advanced and transferable skills.

The PhD thesis demonstrates authority and contributes to knowledge in the candidate's field. The PhD thesis is deeper and more comprehensive in scope than the Master's thesis. See page 60 for more details about research degrees.

What are subject points?

A typical University of Melbourne subject is worth 12.5 points. A full-time load for one year is 100 points, which is usually divided into eight subjects of 12.5 points each, taken over 2 semesters of 50 points (4 subjects) each. This standard University-wide point system was introduced to ensure an equitable workload for students.

Professional Master of Engineering (ME)

The professional Master of Engineering offers an accredited* engineering qualification for graduates seeking entry into the engineering profession, in the following 11 streams: Biomedical, Biomolecular, Chemical, Civil, Electrical, Environmental, Geomatics, Mechanical, Mechatronics, Software and Structural.

The Master of Engineering will suit:

- graduates of the University of Melbourne with an appropriate Engineering Systems major or breadth sequence
- holders of an undergraduate degree from any university with the appropriate maths and science background
- engineers wishing to upgrade their skills and knowledge or make a career change (see also, specialised masters courses).

The Master of Engineering offers you:

- an advanced program with 11 specialisations
- dual accreditation, for professional recognition around the world
- a curriculum, developed in consultation with industry to create engineers ready for the future
- continuous exposure to industry through lectures, projects and internships
- practical experiences through hands-on workshops, design projects, field trips and site visits
- research projects involving you with cutting-edge research and world-class researchers
- professional skills development including team work and communication
- a generous scholarship program for local and international students
- Commonwealth supported places for local students.

Professional accreditation

The Master of Engineering is provisionally accredited by Engineers Australia, full accreditation will be granted when the first students graduate from the program.* The program is internationally recognised in twelve of the world's leading economies, including the United States, the United Kingdom, Canada, Japan, and Singapore, allowing graduates to practice professionally in these countries. Our professional Master of Engineering also has European Accreditation, having been awarded the EUR-ACE® label, opening up further exciting career opportunities for our graduates and confirming that our programs meet high European and international professional standards.

Credit towards the ME program

The Master of Engineering is a 300 point or three year program. The first 100 points (one year) is made up of foundation study tailored to students from non-engineering backgrounds.

Many students who enter the program will have some prior study in engineering, which will allow them to receive credit for up to the first year of the program, reducing the program to two years. Students who have studied at an institution other than the University of Melbourne must supply a copy of engineering subject description details from their institution's subject handbook with their course application, for a credit assessment to be made.

Skills Towards Employment Program (STEP)

The Skills Towards Employment Program (STEP) is designed for engineering students to develop critical professional skills in:

- Verbal communication
- Written communication
- Team work
- Personal and project management.

The program will run concurrently with studies in the Master of Engineering (ME) and will also be available to undergraduate students, who are doing an engineering major or sequence of study and are intending to do the ME.

"Graduates of the professional Master of Engineering are educated to make a real difference in the world, entering the profession at an advanced level, better able to contribute to the challenges of our age and succeed in a global context."

Professor Iven Mareels,
Dean of Engineering

STEP will assist students to develop an ePortfolio in a structured and incremental way; a hurdle requirement in the ME, as well as providing graduates with the skills for a successful career in industry.

Quick Reference Guide to Graduate Programs

Program Name	Overview	Key Entry Requirements[1]	Mode and Duration	Entry	2013 Course Fees[2]	Page No.
COURSEWORK PROGRAMS						
BIOMEDICAL ENGINEERING						
Master of Engineering (Biomedical) Professional entry program **Accredited by** Engineers Australia* and EUR-ACE®	This program trains you to apply engineering techniques and analyses to problem-solving in medicine and the biomedical sciences, bridging the gap between technology, medicine and biology. Key topics include biomechanical engineering, bioengineering, bioinformatics, biocellular engineering, biosignals, neuroengineering and clinical engineering.	**University of Melbourne:** An undergraduate degree in Commerce, Science or Biomedicine with a Bioengineering Systems major or sequence and an average of 65% in the final two years. **Other Universities:** An undergraduate degree with an average grade of 65% in the final two years including the equivalent of 25 points (2 subjects) of first year mathematics, specifically Calculus 2 and Linear Algebra (or equivalent) and 25 points (2 subjects) of first year Biology or Chemistry (or equivalent).	Coursework: 2-3 years full-time.[3] Available part-time.	Semester 1, Semester 2	Local: CSP or $26,976 International: $33,184	Pg 18
CHEMICAL AND BIOMOLECULAR ENGINEERING						
Master of Engineering (Biomolecular) Professional entry program **Accredited by** Engineers Australia*, EUR-ACE® and IChemE	This program explores the development of large-scale processes using microbial, plant or animal cells for applications in fields including biotechnology, food and beverages, pharmaceuticals, petrochemicals, minerals, energy, health and the enviroment.	**University of Melbourne:** An undergraduate degree in Commerce or Science with a Chemical Systems major or sequence and an average of 65% in the final two years. **Other Universities:** An undergraduate degree with an average grade of 65% in the final two years including the equivalent of 25 points (2 subjects) of first-year mathematics, specifically Calculus 2 and Linear Algebra (or equivalent) and 25 points (2 subjects) of first year Chemistry (or equivalent).	Coursework: 2-3 years full-time. [3] Available part-time.	Semester 1, Semester 2	Local: CSP or $26,976 International: $33,184	Pg 22
Master of Engineering (Chemical) Professional entry program **Accredited by** Engineers Australia*, EUR-ACE® and IChemE	This program investigates the invention, design and implementation of chemical processes through which raw materials are converted into valuable products, such as food, petrol, plastics, paints, paper, ceramics, minerals and metals.	**University of Melbourne:** An undergraduate degree in Commerce or Science with a Chemical Systems major or sequence and an average of 65% in the final two years. **Other Universities:** An undergraduate degree with an average grade of 65% in the final two years including the equivalent of 25 points (2 subjects) of first-year mathematics, specifically Calculus 2 and Linear Algebra (or equivalent) and 25 points (2 subjects) of first year Chemistry (or equivalent).	Coursework: 2-3 years full-time. [3] Available part-time.	Semester 1, Semester 2	Local: CSP or $26,976 International: $33,184	Pg 23
CIVIL AND STRUCTURAL ENGINEERING						
Master of Engineering (Civil) Professional entry program **Accredited by** Engineers Australia* and EUR-ACE®	This program covers the design and creation of infrastructure to support our society. Sub-disciplines include sustainability, environmental processes, geotechnical and hydraulic engineering, transport and project management.	**University of Melbourne:** An undergraduate degree in Commerce, Environments, or Science with a Civil Systems major or sequence and an average of 65% in the final two years. **Other Universities:** An undergraduate degree with an average grade of 65% in the final two years including the equivalent of 25 points (2 subjects) of first-year mathematics, specifically Calculus 2 and Linear Algebra (or equivalent) and 25 points (2 subjects) of first year science subjects (any).	Coursework: 2-3 years full-time.[3] Available part-time.	Semester 1, Semester 2	Local: CSP or $26,976 International: $33,184	Pg 26

Professional accredited career entry programs | Specialised programs for career change or professional development

Program Name	Overview	Key Entry Requirements[1]	Mode and Duration	Entry	2013 Course Fees[2]	Page No.
COURSEWORK PROGRAMS						
CIVIL AND STRUCTURAL ENGINEERING (continued)						
Master of Engineering (Structural) Professional entry program **Accredited by** Engineers Australia* and EUR-ACE®	This program applies mathematical and scientific principles to the design, development and evaluation of materials and systems used in building load-bearing structures such as roads, buildings, rail lines, dams and bridges.	**University of Melbourne:** An undergraduate degree in Commerce, Environments or Science with a Civil Systems major or sequence and an average of 65% in the final two years. **Other Universities:** An undergraduate degree with an average grade of 65% in the final two years including the equivalent of 25 points (2 subjects) of first-year mathematics, specifically Calculus 2 and Linear Algebra (or equivalent) and 25 points (2 subjects) of first year science subjects (any).	Coursework: 2-3 years full-time.[3] Available part-time.	Semester 1, Semester 2	Local: CSP or $26,976 International: $33,184	Pg 27
Master of Engineering Structures Specialised program	This program is designed to meet the needs of graduates in disciplines associated with the advanced design of engineering structures (such as civil and structural engineering), who require advanced knowledge of structural issues, such as ecologically sustainable buildings and design of structures for extreme loading, caused by earthquake, wind, fire and explosion.	A four-year undergraduate degree in Structural or Civil Engineering with an average of at least 65% (or equivalent). In addition, Civil Engineering graduates must have one year of relevant work experience, or 30% of the final year of the degree dedicated to structural engineering subjects. A three-year undergraduate degree in Structural or Civil Engineering with an average of at least 65% (or equivalent). Structural engineering graduates must have at least two years of full-time documented and relevant professional work experience since graduation; Civil engineering graduates must have at least three years of full-time documented and relevant professional work experience since graduation experience.	Coursework: 1 year full-time. Available part-time.	Semester 1, Semester 2	Local: $26,976 International: $33,184	Pg 28
ELECTRICAL AND ELECTRONIC ENGINEERING						
Master of Engineering (Electrical) Professional entry program **Accredited by** Engineers Australia* and EUR-ACE®	This program examines the design, implementation and management of systems that exploit electrical phenomena to meet practical needs, including systems for the distribution of power, telecommunications and information processing, on both very large and very small scales.	**University of Melbourne:** An undergraduate degree in Commerce or Science with an Electrical Systems major or sequence and an average of 65% in the final two years. **Other Universities:** An undergraduate degree with an average grade of 65% in the final two years including the equivalent of 25 points (2 subjects) of first-year mathematics, specifically Calculus 2 and Linear Algebra (or equivalent) and 25 points (2 subjects) of first year Physics (or equivalent).	Coursework: 2-3 years full-time.[3] Available part-time.	Semester 1, Semester 2	Local: CSP or $26,976 International: $33,184	Pg 31
Master of Nanoelectronic Engineering Specialised program	This program enables electrical engineering graduates to specialise in the design of nanoelectronic integrated circuits and systems. Nanoelectronic systems are critical in areas such as medicine, the environment, aerospace, wireless and photonic communication systems and automotive applications.	A four-year undergraduate Electrical Engineering degree with a final year average of 65% (or equivalent). An undergraduate degree in an appropriate discipline and at least two years of full-time, documented and relevant work experience.	Coursework: 1.5 year full-time. Available part-time.	Semester 1, Semester 2	Local: $26,976 International: $33,184	Pg 32

Program Name	Overview	Key Entry Requirements[1]	Mode and Duration	Entry	2013 Course Fees[2]	Page No.
COURSEWORK PROGRAMS						
ELECTRICAL AND ELECTRONIC ENGINEERING (continued)						
Master of Tele-communications Engineering Specialised program	This program is for electrical and electronic engineering graduates who wish to develop their knowledge and skills base in optimal network design, network management and network security for modern telecommunications networks.	A four-year electrical engineering degree with a final year average of at least 65% (or equivalent).	Coursework: 1 year full-time. Available part-time.	Semester 1, Semester 2	Local: $26,976 International: $33,184	Pg 33
ENERGY						
Master of Energy Systems Specialised program	This program integrates the study of the technology, business and science of energy, focusing on the key areas of: evaluating energy systems; energy-related investment decisions; policy development and implementation; and greenhouse gas management issues.	An undergraduate degree in a relevant discipline, such as Commerce, Science or Engineering, with at least a 70% average, including at least 12.5 points (1 subject) of mathematics, statistics or another quantitative subject at an appropriate level, or equivalent. An undergraduate degree in a relevant discipline, such as Commerce, Science or Engineering, with at least a 65% average average, including at least 12.5 points (1 subject) of mathematics, statistics or another quantitative subject at an appropriate level and 2 years of continuous documented work experience in an applicable field, or equivalent.	Coursework: 1.5 years full-time. Available part-time.	Semester 1	Local: $26,976** International: $33,184 **A number of CSPs will be available.	Pg 35
ENGINEERING MANAGEMENT						
Master of Engineering Management Specialised program	This program equips the engineer or scientist with the skills required at management levels of technology-based enterprises. It bridges the gap in business knowledge between engineering, technology and management.	A four-year undergraduate degree in Engineering or an appropriate discipline with an average of at least 65% (or equivalent). A three-year undergraduate degree in an appropriate discipline with an average of 65% (or equivalent) with at least two years of full-time documented and relevant work experience since graduation.	Coursework: 1 year full-time. Available part-time.	Semester 1, Semester 2	Local: $26,976 International: $33,184	Pg 38
Master of Engineering Project Management Specialised program **Accredited by** Australian Institute of Project Management	This program provides graduates with an advanced understanding of the theoretical and practical principles of the project management function. This includes understanding the whole process of project procurement, project team leadership skills, establishment of staff employment conditions, and the development of appropriate mechanisms and styles for project management.	A four-year undergraduate degree in engineering or an appropriate discipline with an average of 65% (or equivalent). A three-year undergraduate degree in an appropriate discipline with an average of 65% (or equivalent) and at least two years of full-time, relevant and documented work experience since graduation.	Coursework: 1 year full-time. Available part-time.	Semester 1, Semester 2	Local: $26,976 International: $33,184	Pg 39

Professional accredited career entry programs | Specialised programs for career change or professional development

Program Name	Overview	Key Entry Requirements[1]	Mode and Duration	Entry	2013 Course Fees[2]	Page No.
COURSEWORK PROGRAMS						
ENVIRONMENTAL ENGINEERING						
Master of Engineering (Environmental) Professional entry program **Accredited by** Engineers Australia* and EUR-ACE®	This program teaches engineering approaches to the sustainable solution of environmental challenges. Key topics include hydrology, irrigation, water and waste management. The course has a strong focus on sustainability and project management.	**University of Melbourne:** An undergraduate degree in Commerce, Environments or Science with a Civil or Physical Systems major or sequence and an average of 65% in the final two years. **Other Universities:** An undergraduate degree with an average grade of 65% in the final two years including the equivalent of 25 points (2 subjects) of first-year mathematics, specifically Calculus 2 and Linear Algebra (or equivalent) and 25 points (2 subjects) of first year science (any).	Coursework: 2-3 years full-time. [3] Available part-time.	Semester 1, Semester 2	Local: CSP or $26,976 International: $33,184	Pg 42
Master of Environmental Engineering Specialised program	This program provides graduates with advanced knowledge of the principles underpinning sustainable development and the opportunity to gain employment skills in the engineering practice of environmental management. Themes include: air pollution, water and wastewater, municipal solid wastes, cleaner production, environmental management systems, noise, vibration, water resources management, energy resources management, politics, law and the economy.	A four-year undergraduate degree in Engineering with an average of 65% (or equivalent). A three-year undergraduate degree in an appropriate discipline with an average of 65% (or equivalent) and at least two years of full-time, documented and relevant work experience.	Coursework: 1 year full-time. Available part-time.	Semester 1 , Semester 2	Local: $26,976 International: $33,184	Pg 43
GEOMATICS AND SPATIAL INFORMATION SCIENCE						
Master of Engineering (Geomatics) Professional entry program **Accredited by** Engineers Australia*, EUR-ACE®, Royal Institution of Chartered Surveyors*and Surveyors Registration Board of Victoria	This program teaches the science and technological application of measurement, mapping and visualisation, such as satellite and photographic image processing, 3D computer visualisations and global positioning systems.	**University of Melbourne:** An undergraduate degree in Environments or Science with a Geomatics major and an average of 65% in the final two years. **Other Universities:** An undergraduate degree with an average grade of 65% in the final two years including the equivalent of 25 points (2 subjects) of first-year mathematics (any) and 25 points (2 subjects) of first year science (any).	Coursework: 2-3 years full-time. [3] Available part-time.	Semester 1, Semester 2	Local: CSP or $26,976 International: $33,184	Pg 46
Master of Geographic Information Technology Specialised program	This program is for graduates employed in the disciplines associated with land administration, environmental management, natural resources management, urban planning and conservation, who wish to gain a detailed knowledge of the theory, technology and application of geographic information systems (GIS).	A four-year undergraduate degree in an appropriate discipline. A three year degree and at least two years of full-time, documented and relevant work experience.	Coursework: 1 year full-time. Available part-time.	Semester 1, Semester 2	Local: $26,976 International: $33,184	Pg 47

Program Name	Overview	Key Entry Requirements[1]	Mode and Duration	Entry	2013 Course Fees[2]	Page No.
COURSEWORK PROGRAMS						
GEOMATICS AND SPATIAL INFORMATION SCIENCE (continued)						
Master of Spatial Information Science Professional entry program **Accredited by** Royal Institution of Chartered Surveyors* and EUR-ACE®	This program provides an opportunity for graduates from a wide variety of backgrounds to study spatial information combined with specialisations including economics, psychology, computer science, planning, civil engineering or geomatics.	A three-year undergraduate degree in an appropriate discipline with an average of 65% (or equivalent).	Coursework: 2 years full-time. Available part-time.	Semester 1, Semester 2	Local: $26,976** International: $33,184 **A number of CSPs will be available.	Pg 48
INFORMATION TECHNOLOGY						
Master of Engineering (Software) Professional entry program **Accredited by** Engineers Australia*, EUR-ACE® and the Australian Computer Society	This program combines an understanding of computer science, design, engineering management, mathematics and psychology to manage the development, maintenance and production of large-scale software systems.	**University of Melbourne:** An undergraduate degree in Commerce or Science with a Computing and Software Systems major or sequence and an average of 65% in the final two years. **Other Universities:** An undergraduate degree with an average grade of 65% in the final two years including the equivalent of 25 points (2 subjects) of first-year mathematics (any), and 25 points (2 subjects) of computing, computer science, programming (or equivalent).	Coursework: 2-3 years full-time.[3] Available part-time.	Semester 1, Semester 2	Local: CSP or $26,976 International: $33,184	Pg 51
Master of Information Systems Professional entry program **Accredited by** Australian Computer Society	This program is for students who wish to train as practitioners and consultants in digital business, in roles such as: Information Technology Managers who support, manage and change business processes through information technology and systems.	An undergraduate degree in any discipline with at least H3 (65%) average in the final year of study or equivalent.	Coursework: 2 years full-time.† Available part-time. †1-1.5 year programs are available for eligible applicants, refer to University Handbook for details.	Semester 1, Semester 2	Local: $20,640** International: $30,048 **A number of CSPs will be available.	Pg 52
Master of Information Technology[4] (Computing/ Distributed/ Health, Spatial) Professional entry program Australian Computer Society accreditation is underway.	The Master of Information Technology (MIT) is a new program for creative students that are passionate about cutting edge technology and its applications in solving real world problems across all areas of business, government, health and society. The MIT is available in four specialisations: • Computing • Distributed • Health • Spatial	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). (200 point program) 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). (150 point program) 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: studies in the area of specialisation at an advanced undergraduate level or higher; or at least two years of documented work experience in the area of specialisation. (100 point program)	Coursework: 2 years full-time.† Available part-time. †1-1.5 year programs are available for eligible applicants, refer to University Handbook for details.	Semester 1, Semester 2	Local: $26,976** International: $33,184 **A number of CSPs will be available.	Pg 53-54

Professional accredited career entry programs | Specialised programs for career change or professional development

Program Name	Overview	Key Entry Requirements[1]	Mode and Duration	Entry	2013 Course Fees[2]	Page No.
COURSEWORK PROGRAMS						
INFORMATION TECHNOLOGY (continued)						
Master of Science (Computer Science) Research pathway **Accredited by** Euro-Inf®	This program consists of advanced research training, specialised coursework studies and professional skills development to prepare graduates with a career in computer science research or industry.	An undergraduate degree with a major in computer science, with at least 65% average in the major (or equivalent).	Coursework: 2 years full-time. Available part-time.	Semester 1, Semester 2	Local: $26,976** International: 30,912 **A number of CSPs will be available.	Pg 55
MECHANICAL ENGINEERING AND MECHATRONICS						
Master of Engineering (Mechanical) Professional entry program **Accredited by** Engineers Australia* and EUR-ACE®	This program focuses on turning energy into power and motion. Key topics include generation, conversion and use of energy, as well as the design, construction and operation of devices and systems.	**University of Melbourne:** An undergraduate degree in Commerce or Science with a Mechanical Systems major or sequence and an average of 65% in the final two years. **Other Universities:** An undergraduate degree with an average grade of 65% in the final two years including the equivalent of 25 points (2 subjects) of first-year mathematics, specifically Calculus and Linear Algebra (or equivalent) and 25 points (2 subjects) of first year physics (or equivalent).	Coursework: 2-3 years full-time. [3] Available part-time.	Semester 1, Semester 2	Local: CSP or $26,976 International: $33,184	Pg 58
Master of Engineering (Mechatronics) Professional entry program **Accredited by** Engineers Australia* and EUR-ACE®	This program blends the disciplines of mechanical, electrical and software engineering around the principles of control systems and automation, to create and work with systems that have various degrees of automation and computer control, such as robots, automobiles and CNC machines.	**University of Melbourne:** An undergraduate degree in Science with a Mechanical or Software or Electrical Systems major and an average of 65% in the final two years. **Other Universities:** n undergraduate degree with an average grade of 65% in the final two years including the equivalent of 25 points (2 subjects) of first-year mathematics, specifically Calculus 2 and Linear Algebra (or equivalent) and 25 points (2 subjects) of first year physics (or equivalent).	Coursework: 2-3 years full-time. [3] Available part-time.	Semester 1, Semester 2	Local: CSP or $26,976 International: $33,184	Pg 59
RESEARCH PROGRAMS						
MPhil – Engineering	Masters by Research degrees allow graduates to define and manage a research project characterised by originality and independence.	A four-year undergraduate Honours-level degree in a discipline appropriate to the proposed research with an average of 75% (or equivalent). Completion of the University of Melbourne's Master of Engineering with a minimum average of 75% (or equivalent).	Research normally 1.5 to 2 years full-time.	Semester 1, Semester 2, Flexible	International: $34,080	Pg 60
PhD	Doctoral research projects are for graduates who demonstrate academic leadership, independence, creativity and innovation in their research work.	A four-year undergraduate Honours-level degree in a discipline appropriate to the proposed research with an average of 75% (or equivalent). Completion of the University of Melbourne's Master of Engineering with a minimum average of 75% (or equivalent).	Research 3 years full-time.	Semester 1, Semester 2, Flexible	International: $34,080	Pg 60

[1] Entry requirements listed are a guide only and may be subject to change for 2013 entry. Students must also meet English language requirements (see page 65). Required grades listed are equivalent to University of Melbourne grades. Calculus 2 is a University of Melbourne subject. A subject description is available at https://handbook.unimelb.edu.au/view/current/MAST10006. Linear Algebra is a University of Melbourne subject. A subject description is available at https://handbook.unimelb.edu.au/view/current/MAST10007.

[2] Course fees are indicative only and may vary with subject selection. Fees shown are for 2013 and are shown as course fee per year. One year is equivalent to a standard annual full-time load of 100 points or 1 EFTSL (Equivalent Full-Time Student Load). Please note, Commonwealth Supported Places (CSP) rates for 2013 were not known at the time of publishing and are available at http://www.futurestudents.unimelb.edu.au/admissions/fees.

[3] Credit for students with a first degree or prior study in engineering will be determined upon application. You must supply syllabus subject descriptions of the subjects you have undertaken from your institution of instructions subject handbook.

[4] The University is seeking CRICOS registration for this course. International students can only enrol in this course, once a CRICOS code has been allocated.

*Provisionally accredited, full accreditation will be granted when the first students graduate.

Biomedical Engineering

Rapid advances in the understanding of the building blocks of life, basic cellular processes, new biomaterials and the widespread availability of high-speed computers has led to the current revolution in the biomedical sciences and medicine.

Biomedical engineering at the Melbourne School of Engineering focuses on the following sub-disciplines:

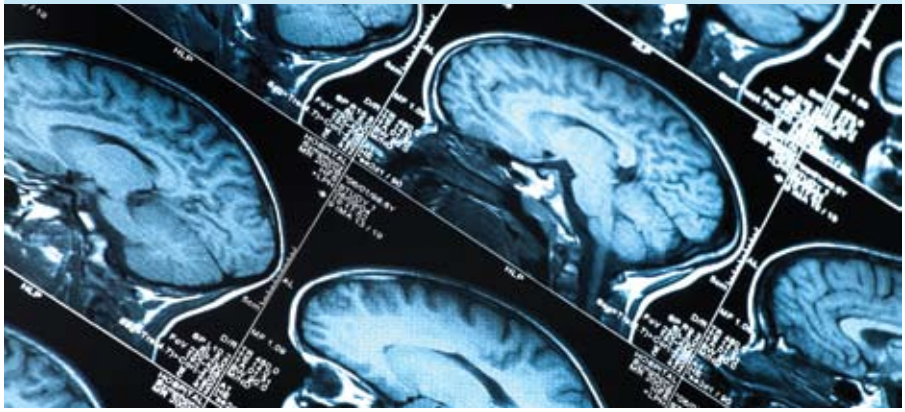
- biomechanics – applying the principles of mechanics to understanding function of cell and whole organ systems in their healthy and diseased states;
- biomaterials – creating the biomedical structures, materials and devices to replace a biological function;
- biosignals – developing the software and technology to monitor physiological activity such as brain activity (EEG and neuroimaging), heart rate (ECG) and muscle activity (EMG);
- computational bioengineering – using computational technology to model, investigate and provide medical solutions to biological systems.

Associate Professor David Grayden

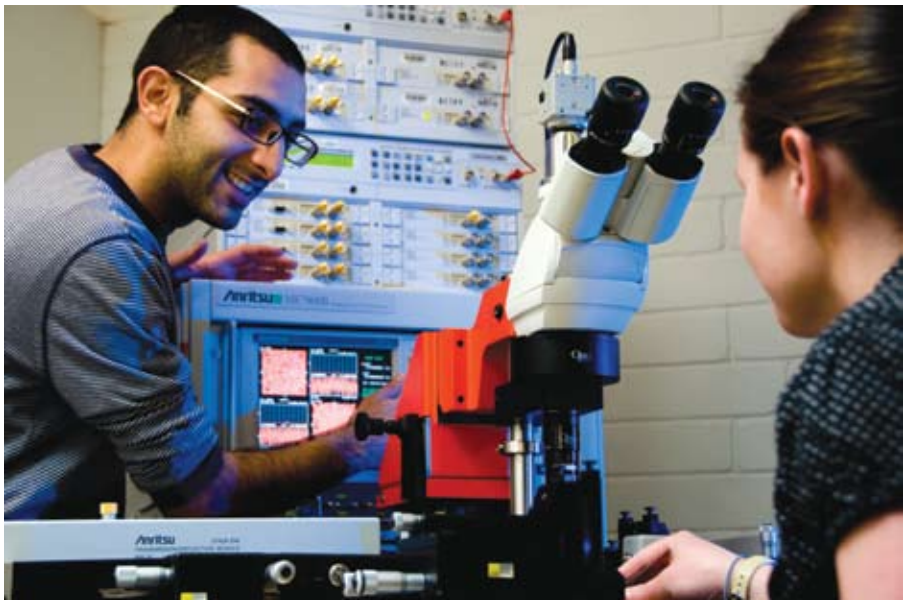
Associate Professor David Grayden is Deputy Head (Academic) of the Department of Electrical and Electronic Engineering and the discipline of Biomedical Engineering at the Melbourne School of Engineering. He is the Academic Program Coordinator of the Master of Engineering (Biomedical) and the Master of Engineering (Electrical).

Associate Professor Grayden is interested in understanding how the brain processes information and how to best present information to the brain using medical bionics, such as the bionic ear and eye. He also conducts research into epileptic seizure prediction and electrical stimulation to stop or prevent epileptic seizures.

"The Biomedical Engineering programs at Melbourne offer background in all areas of biomedical engineering: biosignals, biocellular, biomechanics and bioinformatics. This gives students enormous versatility to choose to develop their own particular area of interest. Biomedical Engineering is an exciting field because it offers huge opportunities for multidisciplinary research, development and industry applications, as well as having enormous potential to make a positive impact on human health."



Professor Anthony Burkitt (centre) and a team of researchers, who are working on the bionic eye project.



Farhad Goodarzy

Biomedical Engineering PhD student Farhad Goodarzy, from the Department of Electrical and Electronic Engineering, is working on the bionic eye project as a radio frequency electronic designer, which includes designing micro- and nano-electronic circuits to be used in the implanted bionic eye chip. Farhad said that his work requires detailed knowledge of electronic circuits and devices, combined with skills in mathematics, telecommunications and biomedicine.

"This project is iconic Australian research bringing together both state-of-the-art research outcomes and top-end industrial fabrications. I am working with a research group of electrical engineers at the University of Melbourne, designing a high acuity bionic eye device. It contains 1000 electrodes, occupies 5 square mm of space and consumes only 5mW of power."

Left: Farhad Goodarzy and Fu Meng, PhD students working on the bionic eye project.

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 at the cutting-edge of modern science and technology, and making a rewarding contribution to humanity."

Coursework programs in Biomedical Engineering

Master of Engineering (Biomedical)

The Master of Engineering (Biomedical) is designed to provide students with a formal qualification in engineering at the Masters level. Biomedical engineers apply engineering techniques and analyses to problem-solving in medicine and the biomedical sciences, bridging the gap between technology, medicine and biology. In this program, students may choose to focus on areas including biomechanical engineering, bioengineering, bioinformatics, biocellular engineering, biosignals, neuroengineering or clinical engineering. Our reputation for biomedical innovation in areas such as developing the bionic ear and eye, and targeted drug delivery systems, ensures students are learning from leaders in the field.

Dual accreditation with Engineers Australia (provisional, until first students graduate) and EUR-ACE® allows graduates of the Master of Engineering, to practice as professional engineers in many countries around the world.

Career outcomes

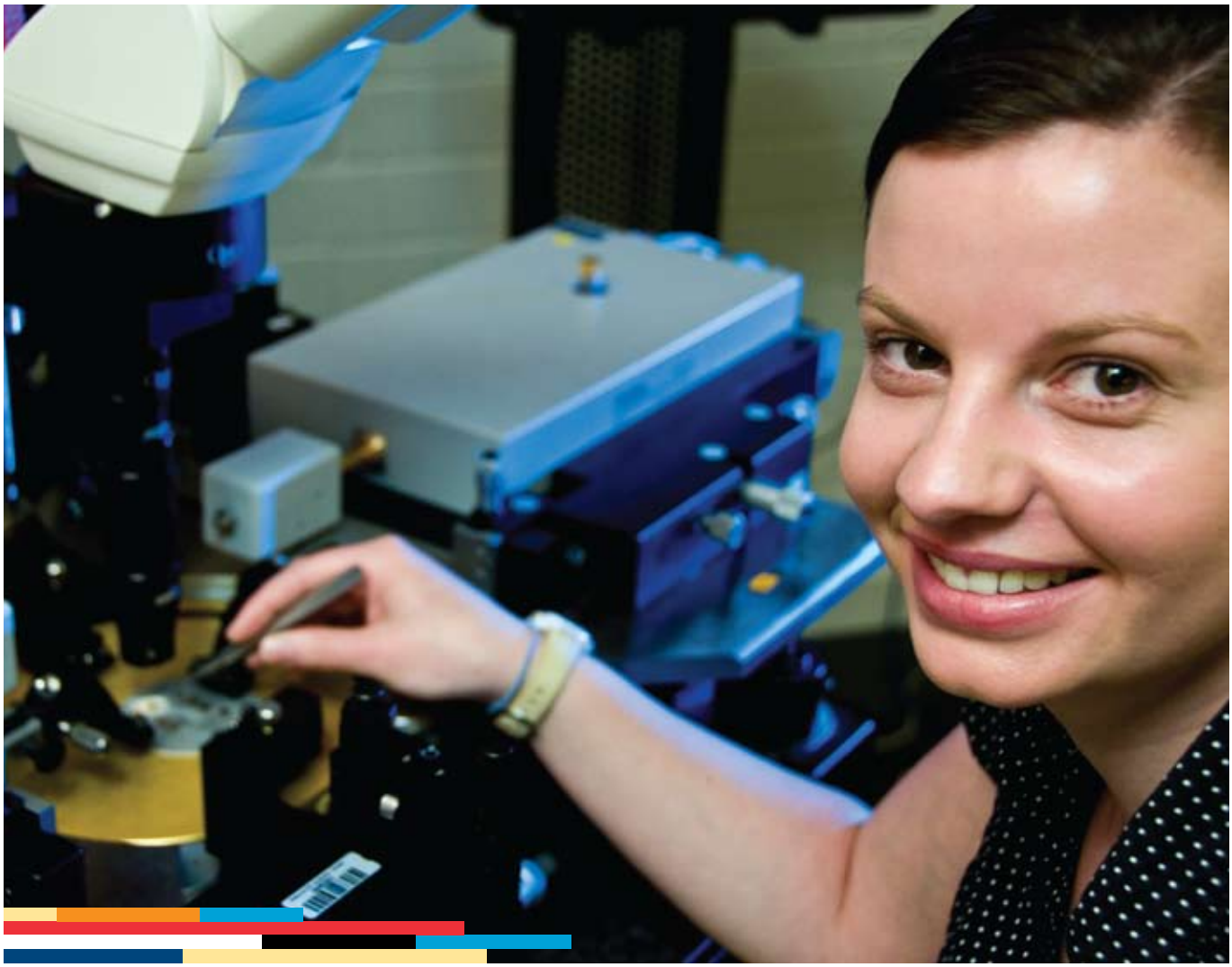
Biomedical engineers use chemistry, physics, mathematical models and computer simulation to develop new drug therapies, or to study many of the signals generated by organs such as the brain, heart and skeletal muscle. They also build artificial organs, limbs, knees, hips, heart valves and dental implants to replace lost function, or grow living tissues to replace failing organs. Graduates can expect to work in the biotechnology, biomedical, pharmaceutical, medical device and equipment industries, in research and innovation, in the health services, hospitals, or in government and consulting. Graduates may work for companies such as Cochlear, Aventis, Cell Therapies, Compumedics, Ausbiotech, GlaxoSmithKline, or for research organisations such as CSIRO and Bio21.

Entry requirements

- A University of Melbourne undergraduate degree in Commerce, Science or Biomedicine with a Bioengineering Systems major or sequence and an average of 65% in the final two years.
- An undergraduate degree from any university with an average grade of 65% (University of Melbourne equivalent) in the final two years, including the equivalent of 25 points (2 subjects) of first-year mathematics, specifically Calculus 2[1] and Linear Algebra[2] (or equivalent) and 25 points (2 subjects) of first year biology or chemistry (or equivalent).

[1] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10006.

[2] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10007.



Course structure

Master of Engineering (Biomedical) sample course plan[1]

Year 1 (Prelim)	Sem 1	Engineering Mathematics	Engineering Communication	Biomechanics and Biotransport	Fundamentals of Biosignals
	Sem 2	Biocellular Systems Engineering	Biosystems Design	Engineering Computation	Biomedical Elective*

Usual entry point for applicants with 100 points advanced standing.

Year 2	Sem 1	Probability and Random Models	Control Systems**	Bioengineering Elective	Bioengineering Elective
	Sem 2	Biomaterials	Bioengineering Elective	Bioengineering Elective	Approved Elective
Year 3	Sem 1	Research/ Industry Project	Biomedical Design and Regulation	Biomedical Engineering Management	Approved Elective
	Sem 2		Biomedical Engineering Design Project		Approved Elective

Core subjects | Elective subjects

[1] These course plans are examples only and provided as an indicative guide. They will vary according to a student's undergraduate degree and the time of commencement.

*Biomedical elective is a choice of Chemistry 1 or Biology of Cells and Organisms, depending on student's background.

**May be replaced with Electrical Analysis and Design in 2013.

Electives are chosen from a prescribed list, available in the Student Handbook at https://handbook.unimelb.edu.au/view/current/MC-ENG.

Receiving credit towards your program

The Master of Engineering is a 300 point or three year program. Students with an engineering background may receive up to 100 points or one year of credit toward their program. To be assessed for credit, you must supply a copy of your completed engineering subject descriptions with your Master's course application.

Chemical and Biomolecular Engineering

Chemical and Biomolecular Engineering is concerned with developing and analysing process systems, which are strongly dependent upon chemistry and involve physical changes.

Chemical and biomolecular engineers take raw products and turn them into useful products. Traditionally this may have involved turning crude oil into petrol, aviation or plastic coatings, but now also involves making pharmaceutical products, being involved in the minerals processing industry, dairy processing and Australia's largest manufacturing industry, the food and beverage industry. Recent advances in nanotechnology have opened exciting new opportunities for developing new materials, biological products and medical therapeutics.

The structure of such materials is central to a range of technological developments in the health, water, energy and communication fields associated with surfaces and particulates.

Our researchers are working on projects that will benefit society, such as: carbon capture and storage; alternative energy from biofuels; bioremediation of waste; tissue engineering to understand disease processes, like Alzheimer's; and targeted drug delivery to improve cancer treatments.

Professor Sandra Kentish

Professor Sandra Kentish is the Academic Program Coordinator of the Master of Engineering (Biomolecular) and the Master of Engineering (Chemical). She is also the 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 will be in energy, food and water. Chemical and biomolecular engineering is the key to creating the solutions to some of the world's most pressing problems, like the energy crisis, limited water resources and how to provide food to the masses."

Xiaotian Li

Xiaotian Li is an international student from Shanghai China, who is in the first year of the Master of Engineering (Chemical). Xiaotian chose to study chemical engineering because he felt it was a good field to be in, with a promising future.

"Chemical engineering is an interesting and challenging course and it gives you a solid and broad background in chemical and biomolecular science," he said.

Xiaotian is enjoying understanding chemical engineering processes, how to apply them and improve the technology.

"I have had a lot of fun playing with the rigs in different experiments. You have a lot of freedom to experiment in some of the labs."

Research spotlight: Bioremediation in Antarctica

Researchers from the Department of Chemical and Biomolecular Engineering are working to preserve Antarctica by cleaning up the contamination, particularly fuel spills and waste disposal sites of past expeditions. Bases in Antarctica are powered by diesel and occasionally leaks and spills occur, sometimes as a result of normal operations and sometimes caused by incidents due to stress caused by freezing and thawing of pipes delivering fuel.

Dr Kathryn Mumford is a Lecturer in the Department of Chemical and Biomolecular Engineering, as well as a researcher with the Department's Particulate Fluids Processing Centre (PFPC). Kathryn designs in situ remediation systems that biodegrade fuel contaminants and bind heavy metals. In particular her work focuses on contaminants located in cold regions such as Antarctica and the Arctic.

"We have problems with water fluxes, because of the large amount of snow melt that we have at the beginning of summer. We also have problems with freeze and thawing, so over the summer you get wide ranges in temperature which results in freezing and thawing of our barrier material. Also at low temperatures reaction rates or different processes are a lot slower, so we have to design our system according to that," Dr Mumford says.

Despite these challenges, the clean-up operations of the Particulate Fluids Processing Centre have yielded positive results over the last decade.

Dr Kathryn Mumford, Department of Chemical and Biomolecular Engineering.

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."

Coursework programs in Chemical and Biomolecular Engineering

Master of Engineering (Biomolecular)

The Master of Engineering (Biomolecular) program is designed to provide students with a formal qualification in engineering at the Masters level. Biomolecular engineers explore the development of large-scale processes using microbial, plant or animal cells. Students develop their expertise in this discipline under the guidance of staff known internationally for their research in areas such as dairy manufacturing innovation, production of biofuels and nanotechnology. Throughout the course, students benefit from interaction with industry representatives and work on a design and a research project, which may take the form of an industrial placement.

The program is accredited by IChemE and provisionally accredited by Engineers Australia; full accreditation will be granted when the first students in the program graduate. In addition the program has received European accreditation, having been awarded the EUR-ACE® label. This multiple accreditation allows graduates to practice as professional engineers in many countries around the world.

Career outcomes

Career opportunities exist in bioprocessing industries including food, beverage and pharmaceutical production and in new fields made possible by the advances of biotechnology. The program also prepares graduates for a career in environmental chemical engineering, including biological waste treatment and bioremediation. Biomolecular engineering graduates can also work in traditional chemical engineering fields such as petrochemicals, minerals and energy. Biomolecular engineering graduates can find employment with companies such as: CSL Limited, GlaxoSmithKline, National Foods, Tatura Milk, Nestle, Kraft and Fosters Group.

Entry requirements

- A University of Melbourne undergraduate degree in Commerce or Science with a Chemical Systems major or sequence and an average of 65% in the final two years.
- An undergraduate degree from any university with an average grade of 65% (University of Melbourne equivalent) in the final two years, including the equivalent of 25 points (2 subjects) of first-year mathematics, specifically Calculus 2[1] and Linear Algebra[2] (or equivalent) and 25 points (2 subjects) of first year chemistry (or equivalent).

[1] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10006.

[2] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10007.

Course structure

Master of Engineering (Biomolecular) sample course plan[1]

Year 1 (Prelim)	Sem 1	Engineering Communication	Chemical Process Analysis 1	Engineering Mathematics	Reactions and Synthesis
	Sem 2	Chemical Process Analysis 2	Process Dynamics and Control	Fluid Mechanics and Thermodynamics*	Transport Processes
Usual entry point for applicants with 100 points advanced standing.					
Year 2	Sem 1	Reactor Engineering	Heat and Mass Transport Processes	Biology for Engineers	Chemical Engineering Management
	Sem 2	Metabolic Engineering	Process Engineering Case Studies	Biomolecular Engineering Research Project or Industry Project	
Year 3	Sem 1	Fermentation Processes	Particle Mechanics and Processing	Process Equipment Design	Process Engineering
	Sem 2	Biomolecular Engineering Design Project		Chemical Engineering Elective	

Core subjects

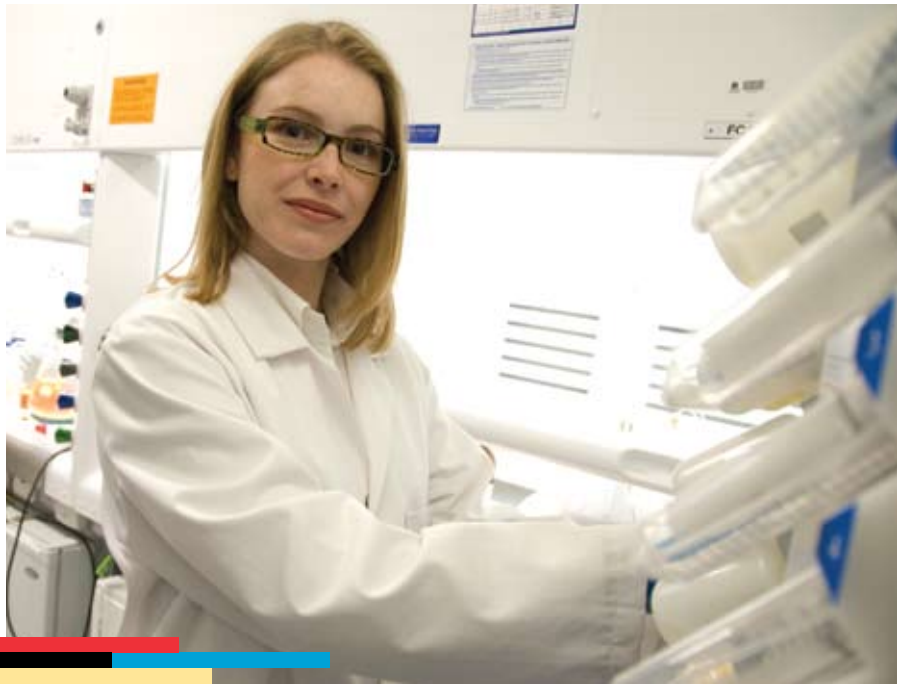
[1] These course plans are examples only and provided as an indicative guide. They will vary according to a student's undergraduate degree and the time of commencement.

*Subject may be replaced with Fluid Mechanics in 2013.

Electives are chosen from a prescribed list, available in the Student Handbook at https://handbook.unimelb.edu.au/view/current/MC-ENG.

Receiving credit towards your program

The Master of Engineering is a 300 point or three year program. Students with an engineering background may receive up to 100 points or one year of credit toward their program. To be assessed for credit, you must supply a copy of your completed engineering subject descriptions with your Master's course application.



Master of Engineering (Chemical)

The Master of Engineering (Chemical) program is designed to provide students with a formal qualification in engineering at the Masters level. Chemical engineers invent, design and implement processes through which raw materials are converted into valuable products, such as petrol, power, ceramics, plastics, food additives and pharmaceuticals. The program promotes development of practical, laboratory-based skills, combined with expertise in computing and simulation. Students develop their expertise under the guidance of staff known internationally for their research in areas such as nanotechnology, bioremediation and solvent extraction. Students have the opportunity to complete an industry project in conjunction with a relevant industry partner.

The program is accredited by IChemE and provisionally accredited by Engineers Australia, full accreditation will be granted when the first students in the program graduate. In addition the program has received European accreditation, having been awarded the EUR-ACE® label. This multiple accreditation allows graduates to practice as professional engineers in many countries around the world.

Career outcomes

Career opportunities in the field are extensive and exist in petrochemical, mining, food, pharmaceutical or chemical industries, as well as biological waste treatment and bioremediation. Our graduates are employed in a diverse range of industries, for companies including: Exxon Mobil, BP, PETRONAS, Schlumberger, Nyrstar, BHP Billiton, Anglo Coal, Worley Parsons, Uhde Shedden, Parsons Brinckerhoff (PB), Production Services Network (PSN), GHD, URS Corporation, ENSR Australia, CSL Limited, Mars and Unilever.

Entry requirements

- A University of Melbourne undergraduate degree in Commerce or Science with a Chemical Systems major or sequence and an average of 65% in the final two years.
- An undergraduate degree from any university with an average grade of 65% (University of Melbourne equivalent) in the final two years, including the equivalent of 25 points (2 subjects) of first-year mathematics, specifically Calculus 2[1] and Linear Algebra[2] (or equivalent) and 25 points (2 subjects) of first year chemistry (or equivalent).

[1] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10006.

[2] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10007.

Course structure

Master of Engineering (Chemical) sample course plan[1]

Year 1 (Prelim)	Sem 1	Engineering Communication	Chemical Process Analysis 1	Engineering Mathematics	Reactions and Synthesis
	Sem 2	Chemical Process Analysis 2	Transport Processes	Fluid Mechanics and Thermodynamics*	Process Dynamics and Control
Usual entry point for applicants with 100 points advanced standing.					
Year 2	Sem 1	Reactor Engineering	Heat and Mass Transport Processes	Bioprocessing Engineering	Chemical Engineering Management
	Sem 2	Advanced Thermo and Reactor Engineering	Process Engineering Case Studies	Chemical Engineering Research Project or Industry Project	
Year 3	Sem 1	Advanced Heat and Mass Transport	Particle Mechanics and Processing	Process Equipment Design	Process Engineering
	Sem 2	Chemical Engineering Design Project		Chemical Engineering Elective	

Core subjects

[1] TThese course plans are examples only and provided as an indicative guide. They will vary according to a student's undergraduate degree and the time of commencement.

*Subject may be replaced with Fluid Mechanics in 2013.

Electives are chosen from a prescribed list, available in the Student Handbook at https://handbook.unimelb.edu.au/view/current/MC-ENG.

Receiving credit towards your program

The Master of Engineering is a 300 point or three year program. Students with an engineering background may receive up to 100 points or one year of credit toward their program. To be assessed for credit, you must supply a copy of your completed engineering subject descriptions with your Master's course application.

Civil and Structural Engineering

Sustainable development is the underpinning philosophy behind the Department of Infrastructure Engineering's civil and structural engineering programs.

Civil engineers provide the infrastructure for essential services, such as transport systems, water supply, drainage systems, and public facilities such as, ports, harbours, airports and railway stations. In countries where infrastructure is already in place, civil engineers work on how best to upgrade and manage existing assets in a sustainable manner, such that the environment is both protected and enhanced.

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. Career opportunities exist in a variety of roles related to the design of structures, their longevity, and their ability to withstand extreme conditions, such as earthquake, high winds, blast or fire.

Associate Professor Nelson Lam

Associate Professor Nelson Lam is the Academic Program Coordinator of the Master of Engineering (Civil), Master of Engineering (Structural) and Master of Engineering Structures programs in the Department of Infrastructure Engineering. Associate Professor Lam is a Reader in Civil Engineering with extensive professional experience working as an engineer in the design and assessment of civil infrastructure. He is also a leading academic in the field of earthquake engineering and impact dynamics and has received medals from Engineers Australia in acknowledgement of his contributions to the civil and structural engineering profession. Associate Professor Lam's main research interests are in various areas of structural dynamics related to both natural hazard (earthquake engineering) and homeland security issues (blast and impact). His teaching covers the areas of concrete and steel design, bridge engineering, structural analysis, earthquake engineering and structural dynamics.

"The Master of Engineering (Civil) features training workshops with strong participation from industry, as well as training in specialised areas of civil engineering. The Master of Engineering (Structural) is taught by experienced engineers who are internationally recognised experts in the engineering of structures to withstand hazards that are associated with earthquakes, fires, wind, waves and acts of terrorism. Graduates of the civil and structural programs can expect to command a high level of technical and management expertise, which will be of great use in the work force."

Hayden Jackson

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."

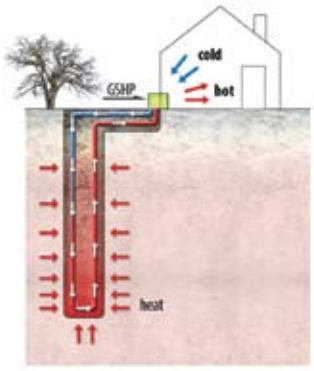
Hayden counts the significant contribution he made to the design and coordination of Dubai Fountain as one of his greatest career highlights to date. During his studies, Hayden developed technical expertise in structural dynamics, earthquake engineering, concrete technology, and particularly enjoyed the insights into engineering contracts and procurement.

Research Spotlight: Geothermal energy

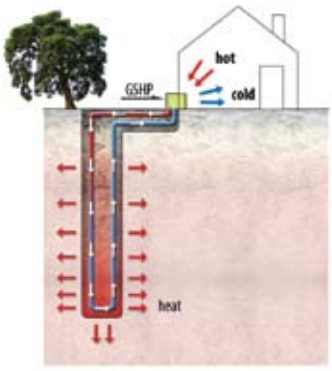
The Department of Infrastructure Engineering's geotechnical research group, headed by Professor Ian Johnston, has begun work on a series of geothermal energy projects around Victoria with partners Geotech Pty Ltd and Direct Energy Pty Ltd thanks to a Victorian government grant received in April 2012.

Energy use in buildings accounts for about one quarter of Australia's greenhouse emissions, and over half of this is for heating and cooling. Ground source heat pumps (GSHPs) use the Earth as a heat source or sink to heat and cool buildings using considerably less electricity than conventional systems. By reducing electricity demand, GSHPs systems have the potential to significantly cut Australia's electricity use and carbon footprint. By collecting data about the use of direct geothermal energy systems in a variety of conditions around Victoria, the team will develop efficiencies in installation practices and design, reducing cost and making the technology more accessible.

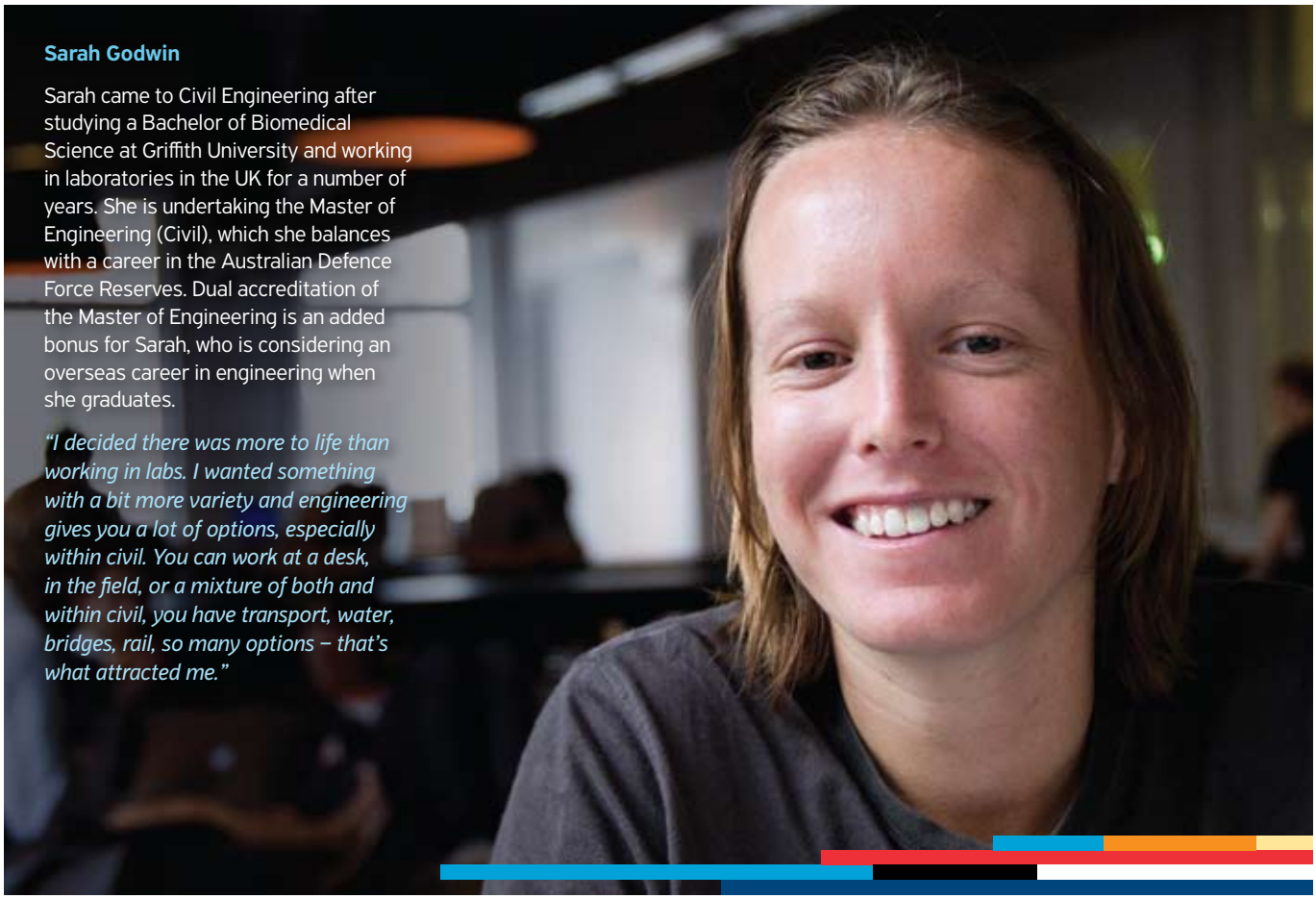
Winter



Summer



Checking ground loops as they are installed.



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."

Coursework programs in Civil Engineering

Master of Engineering (Civil)

The Master of Engineering (Civil) is designed to provide students with a formal qualification in engineering at the Masters level. Civil engineers design and create many different kinds of infrastructure to support our society. This program provides thorough education and training in many facets of civil engineering including sustainable urban developments, environmental protection, the conservation of energy and water resources, as well as the traditional disciplines of structural, geotechnical, hydraulic and transportation engineering. Interaction with industry professionals is available through guest lectures, field and project work. The program is led by an internationally recognised team of academics and is designed to produce a broader and deeper approach to civil engineering by incorporating extra education in sustainability design and environmental processes.

Dual accreditation with Engineers Australia (provisional, until first students graduate) and EUR-ACE® allows graduates of the Master of Engineering, to practice as professional engineers in many countries around the world.

Career outcomes

Career opportunities exist in construction, property, infrastructure, consulting, mining, land, water and waste, for a wide range of organisations including manufacturing companies, research organisations, academic institutions, mining companies, energy agencies, local, state and federal governments and local authorities. Equipped with a diverse skills set across a range of areas within civil engineering, graduates are highly employable and work as professional engineers both locally and internationally with companies such as John Holland, SKM, Connell-Wagner, Mutiplex, and others.

Entry requirements

- A University of Melbourne undergraduate degree in Commerce, Environments, or Science with a Civil Systems major or sequence and an average of 65% in the final two years.
- An undergraduate degree from any university with an average grade of 65% (University of Melbourne equivalent) in the final two years, including the equivalent of 25 points (2 subjects) of first-year mathematics, specifically Calculus 2[1] and Linear Algebra[2] (or equivalent) and 25 points (2 subjects) of first year science subjects (any).

[1] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10006.

[2] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10007.

Course structure

Master of Engineering (Civil) sample course plan[1]

Year 1 (Prelim)	Sem 1	Engineering Communication	Engineering Mechanics	Engineering Mathematics	Fluid Mechanics and Thermodynamics*
	Sem 2	Earth Processes for Engineering	Engineering Materials	Systems Modelling and Design	Structural Theory and Design
Usual entry point for applicants with 100 points advanced standing.					
Year 2	Sem 1	Risk Analysis	Engineering Site Characterisation	Sustainable Infrastructure Systems	Structural Theory and Design 2
	Sem 2	Engineering Project Implementation	Civil Hydraulics	Transport Systems	Civil Engineering Elective
Year 3	Sem 1	IE Research Project	Integrated Design	Geotechnical Engineering	Civil Engineering Elective
	Sem 2			Civil Engineering Elective	Civil Engineering Elective

Core subjects | Elective subjects

[1] These course plans are examples only and provided as an indicative guide. They will vary according to a student's undergraduate degree and the time

*Subject may be replaced with Fluid Mechanics in 2013.

Electives are chosen from a prescribed list, available from the Student Handbook at https://handbook.unimelb.edu.au/view/current/MC-ENG.

Receiving credit towards your program

The Master of Engineering is a 300 point or three year program. Students with an engineering background may receive up to 100 points or one year of credit toward their program. To be assessed for credit, you must supply a copy of your completed engineering subject descriptions with your Master's course application.

Master of Engineering (Structural)

The Master of Engineering (Structural) is designed to provide students with a formal qualification in engineering at the Masters level. Structural engineers apply mathematical and scientific principles to the design, development and evaluation of materials and systems used in building load-bearing structures such as roads, buildings, rail lines, dams and offshore platforms. Students in this discipline learn from researchers, who are recognised internationally for their expertise in high-rise structures, and earthquake and blast-resistant technologies. In fact, the School's expertise in structural engineering is such that we are able to include some highly specialised subjects, such as 'Earthquake Resistant Design of Buildings', 'Extreme Loading of Structures' and 'Structural Dynamics and Modelling' that are rarely taught elsewhere. Design seminars, field work and workshops provide students with opportunities to work with industry professionals in their final year.

Dual accreditation with Engineers Australia (provisional, until first students graduate) and EUR-ACE® allows graduates of the Master of Engineering, to practice as professional engineers in many countries around the world.

Career outcomes

Career opportunities exist in a variety of roles related to the design of structures, their longevity, and their ability to withstand extremes, such as earthquake, high winds, blast or fire, and the risk assessment of infrastructure, for government, consultancies and industry. Structural engineers can find employment with national and global companies such as Arup, Bonacci Group and AECOM.

Entry requirements

- A University of Melbourne undergraduate degree in Commerce, Environments or Science with a Civil Systems major or sequence and an average of 65% in the final two years.
- An undergraduate degree from any university with an average grade of 65% (University of Melbourne equivalent) in the final two years, including the equivalent of 25 points (2 subjects) of first-year mathematics, specifically Calculus 2[1] and Linear Algebra[2] (or equivalent) and 25 points (2 subjects) of first year science subjects (any).

[1] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10006.

[2] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10007.

Course structure

Master of Engineering (Structural) sample course plan[1]

Year 1 (Prelim)	Sem 1	Engineering Communication	Engineering Mechanics	Fluid Mechanics and Thermodynamics*	Engineering Mathematics
	Sem 2	Earth Processes for Engineering	Engineering Materials	System Modelling and Design	Structural Theory and Design
Usual entry point for applicants with 100 points advanced standing.					
Year 2	Sem 1	Structural Theory and Design 2	Engineering Site Characterisation	Sustainable Infrastructure Systems	Risk Analysis**
	Sem 2	Engineering Project Implementation	Structural Theory and Design 3	Structural Engineering Elective	Structural Engineering Elective
Year 3	Sem 1	Research Project	Integrated Design	Geotechnical Engineering	Structural Engineering Elective
	Sem 2			Structural Engineering Elective	Structural Engineering Elective

Core subjects | Elective subjects

[1] These course plans are examples only and provided as an indicative guide. They will vary according to a student's undergraduate degree and the time of commencement.

*Subject may be replaced with Fluid Mechanics in 2013.

**May be replaced with an elective in 2013.

Electives are chosen from a prescribed list, available in the Student Handbook at https://handbook.unimelb.edu.au/view/current/MC-ENG.

Receiving credit towards your program

The Master of Engineering is a 300 point or three year program. Students with an engineering background may receive up to 100 points or one year of credit toward their program. To be assessed for credit, you must supply a copy of your completed engineering subject descriptions with your Master's course application.

Master of Engineering Structures

This program is for civil and structural engineering professionals working in disciplines associated with the advanced design of engineering structures. It focuses on the study of ecologically sustainable building and the design of structures for extreme loading, such as earthquake, wind, blast and fire. The course provides students with a thorough understanding of structural systems, conceptual design and advanced analysis techniques. The Melbourne School of Engineering has many top-quality researchers in the field of structural engineering, who are nationally and internationally recognised, teaching both within the University, as well as in industry around Australia. Research within the area is strong and students have access to a dynamic mix of guest and local seminar presentations on leading research topics.

Career outcomes

Students graduate with a good command of the theory and practice of structural engineering. This knowledge enhances the technical, management and leadership skills of graduates, who work in many different areas including: the design of major structures; the vulnerability assessment of existing structures for projected extreme scenarios of strong wind, waves, earthquakes and impact loading; and the risk assessment of infrastructure. Structural engineers can find employment with national and global companies such as Arup, Bonacci Group and AECOM.

Entry requirements

- A four-year undergraduate degree in structural engineering with a minimum average grade of 65% (or University of Melbourne equivalent).
- A four-year undergraduate degree in civil engineering with a minimum average grade of 65% (or University of Melbourne equivalent), one year of relevant work experience, or 30% of the final year of the degree dedicated to structural engineering subjects.
- A three-year undergraduate degree in structural engineering with a minimum average grade of 65% (or University of Melbourne equivalent), and at least two years of documented professional work experience since graduation from the degree
- A three-year undergraduate degree in civil engineering with a minimum average grade of 65% (or University of Melbourne equivalent) and at least three years of full-time relevant and documented work experience since graduation from the degree.

Course structure

Students will complete a one year (100 point) full-time (or part-time equivalent) program, consisting of eight subjects of 12.5 points each. Students take a minimum of five subjects (62.5 points) selected from the list of structural engineering electives and up to three subjects (37.5 points) from the list of infrastructure engineering electives.

Structural Engineering electives

- Earthquake Resistant Design of Buildings
- High Rise Structures
- Extreme Loading of Structures
- Concrete Design and Technology
- Structural Dynamics and Modelling
- Structural Theory and Design 3

Civil and Environmental electives

- Sustainable Infrastructure Systems
- Quantitative Environmental Modelling
- Solar Energy
- Energy for Sustainable Development
- Project Management Practices
- Engineering Project Implementation
- Geotechnical Applications
- Energy Efficiency Technology
- Sustainable Buildings
- Engineering Contracts and Procurement
- IE Research Project 3

Subject information is available at: https://handbook.unimelb.edu.au/view/current/746-ST.

Electrical and Electronic Engineering

The Melbourne School of Engineering has an outstanding reputation for excellence in teaching and research in the discipline of Electrical and Electronic Engineering.

Academic staff and students of the department are major contributors to the Victoria Research Laboratory of National ICT Australia (NICTA) – the national centre of excellence in information and communications technologies; Bionic Vision Australia – a national consortium of researchers working to develop retinal implants capable of restoring vision; and the Institute for a Broadband Enabled Society (IBES) – a cross-disciplinary research institute dedicated to products, services, and innovations that maximise the benefit of new broadband technologies to Australian society. IBES is also home to the Centre for Energy-Efficient Telecommunications, a research collaboration with Alcatel-Lucent's Bell Labs and a member of the global consortium GreenTouch dedicated to reducing the energy consumption of telecommunications networks by a factor of 1,000 by 2015.

Associate Professor David Grayden

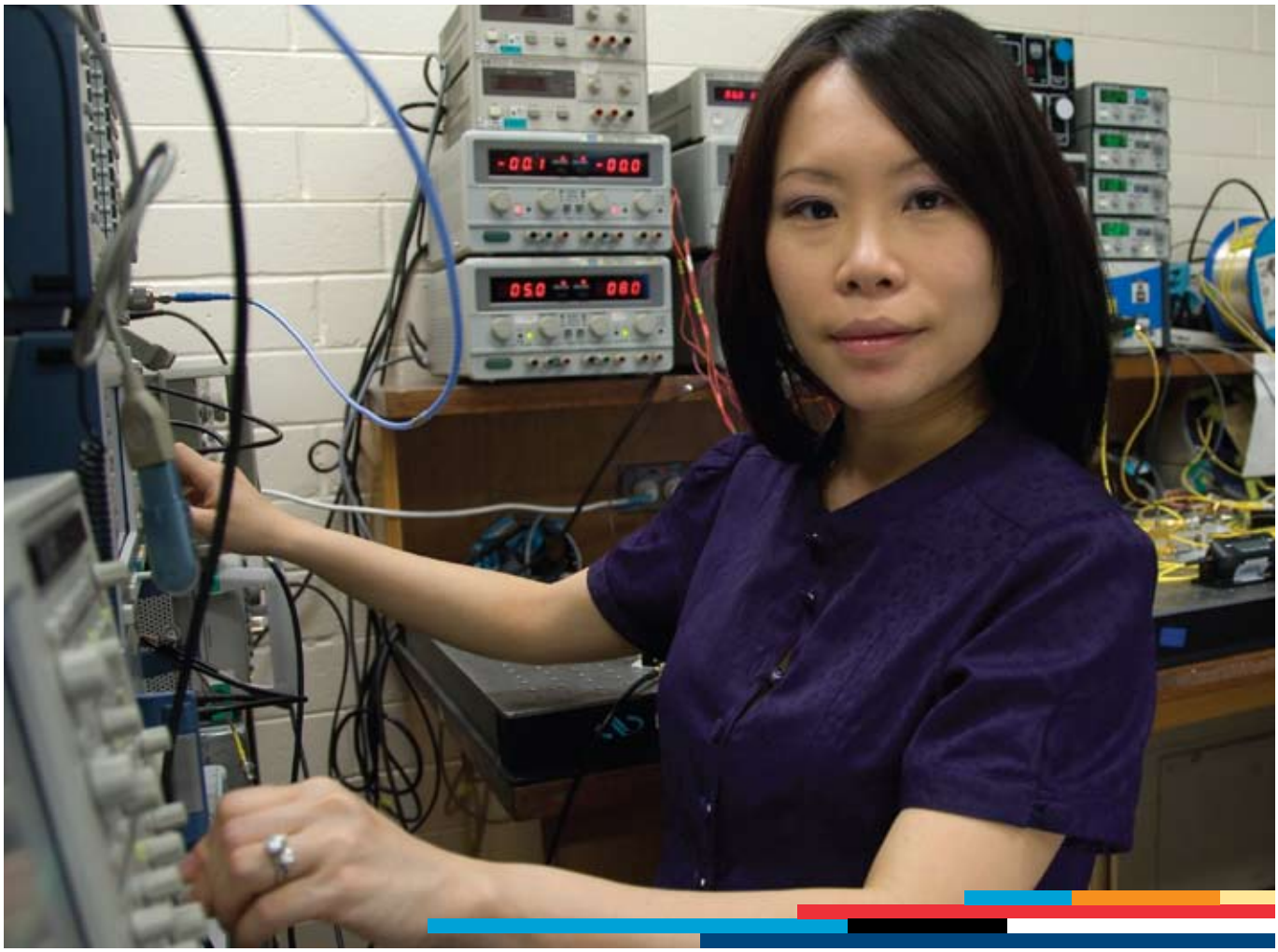
Associate Professor David Grayden is the Academic Program Coordinator of the Master of Engineering (Electrical). Associate Professor Grayden also coordinates the Master of Engineering (Biomedical) program.

"The Master of Engineering (Electrical) program develops students' analytical and problem solving skills, as well as preparing them for key roles in the design, implementation and management of electrical systems. As a result, graduates will find employment in a range of fields, from research and technical engineering, to management and finance."

Professor William Shieh

Professor William Shieh is the Academic Program Coordinator of the Master of Telecommunications Engineering program. Professor Shieh is currently an ARC Future Fellow, investigating Ultrahigh-speed Optical Transport for Sustaining Internet Growth. He has been elected as a Fellow of the Optical Society of America (OSA), the world's leading research, education and industry body for optics and photonics.

"Telecommunications networks supply us with many applications and tools that we use daily and take for granted for work and leisure, such as You Tube, WiFi and Skype. The Master of Telecommunications Engineering provides a unique opportunity to learn the tricks and techniques that build the information highway from leaders in the telecommunications industry."



Facility Spotlight: Nanoelectronics

Nanoelectronic systems are a new and exciting area of technology and the next step in the progression of microelectronic systems. New nanoelectronic systems distinguish themselves from their microelectronic counterparts in that they are smaller, more integrated, operate at higher frequencies and use less power.

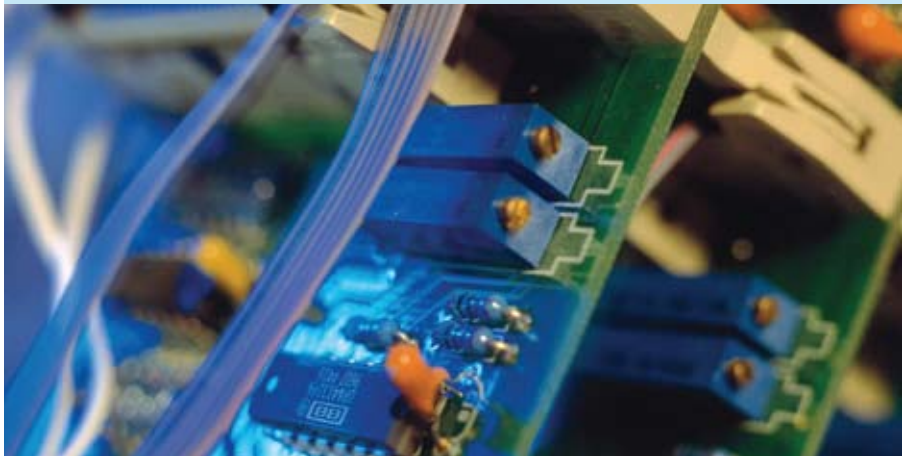
The Department of Electrical and Electronic Engineering houses a nano and micro electronics test and design facility, which is a major attraction for students wishing to study nanoelectronic engineering. The electronics testing facility is unique in the South East Asian region, due to its ability to test devices from very small nano-scale, such as wafer systems, up to devices of 110 gigabytes. Students develop the skills to build a chip set, which is fabricated overseas. This exclusive educational opportunity exposes students to industry standard tools for design and testing worth millions of dollars.

The facility allows students to have a hands-on experience in designing and testing systems, allowing them to verify the theoretical models taught in class and providing an excellent balance between theory and practice, as well as a strong advantage in the employment market upon graduation.

Professor Stan Skafidas

Professor Stan Skafidas is the Academic Program Coordinator of the Master of Nanoelectronic Engineering program and the Director of the Centre for Neural Engineering. Professor Skafidas developed the world's first next generation CMOS millimeter wave wireless communications transceiver. This discovery will enable the truly wireless office and home of the future.

"Students in the Master of Nanoelectronic Engineering program gain experience in designing real systems, while learning the theory behind manufacturing systems into products, translating industry design processes and goals into reliable and robust products. These students are learning how to lead from scientific discovery to product development and the limitations, challenges and opportunities that exist within this process."



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."

Coursework programs in Electrical and Electronic Engineering

Master of Engineering (Electrical)

The Master of Engineering (Electrical) is designed to provide students with a formal qualification in engineering at the Masters level. Electrical engineers design and build electrical and electronic devices on all scales, from transmitters smaller than the head of a pin, to large-scale infrastructure, such as a national power grid. Students in this discipline are taught by leading experts in the field, who work in partnerships with organisations such as NASA, IBM and Bionic Vision Australia. Each subject offered includes a practical laboratory component, combining theory with practice. During their final year students have the opportunity to take part in research under the guidance of leaders in broadband technology, telecommunications, signals processing and control systems. A particular strength and focus of this course is the attention paid to analytical and mathematical theory and practice, giving students the tools to direct their own future research and innovation.

Dual accreditation with Engineers Australia (provisional, until first students graduate) and EUR-ACE® allows graduates of the Master of Engineering, to practice as professional engineers in many countries around the world.

Career outcomes

Graduates pursue careers as technical specialists and managers in fields as diverse as the power industry, telecommunications, electronics, biotechnology, manufacturing, automation, transport, defense and the computer industry. With the strong technical base provided by this course, students are not only able to work as practising electrical engineers, but can also pursue roles in research and innovation. While most graduates will begin their careers in technical roles, most will also move quickly into management roles. The attention paid to analytical and mathematical ability also enables graduates to work in non-engineering fields such as management, finance and banking. Graduates can find employment with companies and organisations such as Telstra, Siemens, Australian Aerospace, Holden, BHP Billiton, Chevron and Alcoa. Opportunities also exist in the biotechnology industry, which is quite strong in Australia, working for companies like Compumedics, Ausbiotech and Cochlear Ltd.

Entry requirements

- A University of Melbourne undergraduate degree in Commerce or Science with an Electrical Systems major or sequence and an average of 65% in the final two years.
- An undergraduate degree from any university with an average grade of 65% (University of Melbourne equivalent) in the final two years, including the equivalent of 25 points (2 subjects) of first-year mathematics, specifically Calculus 2[1] and Linear Algebra[2] (or equivalent) and 25 points (2 subjects) of first year physics (or equivalent).

[1] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10006.

[2] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10007.

Course structure

Master of Engineering (Electrical) sample course plan[1]

Year 1 (Prelim)	Sem 1	Electrical Network Analysis and Design	Digital System Design	Engineering Mathematics	Engineering Communication
	Sem 2	Electrical Device Modelling	Signals and Systems	Foundations of Electrical Networks	Engineering Computation
Usual entry point for applicants with 100 points advanced standing.					
Year 2	Sem 1	Probability and Random Models	Control Systems	Electronic Circuit Design	Approved Elective
	Sem 2	Communication Systems	Signal Processing	Embedded System Design	Electronic System Implementation
Year 3	Sem 1	Electrical Engineering Capstone Project	Electrical Engineering Elective	Electrical Engineering Elective	Approved Elective
	Sem 2		Electrical Engineering Elective	Electrical Engineering Elective	Approved Elective

Core subjects | Elective subjects

[1] These course plans are examples only and provided as an indicative guide. They will vary according to a student's undergraduate degree and the time of commencement.

Electives are chosen from a prescribed list, available in the Student Handbook at https://handbook.unimelb.edu.au/view/current/MC-ENG.

Receiving credit towards your program

The Master of Engineering is a 300 point or three year program. Students with an engineering background may receive up to 100 points or one year of credit toward their program. To be assessed for credit, you must supply a copy of your completed engineering subject descriptions with your Master's course application.

Master of Nanoelectronic Engineering

Nanoelectronic systems are a new and exciting area of technology and the next step in the progression of microelectronic systems. New nanoelectronic systems distinguish themselves from their microelectronic counterparts in that they are smaller, more integrated, operate at higher frequencies and use less power. This program provides electrical and electronic engineers with the technological skills required to design and test nanoelectronic circuits and systems. Students will develop advanced skills in this area, enabling them to develop novel, nanoscale products in a range of fields. Student projects provide access to chipset prototyping facilities unique in the South East Asian region and take students through the critical 'tape out' process, production and testing. This unique educational opportunity exposes students to industry standard tools for design and testing worth millions of dollars. Past student projects include building a 77 gig radar on a chip and building a deep brain simulator.

Career outcomes

The focus of this program provides students with both the theory and practical experience to design, build and test micro and nanoelectronics circuits and systems.

Graduates will be able to apply for work, having had experience with designing and testing a chip, which has been fabricated and may be able to take some intellectual property in their work to industry. This is a truly unique opportunity, which will give our graduates a distinct employment advantage. In addition, our graduates will develop strong team work and project management skills.

Nanoelectronic engineers are in demand in medicine, the environment, aerospace, wireless and photonic communication systems and automotive applications. As a result, graduates can expect to command high salaries and secure excellent working conditions and advancement opportunities in a range of professional areas. There are many international job opportunities for nanoelectronic engineers in the United States, Singapore and China.

Entry requirements

- A four-year undergraduate Electrical Engineering degree with a final year average of 65% (or University of Melbourne equivalent).
- An undergraduate degree in an appropriate discipline and at least two years of full-time, documented and relevant work experience.

Course structure

Students will complete a 1.5 year (150 point) full-time (or part-time equivalent) program, comprised of eight compulsory subjects of 12.5 points each, plus one major design project of 25 points and two electives of 12.5 points.

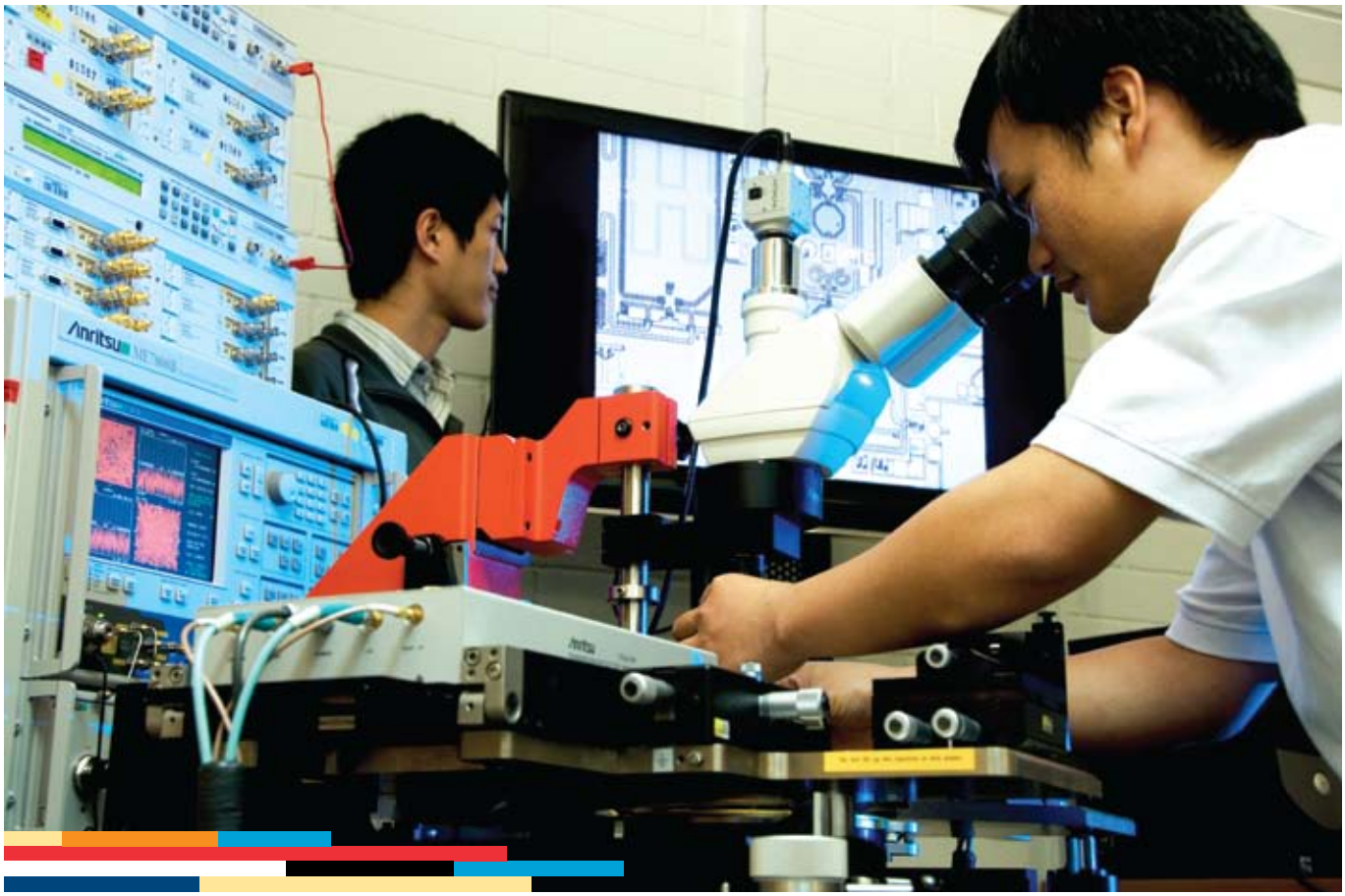
Core subjects

- Device Models
- Passive Component Design and Simulation
- Analogue Electronics
- Mixed Signal Design
- RF Systems and Architectures
- RF Electronics and Design
- Electronic Manufacturing
- Electromagnetic Compatibility
- Major Design Project (25 points)

Elective subjects

- Two engineering electives, subject to approval of the course coordinator.

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



Master of Telecommunications Engineering

Telecommunications engineers design, build and manage systems that transmit, process and store information as electrical or optical signals. This program enables engineering graduates to develop the technological and competitive skills needed in the design and engineering of modern telecommunications systems and networks. Students gain an understanding of the principles of telecommunications engineering, including the planning and management of telecommunications networks and the mathematical and computational skills necessary to solve technical and theoretical problems. The majority of lecturers are telecommunications industry practitioners and students benefit from learning from some of the most influential people, in both Australia and the world, in this field. Graduates of this program will have highly developed analytical and design skills and a broad knowledge of telecommunications networks.

Career outcomes

The program gives recent graduates and professionals working in the industry the skills and specialist knowledge required for careers in the modern telecommunications industry. Graduates will work in the design and development of new communications technology, digital communications and signal processing, wireless systems, and telecommunications hardware and software development. Great employment opportunities exist for telecommunications engineers in Australia and overseas, working for telecommunications companies such as Telstra, Siemens, Ericsson and Alcatel-Lucent.

Entry requirements

- A four year electrical engineering degree with a final-year average of at least 65% (or University of Melbourne equivalent).

Course structure

Students will complete a one year (100 point) full-time (or part-time equivalent) program, consisting of a choice of eight subjects of 12.5 points each. Up to eight subjects can be selected from Master of Telecommunications Engineering electives, and up to two subjects can be selected from other Master level engineering programs.

Subjects

- Network Design and Optimisation
- Internet Engineering
- Wireless Communication Systems
- Signaling and Network Management
- Directed Studies
- Mobile and Wireless Networks and Design
- Multimedia Content Delivery
- Broadband Access Networking and Design
- Optical Networking and Design
- Lightwave Systems
- Advanced Communications Systems
- Business of Telecommunications

Mingyue Zhang

Mingyue Zhang moved from China to Melbourne to undertake his Master of Telecommunications Engineering. He is considering further studies in management or computer science, before looking for industry experience in Australia.

"I need to feel that I'm keeping pace with avant-garde technology and I think telecommunications is one of the most popular technologies of recent decades. Following the development of the internet and wired technologies, it seems that wireless technologies have the most potential for the future."

Other Engineering electives (you may choose up to two)

- Sensor Networks and Applications
- Cluster and Grid Computing
- IT Project Management

Subject information is available at: https://handbook.unimelb.edu.au/view/current/364-AA.

Energy

The University and its partners have broad capabilities in the technology and business of energy. The Master of Energy Systems brings together engineers, scientists and specialists in economics, finance and energy systems.

The Master of Energy Systems' curriculum has been developed in consultation with an industry advisory panel. The panel includes senior representatives from GE Energy, Pacific Hydro, Deloitte, SKM, Origin Energy and the Australian Industry Group, along with Federal Government Climate Change Advisor, Professor Ross Garnaut and former Chief Scientist of Australia, Professor Robin Batterham.

The Master of Energy Systems program has close ties with industry practitioners, ensuring students benefit from an industry-relevant program, internship opportunities and contact with future employers. Our academics and industry partners bring their broad experience to the material that they teach. Our lecturers in renewable energy include those at the forefront of solar photovoltaic, solar thermal and geothermal energy research. We also have major research activities in low emissions combustion, carbon-capture and storage, as well as transportation. Most recently, the University has contributed significantly to the national policy debate, particularly through the Garnaut Review and in our ongoing collaboration with the Grattan Institute.

Students will work with specialists from diverse areas. Graduates will find employment in industry and government in the following areas:

- evaluating the performance of energy systems
- energy-related investment decisions
- policy development and implementation
- greenhouse gas and pollutant reporting, regulation and compliance.

Graduates will develop core competencies in the:

- ability to analyse energy systems from technical and business standpoints
- understanding of energy economics and energy markets
- knowledge of renewable and non-renewable energy sources and systems
- ability to audit different types of energy systems for their energy consumption and greenhouse emissions
- ability to combine technical and business knowledge to guide business decision making on energy needs.

Associate Professor Michael Brear (pictured below)

Associate Professor Michael Brear is the Academic Program Coordinator of the Master of Energy Systems program. Associate Professor Brear is a member of the Fluid and Thermal Sciences research group in the Department of Mechanical Engineering. His research and teaching are in the fields of thermodynamics, fluid dynamics and control systems. He joined the Department in 2001, having completed a PhD at Cambridge University and postdoctoral research at the Massachusetts Institute of Technology (MIT).

Associate Professor Brear is interested in improving combustion system efficiency whilst reducing emissions of greenhouse gases and other pollutants. This involves both fundamental and applied research of combustion systems, and includes close collaboration with specialists in control, optimisation and economics. Associate Professor Brear is also currently an ARC Future Fellow investigating aspects of alternative fuel combustion.

Associate Professor Michael Brear

Master of Energy Systems

The Master of Energy Systems examines the technology and business of energy. The program is led by University specialists in engineering, science, business and economics, and will suit graduates in all of these fields. Graduates will acquire the skills to make informed decisions about energy issues that incorporate technical, economic, environmental and social considerations. The program has close links with industry and potential future employers.

Career outcomes

The Master of Energy Systems program will prepare graduates for careers in energy-related roles in industry and government, in areas such as:

- evaluating the technical and economic performance of energy systems
- energy-related investment decisions
- policy development and implementation
- greenhouse gas and pollutant reporting, regulation and compliance.

Graduates will find employment in a wide range of areas, including roles in technical and business consultancy, government, sustainability management, energy and greenhouse audit, energy market analysis and banking.

Entry requirements

- An undergraduate degree in a relevant discipline, such as Commerce, Science or Engineering, with at least a 70% average (or University of Melbourne equivalent), including at least 12.5 points (1 subject) of mathematics, statistics or another quantitative subject at an appropriate level, or equivalent.
- An undergraduate degree in a relevant discipline, such as Commerce, Science or Engineering, with at least a 65% average average (or University of Melbourne equivalent), including at least 12.5 points (1 subject) of mathematics, statistics or another quantitative subject at an appropriate level and 2 years of continuous documented work experience in an applicable field, or equivalent.

Course structure

Students will complete a one-and-a-half year (150 point) full-time (or part-time equivalent) program, comprising seven compulsory core subjects and four electives.

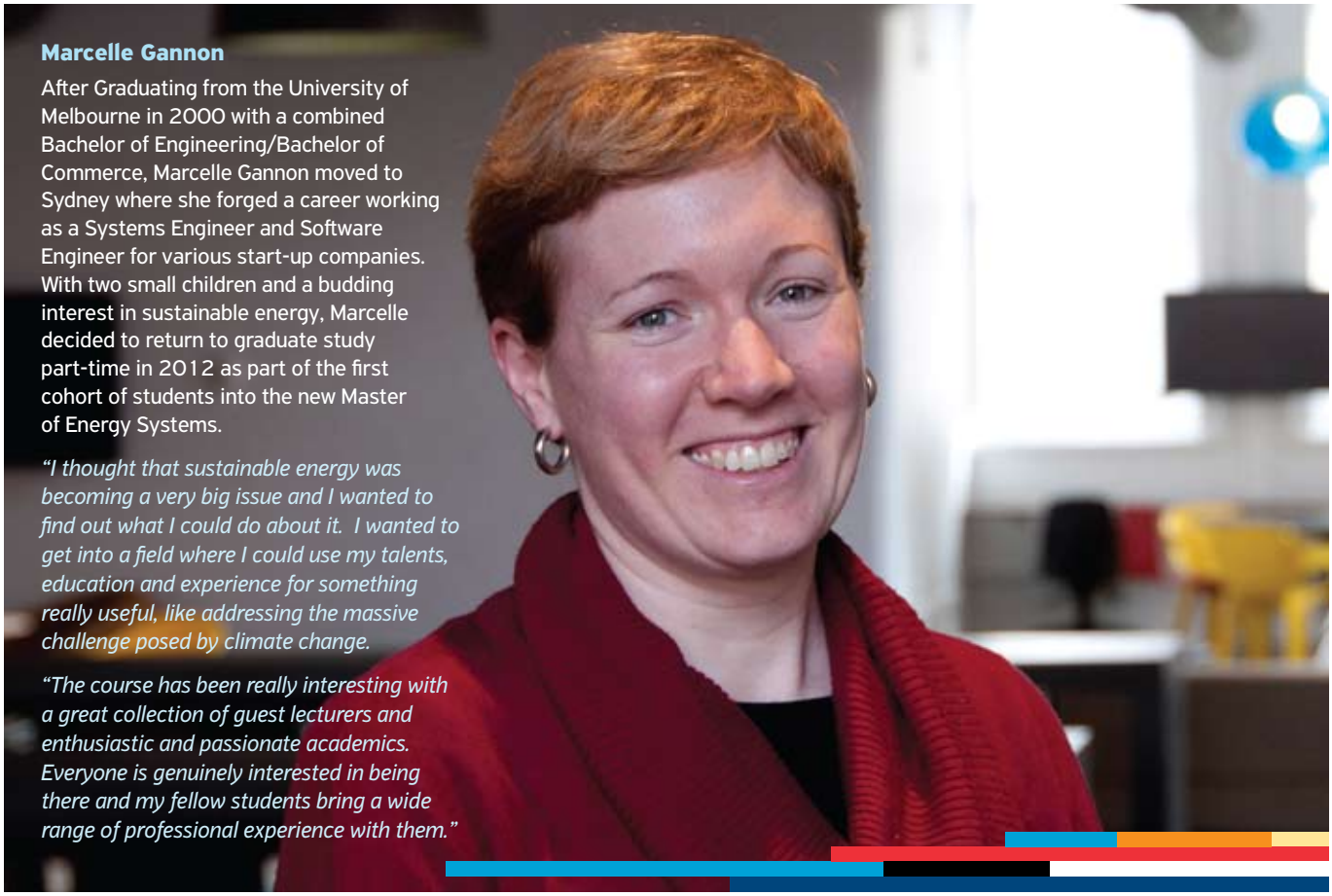
Core Subjects

- Introduction to Energy Systems
- Analysing Energy Systems
- Managerial Economics
- Financial Management
- Non-Renewable Energy
- Renewable Energy
- Energy Supply and Value Chains

Elective subjects

- Energy Systems Project (with possible internship – 25 points)
- Solar Energy
- Electrical Power Systems
- Carbon Capture and Storage Fundamentals
- Propulsion Systems
- Climate Modelling and Climate Change
- Nuclear Energy
- Sustainable Buildings
- Sustainability Accounting

Other subjects may be taken with the approval of the program coordinator.



Marcelle Gannon

After Graduating from the University of Melbourne in 2000 with a combined Bachelor of Engineering/Bachelor of Commerce, Marcelle Gannon moved to Sydney where she forged a career working as a Systems Engineer and Software Engineer for various start-up companies. With two small children and a budding interest in sustainable energy, Marcelle decided to return to graduate study part-time in 2012 as part of the first cohort of students into the new Master of Energy Systems.

"I thought that sustainable energy was becoming a very big issue and I wanted to find out what I could do about it. I wanted to get into a field where I could use my talents, education and experience for something really useful, like addressing the massive challenge posed by climate change.

"The course has been really interesting with a great collection of guest lecturers and enthusiastic and passionate academics. Everyone is genuinely interested in being there and my fellow students bring a wide range of professional experience with them."

Engineering Management

Engineering management studies are designed to bridge the gap in business knowledge between engineering, technology and management. The field of engineering management concerns the application of engineering principles to the planning and management of industrial and manufacturing operations.

Engineering managers lead engineering projects and personnel, in a range of technical fields such as product development, manufacturing, construction, design engineering, industrial engineering, software engineering and telecommunications.

Engineering Project Management is designed to meet the needs of engineers in disciplines requiring an advanced understanding of the theoretical and practical principles of the project management function.

These courses provides engineers and scientists with the skills needed at the management level of technology-based enterprises, plus the financial, investment evaluation and business skills necessary to operate in diverse areas of technology.

Dr Alan Smith

Dr Alan Smith is the Academic Program Coordinator of the Master of Engineering Management program. Dr Smith's research interests span many aspects of manufacturing science and management. His fundamental objective is to place manufacturing on a quantitative and scientific basis in order to fully optimise productive systems.

"The Engineering Management program is a valuable adjunct to your technical degree. It will enable you to fully participate in any organisation that you join, essentially expanding your horizons. The Master of Engineering Management is unique in that it draws upon the expertise of academics and industry practitioners from the fields of engineering and commerce, delivering the best of both worlds."

Lintang Wallandouw

Lintang completed a Master of Engineering Management at the University of Melbourne and now works in the climate change sector, for PT. AES AgriVerde, Indonesia, a company that works with industries to reduce their greenhouse gas emissions.

"Being the Clean Development Mechanism Services Manager means that I am responsible for assessing a project's feasibility, driving a feasible project to be registered, monitoring it and getting it certified by the United Nations Framework Convention on Climate Change."

Lintang enrolled in the Master of Engineering Management after completing an undergraduate mechanical engineering degree at Queensland University of Tehnology.

"I had heard about the University of Melbourne's education standards and rating, and visited Melbourne for a quick trip during my final year in QUT. Studying at the University of Melbourne gave me the confidence, skills, knowledge and capability to achieve things both within and outside of work."

Associate Professor Colin Duffield

Associate Professor Colin Duffield is the Academic Program Coordinator of the Master of Engineering Project Management program. Associate Professor Duffield brings a blend of industry experience to his current academic roles and consistently builds on his twenty-six years experience in the procurement and management of building and infrastructure assets through his active involvement in industry sponsored research and consultancies. He is a highly skilled engineering consultant, project manager, and research academic and his expertise encompasses the full life cycle of projects.

Ming Xu (China)

In 2005, Ming Xu left his home country of China, to pursue studies in Project Management with the Melbourne School of Engineering. It was a difficult year, finding his way around an unfamiliar city and struggling with the language barrier, but with much hard work, he completed the Master of Project Management. In 2006, his efforts paid off and under the supervision of Associate Professor Colin Duffield, he undertook a PhD and worked as a tutor in project management.

"The Master of Project Management is a well-designed course. Practical field trips to view engineering projects are a particularly useful aspect, ensuring that students have a good grasp of what is happening in industry."

Coursework programs in Engineering Management

Master of Engineering Management

The Master of Engineering Management provides engineers and scientists with the skills needed at the management level of technology-based enterprises, plus the financial, investment evaluation and business skills necessary to operate in diverse areas of technology. Graduates will gain an understanding of the legal, commercial, marketing and human issues that a manager deals with in a technical environment. Themes covered include: international social systems, the regulatory role of managers, application of software and new technologies relevant to management of technological enterprises; and the social, cultural and environmental responsibilities of managers. The program is taught by engineers and managers from major engineering companies and government, ensuring the depth of pertinent theoretical and practical content. The program is well-aligned with industry standards and equips students with the key competencies at the higher end of the profession from initial decision to invest through to operation.

Career outcomes

Students graduate from the program with the skills required for leadership roles and the ability to provide solutions to organisations involved in technology, manufacturing, construction, engineering and production. Careers for graduates of this program are varied and the skills obtained are in high demand. Past graduates work in management or consultancy roles in areas such as general management, human resources, finance, marketing, quality assurance, education, contract arbitration and policy development within technically-focused organisations.

Entry requirements

- A four-year undergraduate degree in Engineering or an appropriate discipline with a minimum average grade of 65% (or University of Melbourne equivalent).
- A three-year undergraduate degree in an appropriate discipline with a minimum average grade of 65% (or University of Melbourne equivalent) and at least two years of full-time documented and relevant work experience.

Course structure

Students will complete a one year (100 point) full-time (or part-time equivalent) program, of which 50 points or four subjects are compulsory.

Core subjects

- Management of Technological Enterprises
- Finance and Human Resources for Engineers
- Managerial Economics
- Managing Innovation and Entrepreneurship

Elective subjects

- IE Research Project 1
- IE Research Project 2(25 points)
- Sustainable Infrastructure Systems
- Project Management Practices
- Engineering Communication
- Engineering Project Implementation
- Monitoring Environmental Impacts
- Engineering Contracts and Procurement
- Sustainable Buildings
- Engineering Entrepreneurship
- Quality and Reliability
- IE Research Project 3

Subject information is available at: https://handbook.unimelb.edu.au/view/current/7611-EM.

Master of Engineering Project Management

This program provides engineers with an advanced understanding of the theoretical and practical principles of project management. Students learn the key competencies required to manage a project from start to finish, including skills in risk management, communication and how to work with a client. This includes understanding the whole process of project procurement, project team leadership skills, establishment of staff employment conditions and development of appropriate mechanisms and styles for project management. The program has been designed in conjunction with industry practitioners and is taught by staff and guest lecturers with extensive experience in industry, offering a unique opportunity to learn from experts in the field. The Master of Project Management is accredited by the Australian Institute of Project Management.

Career outcomes

Graduates of the program take on leadership roles in project delivery function and are equipped with professional skills across the full scope of Project Management, from conception to completion. Project Management is a highly-paid career choice and our graduates work for companies such as SKM, KPMG, Grocon, Arup, Worley Parsons, the World Bank and Asia Bank.

Entry requirements

- A four-year undergraduate degree in Engineering or an appropriate discipline with an average grade of 65% (or University of Melbourne equivalent).
- A three-year undergraduate degree in an appropriate discipline with an average grade of 65% (or University of Melbourne equivalent) with at least two years of full-time, relevant and documented work experience since graduation.

Course structure

Students will complete a one year (100 point) full-time (or part-time equivalent) program, consisting of eight subjects of 12.5 points each. Students take two core subjects (totaling 25 points), at least two project management electives (totaling 25 points) and a maximum of four other engineering electives (totaling 50 points).

Themes covered include: initiation of projects, methods and techniques to control time, cost and quality, resource management and long-term stewardship of assets.

Core subjects

- Project Management Practices
- Engineering Contracts and Procurement

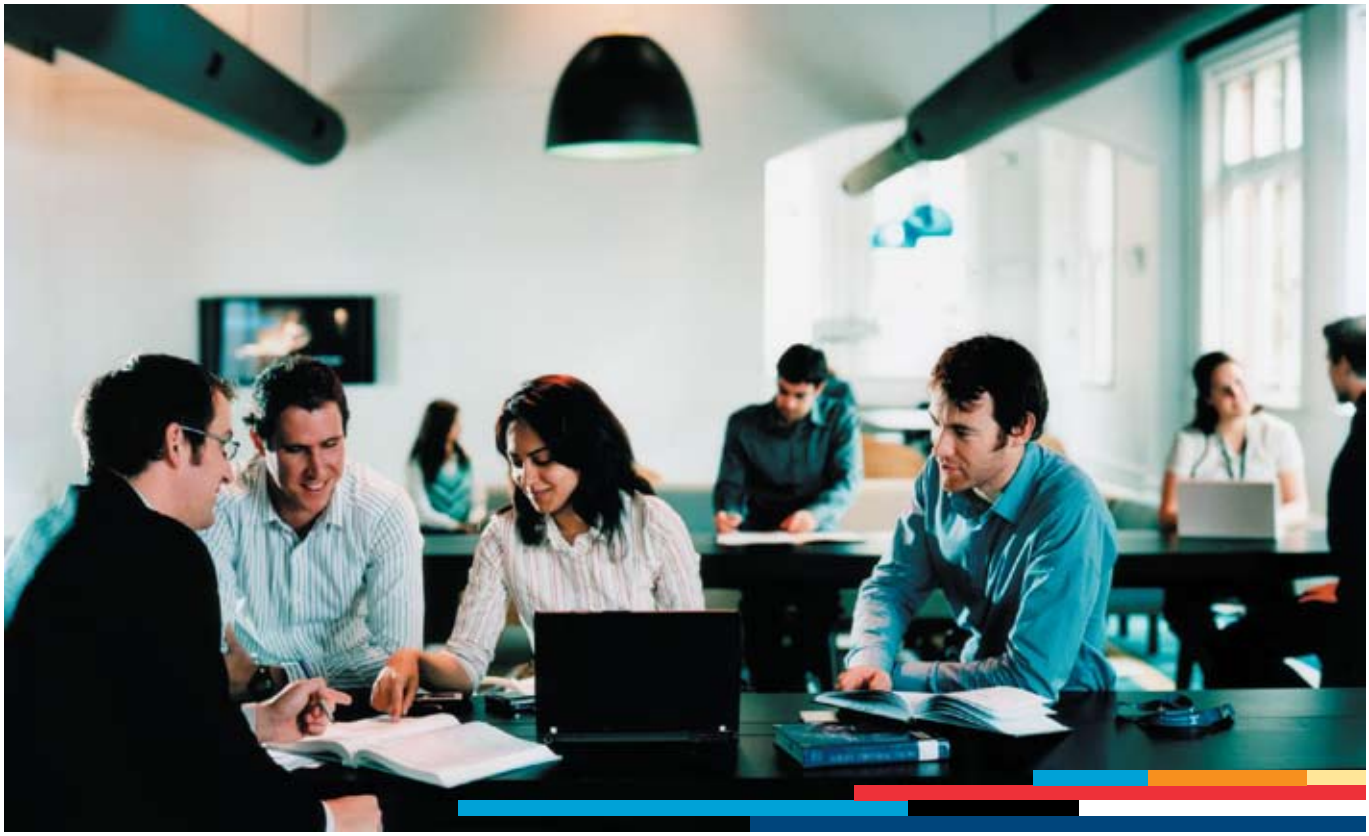
Project Management electives (a minimum of two)

- Engineering Communication
- Business Risk Management (with approval)
- Multidisciplinary Project
- Management of Technological Enterprises
- Sustainable Infrastructure Systems
- Finance and Human Resources for Engineers
- Engineering Project Management Implementation
- Environmental Management
- Sustainable Buildings

Other Engineering Electives

- Other Master level subjects from within the School of Engineering
- A maximum of one elective (12.5 points) may be selected from anywhere in the university, subject to approval.
- Integrated Design (25 points – year long) (with approval)
- IE Research Project 1(with approval)
- IE Research Project 2 (25 points) (with approval)
- Quality and Reliability

Subject information is available at: https://handbook.unimelb.edu.au/view/current/532-PM.



Environmental Engineering

Sustainable development is the underpinning philosophy behind our environmental engineering programs, which are concerned with protecting and restoring the environment.

Now, more than ever, advancing the understanding and management of our water resources is critically important. Away from the eastern seaboard, Australia has one of the driest climates in the world. This, together with the influence of climate change and population growth, means our water resources, catchments and rivers are under significant pressure. It is a unique situation that has made Australia a focus of international interest and our water research and knowledge have become attractive to countries around the world.

Waste management and energy are also major themes in our environmental programs and crucial in managing the world's limited resources. Students benefit by studying with consultants who share their expertise in environmental engineering projects around the world, in countries such as China, Vietnam, Thailand, Nepal, Sri Lanka and India.

Dr Dongryeol Ryu

Dr Dongryeol Ryu is the Academic Program Coordinator of the Master of Engineering (Environmental) program. Dr Ryu is a Senior Lecturer in Environmental Hydrology and Water Resources in the Department of Infrastructure Engineering. He leads the Hydrology and Remote Sensing group in the Department with a special interest in surface water hydrology and microwave remote sensing. Dr Ryu is currently working on developing microwave soil moisture retrieval algorithms and on investigating a new-generation of flood forecasting by using various satellite observations. He is also a past recipient of a NASA Earth System Science Fellowship and the University of California, Irvine Medal.

"The Master of Engineering (Environmental) course is taught by the leading environmental engineering research group in Australia and prepares graduates for tackling the emerging global challenge of designing a sustainable future for society. It offers practical training in the core environmental engineering skills of environmental modelling, monitoring and analysis with a breadth of elective subjects in water, energy and waste."

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.

Rodney Springer

Rodney Springer decided to do the Master of Environmental Engineering because he had a keen interest in water resource management and wanted to work as a specialist in water management. Rodney is enjoying learning to research and analyse efficient water use, prioritise allocation, and deliver water to meet urban, rural, agricultural, industry and environmental needs.

"I would like to work within a team of lateral-thinking specialists and creative people to brainstorm, develop, design and deliver water-efficient products and implement state-of-the-art water-use programs. Highlights of the course so far have been meeting the course staff, guest lecturers and my peers, as well as learning from industry specialists about what water efficiency products and ideas do and don't work and what has not been tried before."

Dr Graham Moore

Dr Graham Moore is the Academic Program Coordinator of the Master of Environmental Engineering program. Dr Moore's broad interests lie in the application of engineering technology to the natural environment and agricultural production, particularly systems thinking for improved environmental and social sustainability.

"The Master of Environmental Engineering allows engineers to consolidate and learn key quantitative skills, and then apply them to real-world issues of sustainability in the choice of three themes; energy, waste management, and water. It offers an excellent opportunity for engineers from all disciplines to refocus their careers on key sustainability issues."

Hao Ji Sima (China)

Hao Ji Sima followed his Bachelor degree in Environmental Engineering with the Master of Environmental Engineering program. He found that the Masters degree provided him with broader knowledge of environmental engineering and he particularly enjoyed the group work, where he got to mix with many people of different backgrounds and cultures.

"I gained a broader perspective on the latest trends in sustainability and water management, as well as communication, writing and computer modelling skills. The intensive week of the sustainable water resource management subject was the highlight of this year. I had a really packed week with my fellow group members. Although the study was intense, we made it really fun and we had a strong bond in the end. I have never made so many friends in such a short period of time before."

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.

Penny 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."

Coursework programs in Environmental Engineering

Master of Engineering (Environmental)

The Master of Engineering (Environmental) program is designed to provide students with a formal qualification in engineering at the Masters level. Environmental engineers create sustainable solutions to environmental problems. Students in this discipline learn from staff active in research areas such as hydrology, irrigation and water management. The course has a strong focus on sustainability and project management. Guest lecturers and seminars by industry professionals are available to students, as well as community project work, technical society meetings and site visits that combine theory with practice.

Dual accreditation with Engineers Australia (provisional, until first students graduate) and EUR-ACE® allows graduates of the Master of Engineering, to practice as professional engineers in many countries around the world.

Career outcomes

Environmental engineering is a rapidly growing field and qualified environmental engineers are in demand. Graduates typically have several employment offers to choose from, in a variety of environmental settings.

It is an exciting field 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.

With growing interest and job opportunities, as well as new kinds of jobs being developed, in environmental areas such as bushfire protection, carbon management, climate change, sustainable systems, land and water management, conservation and hydrology, waste management and renewable energy, it has never been a better time to gain an environmental engineering qualification, and the need for qualified environmental engineers has never been greater.

Employment opportunities exist in local and international organisations such as, consulting firms, conservation and natural resource management agencies, environmental protection agencies, catchment management authorities, local, state and federal government, management consulting firms, and in research and academia. Companies that employ environmental engineering graduates include: GHD, Golder Associates, Alluvium, John Holland, Coffey International Pty Ltd and AECOM, to name a few.

Entry requirements

- A University of Melbourne undergraduate degree in Commerce, Environments or Science with a Civil or Physical Systems major or sequence and an average of 65% in the final two years.
- An undergraduate degree from any university with an average grade of 65% (University of Melbourne equivalent) in the final two years, including the equivalent of 25 points (2 subjects) of first-year mathematics, specifically Calculus 2[1] and Linear Algebra[2] (or equivalent) and 25 points (2 subjects) of first year science (any).

[1] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10006.

[2] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10007.

Course structure

Master of Engineering (Environmental) sample course plan[1]

Year 1 (Prelim)	Sem 1	Engineering Communication	Engineering Mechanics	Engineering Mathematics	Fluid Mechanics and Thermodynamics*
	Sem 2	Earth Processes for Engineering	Engineering Materials	Systems Modelling and Design	Approved Elective
Usual entry point for applicants with 100 points advanced standing.					
Year 2	Sem 1	Quantitative Environmental Modelling	Engineering Site Characterisation	Sustainable Infrastructure Systems	Risk Analysis
	Sem 2	Engineering Project Implementation	Civil Hydraulics	Environmental Analysis Tools	Monitoring Environmental Impacts
Year 3	Sem 1	IE Research Project	Integrated Design	Environmental Engineering Elective	Environmental Engineering Elective
	Sem 2			Environmental Engineering Elective	Environmental Engineering Elective

Core subjects | Elective subjects

[1] These course plans are examples only and provided as an indicative guide. They will vary according to a student's undergraduate degree and the time of commencement.

*May be replaced with Fluid Mechanics in 2013.

Electives are chosen from a prescribed list, available in the Student Handbook at https://handbook.unimelb.edu.au/view/current/MC-ENG.

Receiving credit towards your program

The Master of Engineering is a 300 point or three year program. Students with an engineering background may receive up to 100 points or one year of credit toward their program. To be assessed for credit, you must supply a copy of your completed engineering subject descriptions with your Master's course application.

Master of Environmental Engineering

Environmental engineers manage and evaluate sustainable solutions for their impact on the economy, society and the environment. The Master of Environmental Engineering program is designed to provide engineers with advanced knowledge of the principles underpinning sustainable development and the opportunity to gain skills in the engineering practice of environmental management. Participants will develop a broad understanding of environmental management practice, while investigating themes that focus on water management, energy and water resources. The program has a strong industry focus, with 50% of subjects taught by industry practitioners. A research project may also be taken in the work place, as part of the program.

Career outcomes

This program is suitable for engineers seeking a career change to a position that involves responsibilities in environmental engineering. Participants will have an advanced understanding of the practice of environmental management and sustainable development, particularly in the fields of water resources management, energy studies and development technologies. Environmental engineers manage environmental aspects of a business and model and analyse the environmental impact of an engineering solution.

Environmental engineering is a growth area with many job opportunities, as well as new kinds of jobs being developed, in fields such as bushfire protection, carbon management, climate change, sustainable systems, land and water management, conservation and hydrology, waste management and renewable energy. It has never been a better time to gain an environmental engineering qualification, and the need for qualified environmental engineers has never been greater.

Graduates work in government environmental organisations and in a variety of consulting and technical roles in industry. Many of our graduates work as environmental officers with local councils and other government authorities and in water and land management roles for the Environment Protection Authority, Department of Sustainability and Environment, water and water catchment authorities and as consultants. Environmental engineering graduates may find work with companies such as GHD, Golder Associates, Alluvium, Coffey International Ltd., John Holland and AECOM.

Entry requirements

- four-year undergraduate degree in Engineering with an average grade of 65% (or University of Melbourne equivalent).
- A three-year undergraduate degree in an appropriate discipline with an average grade of 65% (or University of Melbourne equivalent) and at least two years of full-time, documented and relevant work experience.

Course structure

Students will complete a one year (100 point) full-time (or part-time equivalent) program, consisting of eight subjects of 12.5 points each. Students must take four 12.5 point core subjects and 37.5 points of subjects from one of the following three themes:

- Waste Management
- Energy
- Water Resources

Topics covered include: air pollution, water and wastewater, municipal solid wastes, cleaner production, environmental management systems, noise, vibration, water resources management, energy resources management, politics, the law and the economy. Participants are able to focus on skill development in the sectors relevant to them.

Core subjects

- Sustainable Infrastructure Systems
- Quantitative Environmental Modelling
- Monitoring Environmental Impacts
- Environmental Analysis Tools

Waste Management focus – 37.5points

- IE Research Project 1 (with approval)
- IE Research Project 2 (25 points) (with approval)
- Solid Wastes to Sustainable Resources
- Water and Waste Water Management
- Environmental Management
- Contaminant Hydrogeology

OR

Energy focus – 37.5points

- IE Research Project 1 (with approval)
- IE Research Project 2 (25 points) (with approval)
- Energy for Sustainable Development
- Solar Energy
- Energy Efficiency Technology
- Sustainable Buildings

OR

Water Resources focus – 37.5points

- IE Research Project 1 (with approval)
- IE Research Project 2 (25 points) (with approval)
- Hydrological Processes
- Water and Waste Water Management
- Sustainable Water Resources Systems

Suggested Approved electives

- Hydrological Processes
- Foundations of Spatial Information
- Geotechnical Applications
- Engineering Contracts and Procurement
- Sustainable Water Resources Systems
- Contaminant Hydrogeology

Subject Information is available at: https://handbook.unimelb.edu.au/view/current/206-EC.

Geomatics and Spatial Information Science

Geomatics is about spatial information; its capture, management, analysis and provision. Spatial information is an essential and indispensible part of any economy's infrastructure. It is needed in all walks of life and on many scales, with applications in land tenure systems, environmental modelling, food production, disaster management, resource management, climate change modelling, construction engineering, transportation engineering, architecture and urban planning, health and artificial intelligence.

The spatial information industry comprises remote sensing from satellites, aircraft and ground-based sensors, global positioning systems, conventional surveying, geographic information systems and all forms of data with a geographic coordinate. In the past 40 years there has been a radical change and expansion of spatial information with the advent of information and communication technology, satellites for imaging and positioning, and the web and communication infrastructure for ubiquitous and smart access to spatial information. 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.

Mr Clifford Ogleby

Clifford Ogleby is the Program Coordinator of the Master of Engineering (Geomatics) and a Senior Lecturer in the Department of Infrastructure Engineering. His research involves heritage monument recording and documentation, digital imaging, photogrammetry, multi-media development, rock art recording, Thai and Lao architecture and site and monument visualisation. Cliff is the Director of the International Society of Photogrammetry and Remote Sensing (ISPRS) Congress, which will take place in Melbourne in 2012. He is also President of CIPA Heritage Documentation.

"The Master of Engineering (Geomatics) is an accredited program that provides professional skills in all areas from spatial data acquisition through to the generation of spatial products and services. It has a strong focus of measurement science (land surveying) and provides the essential subjects necessary for becoming a licensed land surveyor. A graduate from this degree program will become part of a specialised industry in which there are many opportunities for well-paid work, travel and flexible working environments."

Research Spotlight: How we describe place

Imagine you witnessed an accident and needed to call an ambulance, but you did not know where you were. How would you describe your location to the operator? You might mention a nearby landmark or main street, but if you are in an unfamiliar city, you may only be able to describe the colours of the buildings around you.

Associate Professor Stephan Winter is leading a research team to try and bridge the gap between the way we explain locations and how mapping services such as Google Maps and in-car navigation systems translate our instructions.

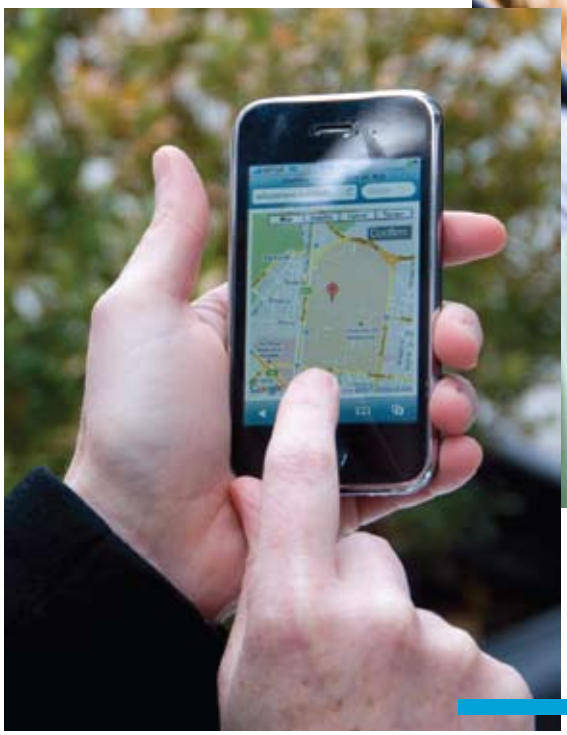
"Computers require specific instructions and can struggle to interpret the often-vague way we describe place. We must overcome this in order to enable smarter navigation and mapping services. Improving computer recognition of natural language will lead to more effective communication and will also assist in emergency situations, potentially saving lives," says Associate Professor Winter.

A key component of the team's research is a mobile phone game; users simply log in and confirm where their phone has located them on a map and type in a description of where they are. These natural-language descriptions are then used by the research team to gather the words we use to describe a place.

Associate Professor Stephan Winter

Associate Professor Stephan Winter is the Program Coordinator of the Master of Geographic Information Technology and the Master of Spatial Information Science programs. Associate Professor Winter is the discipline leader in Geomatics at the Department of Infrastructure Engineering. He is an expert in spatial information and designed the curriculum for the Master of Spatial Information Science program, Australia's leading degree in this discipline.

"Spatial information helps us to make smarter decisions, build on a more sustainable future, facilitate transparent and open participation in public debates, or simply meet our friends. It has become an indispensible part of a global information infrastructure, and we are building this infrastructure. Within this area I am trying to contribute to making information more useful, to improving decision-making by providing better information, and to developing novel information products."



Coursework programs in Geomatics and Spatial Information

Master of Engineering (Geomatics)

Geomatic engineers study the science and technology of measurement, mapping and visualisation. This program is for those who want a formal qualification in geomatic engineering at the Masters level. You will develop sought-after skills in these areas:

- geographic information systems (GIS)
- measurement, mapping and visualisation
- three-dimensional computer visualisations
- surveying
- satellite and photographic image processing.

The ME(Geomatics) is:

- a two-year full-time (or part-time equivalent) program for students who have completed the Geomatics major
- a three-year full-time program (or part-time equivalent) for students from other study backgrounds. Students who already have Geomatics backgrounds may receive up to 1.5 years of credit
- accredited by Engineers Australia, the Surveyor Registration Board Victoria, the Royal Institution of Chartered Surveyors and EUR-ACE®, opening up career opportunities around the globe.

Career outcomes

There is a growing demand for people with expertise in spatial information, along with a current labour shortage in Australia, ensuring graduates a range of well-paid employment opportunities. Geomatics graduates work in roles relating to land and surveying, in environmental remote sensing, disaster management and in firms specialising in land and resource management, mapping, three dimensional visualisation and spatial data infrastructure. Our recent graduates have been employed by organisations such as Yarra Water, the Office of the Surveyor-General, Reeds Consulting and Geoscience Australia.

Entry requirements

- A University of Melbourne undergraduate degree in Environments or Science with a Geomatics major and an average of 65% in the final two years.
- An undergraduate degree from any university with an average grade of 65% (University of Melbourne equivalent) in the final two years, including the equivalent of 25 points (2 subjects) of first-year mathematics (any) and 25 points (2 subjects) of first year science (any).

Course structure

Master of Engineering (Geomatics) sample course plan[1]

Year 1 (Prelim)	Sem 1	Engineering Communication	Imaging the Environment	Applications of GIS	Risk Analysis
	Sem 2	Surveying and Mapping	Engineering Computation	Land Administration Systems	Integrated Spatial Systems
Usual entry point for applicants with 100 points advanced standing.					
Year 2	Sem 1	Property Law	Cadastral Surveying	Management of Technological Enterprises	Geomatics Elective
	Sem 2	*Winter Semester* Advanced Surveying and Mapping	Adjustment Theory and Practice	Satellite Positioning	Geomatics or Engineering Elective
Year 3	Sem 1	IE Research Project	Advanced Imaging	Residential Land Development	Geomatics Elective
	Sem 2	IE Research Project	Engineering Project Implementation	Spatial Data Infrastructure	Geomatics or Engineering Electives

Core subjects | Elective subjects

[1] These course plans are examples only and provided as an indicative guide. They will vary according to a student's undergraduate degree and the time of commencement.

Electives are chosen from a prescribed list, available in the Student Handbook at https://handbook.unimelb.edu.au/view/current/MC-ENG.

Receiving credit towards your program

The Master of Engineering is a 300 point or three year program. Students with an engineering background may receive up to 100 points or one year of credit toward their program. To be assessed for credit, you must supply a copy of your completed engineering subject descriptions with your Master's course application.

Master of Geographic Information Technology

The Master of Geographic Information Technology (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. The MGIT is a one year, full-time program. Part-time study is available.

Career outcomes

There is a growing demand for people with expertise in spatial information, along with a current labour shortage in Australia, meaning graduates are ensured a range of well-paid employment options. Graduates will find careers in GIS, remote sensing, computer-aided design (CAD) and mapping, land administration, urban planning and conservation. Our recent graduates have been employed by organisations such as the City of Melbourne, the Metropolitan Fire Brigade and Geoscience Australia.

Entry requirements

- A four-year undergraduate degree in an appropriate discipline.
- A three-year degree and at least two years of full-time, documented and relevant work experience.

Course structure

Students will complete a one year (100 point) full-time (or part-time equivalent) program. The selection of subjects from a prescribed list will be based on discussion with a course coordinator. There are no core subjects for this program, however students with no GIS experience would be expected to take Foundations of Spatial Information and Remote Sensing.

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/HO4-AA.

Note: Commencing 2013, spatial information will also be available as a stream in the Master of Information Technology. See page 54 for details.

Master of Spatial Information Science

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 as spatial experts around the world.

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.

Joanne Bull

Joanne has recently completed her Bachelor of Environments, majoring in Geomatics and has begun a Master of Spatial Information Science. Throughout her undergraduate course, Joanne has enjoyed working on fascinating assignments such as a GPS scavenger hunt using Google Maps, 3D modeling 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."

Information Technology

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.

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.

Associate Professor Tim Baldwin

Associate Professor Tim Baldwin is the Academic Program Coordinator of the newly developed Master of Information Technology suite of programs. His research interests cover topics including deep linguistic processing, multiword expressions, deep lexical acquisition, computer-assisted language learning, information extraction and web mining. Prior to his current role, Associate Professor Baldwin was a Senior Research Engineer at Stanford University's Center for the Study of Language and Information.

"The Master of Information Technology is a flexible, practical course offering graduates the deep, technical tools to solve problems across domains. The course has strong industry links, and you will have the opportunity to take part in our placement program, giving you a foot in the door with leading employers in the IT sector. You'll be in the midst of an exciting technology precinct working with world-class innovators in areas such as eHealth, cloud computing, spatial information and application programming."

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.

Nicole Dial

Originally from the USA, Nicole Dial was working as a Data Analyst for two years before she decided it was time to undertake further study abroad. She chose the Master of Information Systems (MIS), a course she said has been vital in providing her with career direction. Recently Nicole was offered an internship at Management Consulting Firm DB Results, via the MIS work experience program. As a result of the internship, Nicole has now been offered an ongoing role at DB Results with the hope that it can transition to a permanent role upon graduation.

"Taking up the internship was one of the best decisions I've ever made because I really enjoy my company."

"I think internships and other student opportunities allow you to align what you're learning in academia with the practical side of things. There is something about being in a real world environment that allows you to take those scenarios and experiences that you see happening in real time and apply it to your theory."

Dr Wally Smith

Dr Wally Smith is the Academic Program Coordinator of the Master of Information Systems program. Dr Smith's research explores the way people use and understand information technology. He conducts research case studies into disaster management, and is currently Chief Investigator on an Australian Research Council Linkage Project investigating how social networking can assist in efforts to quit smoking.

"The Master of Information Systems is our premiere graduate course for digital business professionals and future IT leaders. It was designed in consultation with senior industry figures, in response to the skills they advised us that they are looking for in their graduates. As a result, the Master of Information Systems offers highly transferrable and industry-relevant skills across areas such as change and project management, business analytics, IT service provision and consulting, and IT innovation."

Associate Professor Shanika Karunasekera

Associate Professor Shanika Karunasekera is the Academic Program Coordinator of the Master of Engineering (Software) program. Associate Professor Karunasekera's main areas of expertise are software engineering, distributed systems, peer-to-peer systems and sensor networks.

"Our state-of-the-art Master of Engineering (Software) program gives a good balance between theory and practice in software engineering, preparing students to become competent software engineers in industry. By working as a lead software engineer in industry, I gained an appreciation of the role of software engineering in shaping the modern technology-driven society. I believe that with a solid education in software engineering, one will be able to embark on a challenging career and make a real difference to future software solutions."

Sandra Oveissi

Iranian Master of Engineering (Software) student Sandra Oveissi is in her second year of the program and is an ME Merit Scholarship recipient.

Outside of study, Sandra keeps busy with community projects such as her work as IT Manager with Teachabout, an organisation aiming to improve the education of children from Aboriginal backgrounds. She also encourages young women to study engineering and technology through her work with Robogals.

Sandra enjoys the interactivity of the Master of Engineering (Software).

"Each year we need to complete a project for real clients. This has helped me to improve my knowledge, in a formal and practical sense, while increasing my confidence through experiencing software engineering projects in real environment."

Coursework Programs in Information Technology

Master of Engineering (Software)

The ME (Software) provides students with a formal qualification in engineering at the Masters level, specialising in software engineering. In this program you will:

- use your mathematical, scientific and technical knowledge and your creativity to tackle large-scale software design and development projects
- focus on team-based projects to design, implement and operate software engineering solutions
- work closely with IT professionals in a year-long industry project.

The ME(Software) is:

- a two-year full-time (or part-time equivalent) program for students who have completed the Computing and Software Systems major
- a three-year full-time program (or part-time equivalent) for students from other study backgrounds. Students who already have IT backgrounds may receive up to 1.5 years of credit
- accredited by the Australian Computer Society, Engineers Australia, and EUR-ACE®, opening up career opportunities around the globe.

Career outcomes

The ICT industry in Australia is experiencing a critical skills shortage and highly-trained graduates are in strong demand. Graduate roles include software designers and developers, project managers, database managers, programmers, web producers, analysts, gaming software authors and consultants to the private sector or government.

Entry requirements

A University of Melbourne undergraduate degree in Commerce or Science with a Computing and Software Systems major or sequence and an average of 65% in the final two years.

- An undergraduate degree from any university with an average grade of 65% (University of Melbourne equivalent) in the final two years, including the equivalent of 25 points (2 subjects) of first year mathematics (any), and 25 points (2 subjects) of computing, computer science, programming (or equivalent).

Course structure

Master of Engineering (Software) sample course plan[1]

Year 1 (Prelim)	Sem 1	Engineering Computation	Algorithms and Complexity	Programming and Software Development	Engineering Communication
	Sem 2	Discrete Structures	CIS Elective	CIS Elective	CIS Elective
Usual entry point for applicants with 100 points advanced standing.					
Year 2	Sem 1	Software Requirements Analysis	IT Project and Change Management	Modelling Complex Software Systems	Software Modelling and Design
	Sem 2	Masters Software Engineering Project	Software Engineering Methods	CIS Advanced Elective	CIS Advanced Elective
Year 3	Sem 1	Masters Advanced Software Project	Elective	CIS Advanced Elective	Approved Elective
	Sem 2		Elective	CIS Advanced Elective	Approved Elective

Core subjects | Elective subjects

[1] These course plans are examples only and provided as an indicative guide. They will vary according to a student's undergraduate degree and the time of commencement.

Electives are chosen from a prescribed list, available in the Student Handbook at https://handbook.unimelb.edu.au/view/current/MC-ENG.

Receiving credit towards your program

The Master of Engineering is a 300 point or three year program. Students with an engineering background may receive up to 100 points or one year of credit toward their program. To be assessed for credit, you must supply a copy of your completed engineering subject descriptions with your Master's course application.

Master of Information Systems

The Master of Information Systems (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 of 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.

Course structure

The MIS can be taken as a 12 month (100 point), 18 month (150 point) or a two-year (200 point) full-time program depending on the number of years of work experience and your undergraduate qualification.

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:

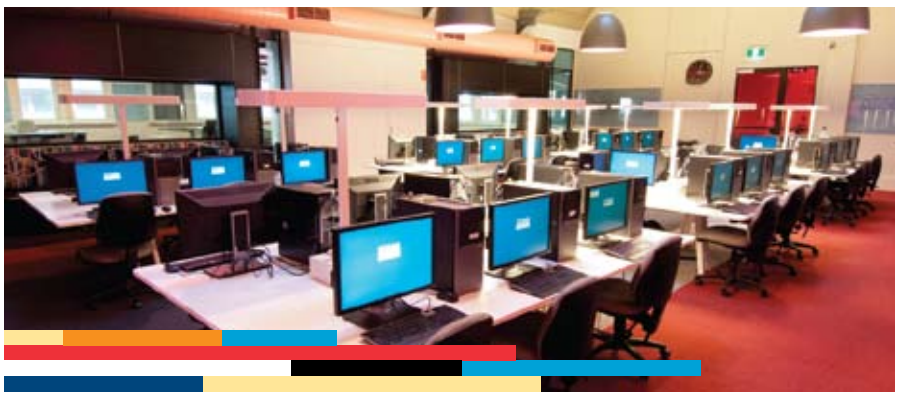
- Emerging Technologies and Issues
- Enterprise Applications and Architectures
- IS Strategy and Governance
- Impact of Digitisation

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)

Research pathways are available to MIS students wishing to undertake further research via a Master of Philosophy or PhD program.

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



Master of Information Technology

The Master of Information Technology (MIT) will offer you the lifelong technical skills to devise solutions to the problems of today and those of tomorrow.

The 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 program 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 IT 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 some study background in their area of specialisation, or two years of work experience.

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.

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 Plan: 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

Research pathways are available to MIT students wishing to undertake further research via a Master of Philosophy or PhD program.

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

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, 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 (Spatial) 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.

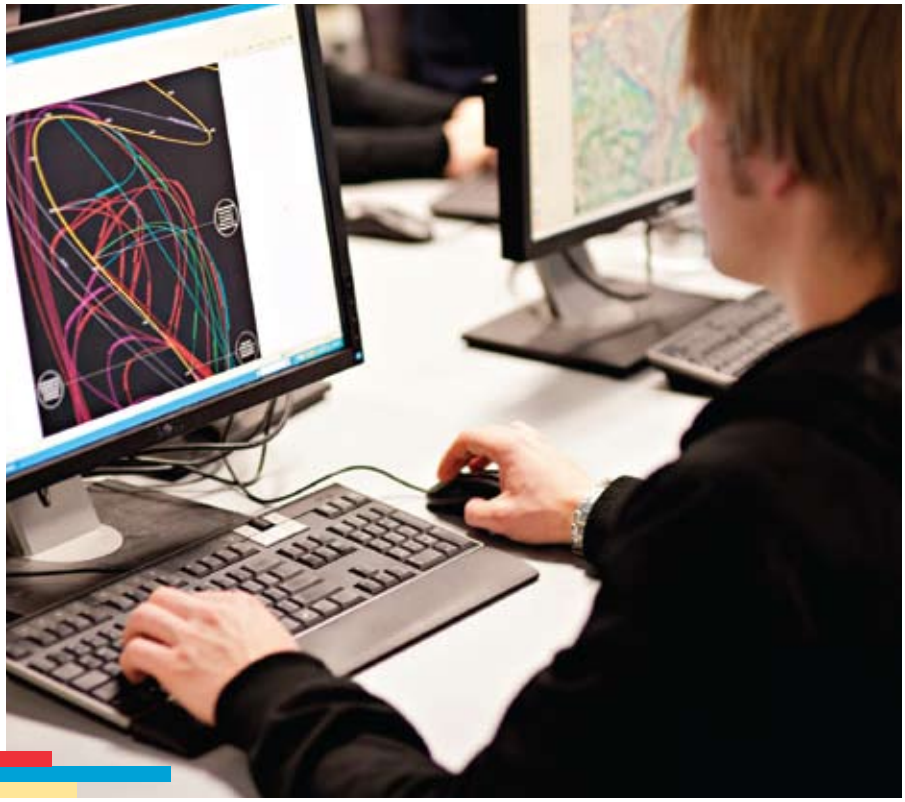
Major strands of study are:

- 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 the Master of Science (Computer Science) program are changing the way we live our lives, especially in the health sciences and in social infrastructures delivered by web-based tools.

The program 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 innovative 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 Euro-Inf®, providing professional recognition in Europe.

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.

Mechanical Engineering and Mechatronics

Mechanical engineering applies human and material resources to the design, construction, operation and maintenance of machines to move people, goods and materials, generate energy, produce goods and services, and control pollution and dispose of wastes.

Mechanical engineering not only interacts with all other disciplines of engineering, but increasingly with other disciplines such as medicine and biology, supported by sophisticated computer technology.

Graduates are versatile, with a breadth of skills and a grounding in fundamental knowledge, which equips them for responsibility in a wide range of activities and career directions. Students have access to well-equipped laboratories for materials testing, engine/turbine testing, wind tunnel investigations, simulation and metal forming processes. A heavy engineering workshop is available for the manufacture of testing facilities and research apparatus, as well as extensive computer facilities in computational mechanics.

Associate Professor Chris Manzie

Associate Professor Chris Manzie is the Program Coordinator of the Master of Engineering (Mechatronics) program. Associate Professor Manzie's research interests are in the applications of nonlinear and adaptive control, optimisation and learning systems to improve efficiency and emissions, particularly in the automotive and mechatronic domains. Recent projects include work on automotive powertrain control, hybrid vehicles, advanced control of machine tools and reducing wall turbulence drag through adaptive control to improve fuel efficiency. Associate Professor Manzie is currently an ARC Future Fellow, investigating low emission road transportation through alternative fuels and advanced vehicle technologies using online optimisation techniques.

Associate Professor Peter Lee

Associate Professor Peter Lee is the Program Coordinator of the Master of Engineering (Mechanical) program and the Deputy Head of the Department of Mechanical Engineering. Associate Professor Lee is a member of the Biomechanical Engineering research group and is interested in biomechanics; the ability to predict and better understand the mechanism of injury, leading to effective prevention strategies and rehabilitation engineering. One of his projects involves 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.

Alex Sear

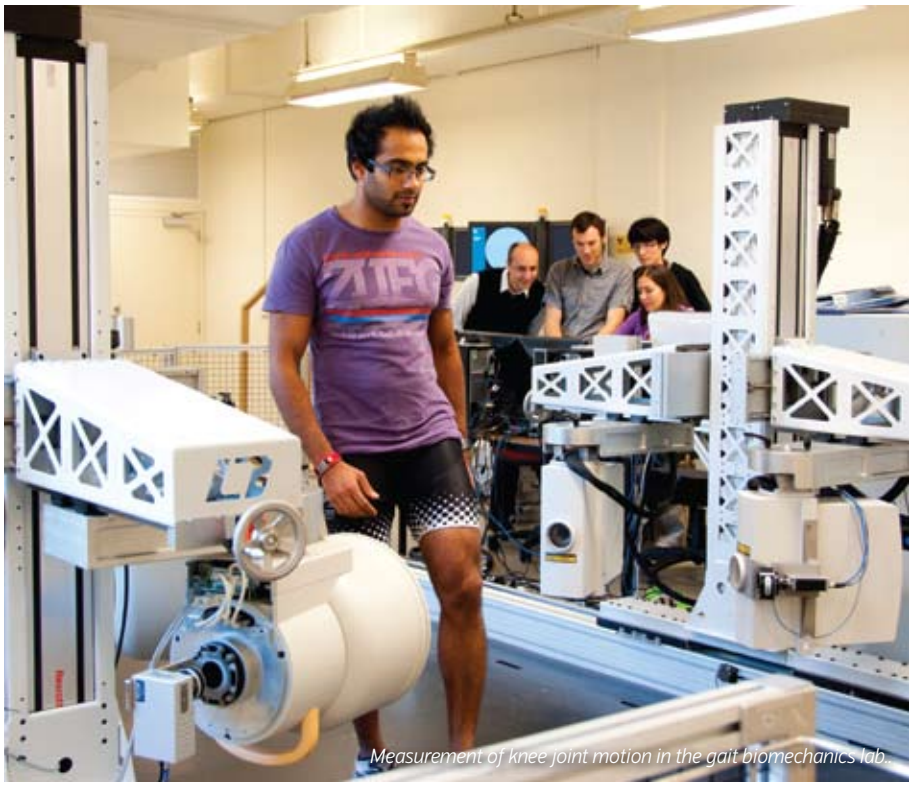
A desire to enhance his career prospects led Alex Sear to follow his applied physics degree at RMIT with a Master of Engineering (Mechanical) degree at the University of Melbourne, which will provide him with professional accreditation as a qualified engineer.

"Physics is very theoretical, whereas engineering is a lot more practical, and I feel as though I'm more of a practical person. I got several offers but I took the one at Melbourne because I'd prefer to do a Masters program rather than another undergraduate degree. I think that mechanical is a very broad stream of engineering. I looked up a lot of careers, and I found that quite a few jobs in Australia are in mechanical engineering, so I feel that it would be the best place for me to get a job, and it would provide the best job security."

Research spotlight: biomechanics of muscle function

Understanding the biomechanics of movement is essential to developing rehabilitation or preventative strategies for people with gait impairments. While many experiments have been conducted to help understand the biomechanics of human movement, Professor Marcus Pandy, Chair of Mechanical and Biomedical Engineering at the Department of Mechanical Engineering, says that little is currently known about the way individual muscles control body movement, primarily because muscle forces cannot be measured directly in people.

"Our research aims to advance the current understanding of muscle function during human locomotion and ultimately deliver improved rehabilitation and injury prevention programs that will ensure an active and healthy lifestyle for all Australians," Professor Pandy says.



Measurement of knee joint motion in the gait biomechanics lab.

Andrew George

After graduation, Andrew George found that the broad foundation of his mechanical engineering course meant his skills were also highly applicable in the areas of mechatronics and aeronautical engineering. Andrew 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 a foot in the door for 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, aerospace, or 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."

Coursework programs in Mechanical Engineering and Mechatronics

Master of Engineering (Mechanical)

The Master of Engineering (Mechanical) is designed to provide students with a formal qualification in engineering at the Masters level. Mechanical engineers focus on turning energy into power and motion. More specifically, this discipline looks at the generation, conversion and use of energy, as well as the design, construction and operation of devices and systems. Students learn from world leaders in fluid mechanics, turbulence and biomechanics, and have the opportunity to undertake an industry project combining research and practical implementation. Group activities and site visits help to consolidate theoretical knowledge and prepare students for employment.

Dual accreditation with Engineers Australia (provisional, until first students graduate) and EUR-ACE® allows graduates of the Master of Engineering, to practice as professional engineers in many countries around the world.

Career outcomes

Mechanical engineers have expertise in a variety of fields, such as energy technology, combustion, acoustics, noise and vibration control, fluid mechanics and aeronautics, automatic control, manufacturing, biomechanics, robotics, quality management, plant layout and process simulation. Graduates find employment in a diverse range of industries from the aeronautical and automotive industries, to robotics and manufacturing, in roles as environmental consultants, computer programmers and in management and finance roles. Emerging technologies in biotechnology, materials science, and nanotechnology will create further opportunities.

Entry requirements

- A University of Melbourne undergraduate degree in Commerce or Science with a Mechanical Systems major or sequence and an average of 65% in the final two years.
- An undergraduate degree from any university with an average grade of 65% (University of Melbourne equivalent) in the final two years, including the equivalent of 25 points (2 subjects) of first-year mathematics, specifically Calculus 2[1] and Linear Algebra[2] (or equivalent) and 25 points (2 subjects) of first year physics (or equivalent).

[1] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10006.

[2] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10007.

Course structure

Master of Engineering (Mechanical) sample course plan[1]

Year 1 (Prelim)	Sem 1	Engineering Mechanics	Engineering Communication	Mechanical Dynamics	Mechanics and Materials
	Sem 2	Engineering Computation	Engineering Mathematics	Fluid Mechanics and Thermodynamics*	Foundations of Electrical Networks
Usual entry point for applicants with 100 points advanced standing.					
Year 2	Sem 1	Thermodynamics	Control Systems	Materials	Design and Manufacturing 1
	Sem 2	Mechanical Design	Fluid Dynamics	Dynamics of Machines	Solid Mechanics
Year 3	Sem 1	Mechanical Engineering Elective	Mechanical Engineering Elective	Mechanical Engineering Elective	Capstone Project
	Sem 2	Mechanical Engineering Elective	Mechanical Engineering Elective	Design and Manufacturing 2	

Core subjects | Elective subjects

[1] These course plans are examples only and provided as an indicative guide. They will vary according to a student's undergraduate degree and the time of commencement.

*Subject may be replaced with Fluid Mechanics in 2013.

Electives are chosen from a prescribed list, available in the Student Handbook at https://handbook.unimelb.edu.au/view/current/MC-ENG.

Receiving credit towards your program

The Master of Engineering is a 300 point or three year program. Students with an engineering background may receive up to 100 points or one year of credit toward their program. To be assessed for credit, you must supply a copy of your completed engineering subject descriptions with your Master's course application.

Master of Engineering (Mechatronics)

The Master of Engineering (Mechatronics) is designed to provide students with a formal qualification in engineering at the Masters level. Mechatronics Engineering is a fast-changing discipline that blends mechanical, electrical and software engineering to develop automation and advanced manufacturing technologies.

In this program, you will:

- combine in-depth technical knowledge with broader aspects of engineering, such as project management and intellectual property
- learn to create and work with automated systems that feature computer control, such as robots, automobiles and CNC machines.
- Benefit from industry interaction and guest lectures and undertake an industry design project using state-of-the-art facilities, with companies such as Ford, ABB, ANCA, Invertech, Bosch and BAE Systems.

Dual accreditation with Engineers Australia (provisional, until first students graduate) and EUR-ACE® allows graduates of the Master of Engineering, to practice as professional engineers in many countries around the world.

Career outcomes

Mechatronics provides graduates with advanced skills and knowledge that can be used in a variety of interesting careers, such as developing 'smart' products and systems in the manufacturing or robotics industries. Graduates have a wealth of job opportunities with companies that use advanced automation equipment and computer integrated manufacturing systems, in the private and public sector, in fields such as aerospace and advanced manufacturing. Mechatronic engineers are able to solve a wide range of mechanical, electrical and software problems. This allows them to participate in and lead multidisciplinary teams in areas such as product development, manufacturing, computing and electronics hardware and software, mining engineering and robotics.

Entry requirements

- A University of Melbourne undergraduate degree in Science with a Mechanical or Software or Electrical Systems major and a GPA of 65% in the final two years.
- An undergraduate degree from any university with an average grade of 65% (University of Melbourne equivalent) in the final two years, including the equivalent of 25 points (2 subjects) of first year mathematics, specifically Calculus 2[1] and Linear Algebra[2] (or equivalent) and 25 points (2 subjects) of first year physics (or equivalent).

[1] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10006.

[2] University of Melbourne subject, see https://handbook.unimelb.edu.au/view/current/MAST10007.

Course structure

Master of Engineering (Mechatronics) sample course plan[1]

Year 1 (Prelim)	Sem 1	Engineering Mechanics	Engineering Mathematics	Mechanical Dynamics	Mechanics and Materials
	Sem 2	Engineering Computation	Engineering Communication	Fluid Mechanics and Thermodynamics*	Foundations of Electrical Networks
Usual entry point for applicants with 100 points advanced standing.					
Year 2	Sem 1	Software Modelling and Design	Control Systems	Electrical Network Analysis and Design	Digital System Design
	Sem 2	Mechatronics Design	Programming and Software Development	Dynamics of Machines	Advanced Control Systems
Year 3	Sem 1	Capstone Project	Algorithm and Complexity	Manufacturing Systems	Thermodynamics
	Sem 2	Capstone Project	Embedded Systems Design	Advanced Motion Control	Mechatronics Elective

Core subjects | Elective subjects

[1] These course plans are examples only and provided as an indicative guide. They will vary according to a student's undergraduate degree and the time of commencement.

*Subject may be replaced with Fluid Mechanics in 2013.

Electives are chosen from a prescribed list, available in the Student Handbook at https://handbook.unimelb.edu.au/view/current/MC-ENG.

Receiving credit towards your program

The Master of Engineering is a 300 point or three year program. Students with an engineering background may receive up to 100 points or one year of credit toward their program. To be assessed for credit, you must supply a copy of your completed engineering subject descriptions with your Master's course application.

Research Programs

The Melbourne School of Engineering conducts world-leading research focusing on problems of global importance. We emphasise multidisciplinary approaches and partnerships with government, industry and other research institutes. Research activities are organised into six disciplines across four interdisciplinary research themes, encouraging collaborative research and the development of leading research teams, attracting the best researchers and research students.

Research themes reflect areas in our world where engineers are seeking to build solutions to societal problems and currently include:

- biomedical engineering – in support of medicine and health
- information and communication systems – underpinning the future of information sharing, collaboration, education and business
- structured matter – the role modern materials play in our world
- sustainable systems and energy – the future of water, energy and the environment for our society.

Each theme has strong backing from industry and government, providing a well-supported research environment, with many opportunities for research students to work with staff on leading projects. Masters by research (MPhil) and PhD programs are available in all disciplines of the School.

An MPhil is normally a one-and-a-half year program (full-time), with a minimum of one year full-time and a maximum of two years part-time. MPhil students may apply for transfer to PhD candidature, ideally before the end of their first year. The transfer application must have the strong support of the candidate's supervisor and department.

Initial admission to PhD candidature is probationary. After 12 months, full-time candidates are eligible for admission to confirmed candidature. Confirmed candidature is normally for a further period of two years full-time. Candidates are guided by a research supervisor, who, in consultation with the candidate, arranges a research program designed to suit the individual requirements and interests of the candidate.

Find a Project/Find a Supervisor

To search for available PhD projects visit www.eng.unimelb.edu.au/research/graduate.html

To search for a supervisor visit www.findanexpert.unimelb.edu.au/support/supervisor.html

Lisa Lowe

Lisa completed her PhD in Environmental Engineering at the University of Melbourne. She is now a senior hydrologist at Sinclair Knight Merz, leading a team that works on groundbreaking water projects such as a water accounting report for the Murray-Darling Basin.

During her time as a PhD candidate, she was awarded a prestigious two-month internship at the United Nations in New York, working with a global water accounting team.

Lisa won Engineers Australia's Victorian Young Engineer of the Year award in 2010 for her outstanding work in the area of water accounting.

"In undertaking a PhD you gain a lot of independent thought. Coming out of uni into a graduate program at a large firm, you are always conscious that there are people around you, who have more experience. It's probably quicker and easier to go and ask them, rather than think it through yourself. A PhD really forces you to go to that next level. You become more confident in your own problem-solving abilities and you really learn to back yourself."

Research Opportunities by Discipline

Computing and Information Systems

The Melbourne School of Engineering is an international leader in research in Computer Science, Information Systems, and Software Engineering and has been a leading contributor to the technology revolution for over 50 years.

Research strengths include Business Information Systems, Complex and Intelligent Systems, Distributed and Cloud Computing, Health and BioInformatics, Interaction Design, Knowledge Discovery, Optimisation and Programming Languages.

Within these areas, a wide range of projects and collaborative ventures are underway, with organisations such as: NICTA Victorian Research Laboratory, IBM Global Research and Development Lab, Victorian Life Sciences Computing Initiative, Institute for a Broadband Enabled Society, Defence Science Institute and the Australian Urban Research Information Network.

Project topics include: investigation of media-based techniques for helping people to quit smoking; longitudinal data mining for neuropsychiatry research; algorithms for analysis of genomic data; network security and cyber crime; creation of a web-based intervention for young people suffering first episode psychosis; resource allocation models for grid computing; engineering safety critical software systems; development of computational models for renal behavior; medical image analysis; language preservation in Papua New Guinea; declarative language design; and adaptive diagrams for new media.

Our academic staff and research students publish work in high-quality international conferences and journals, and have earned an enviable reputation for cutting-edge foundational and applied research. We tackle problems across the range of human activities, and develop solutions that are of both immediate and long-term benefit to the community.

More information about computing and information systems research is available at www.cis.unimelb.edu.au/research/

Electrical and Electronic Engineering

The Department of Electrical and Electronic Engineering has a vibrant, internationally recognised research program, which receives exceptional support from industry and government and is focused in the following four research laboratories: control and signal processing; communications and networks; electronics and photonics; and neuroengineering.

Topics of interest include: mobile and wireless networks; network design and performance monitoring; optical communication systems; sustainability of growth of the internet; computational neuroscience; neuroimaging and neuroinformatics; audition, speech and bionic ear design; bionic eye design and vision; consciousness and communication; information theory; mathematical systems theory; numerical methods; signal processing and radar tracking; and control systems.

The Department is home to a number of research centres, including:

- National ICT Australia (NICTA) Victorian Research Laboratory
- Institute for a Broadband Enabled Society (IBES)
- Centre for Energy-Efficient Telecommunications (CEET) – (with Alcatel-Lucent's Bell Labs)
- The Melbourne Systems Laboratory (MSL)
- ARC Research Network on Intelligent Sensors, Sensor Networks and Information Processing (ISSNIP)

More information about Electrical and Electronic Engineering research is available at www.ee.unimelb.edu.au/research.

Infrastructure Engineering

The Department of Infrastructure is a unique blend of the disciplines of Geomatics, Civil and Environmental Engineering, focussed on solving large infrastructure problems. Our programs are dedicated to solving the major challenges facing societies around the world in the environment, physical infrastructure and spatial information. Over the years, we have established excellent links with industry and government. Our research projects focus on significant and topical subject matter, in the three main areas of: civil infrastructure; environmental hydrology and water resources; and geomatics.

The Department of Infrastructure is home to four important research centres:

- Research Network for a Secure Australia
- eWater Cooperative Research Centre
- CRC for Spatial Information
- Centre for Spatial Data Infrastructures and Land Administration

Areas of research investigation include: structural engineering; geotechnical engineering; management; energy efficiency in buildings; integrated transport; disaster management; catchment systems; environmental monitoring and assessment; water resource management; next generation flood prediction; impacts of climate change; land administration; environmental modelling; food production; artificial intelligence; and spatial data infrastructure.

More information about Infrastructure Engineering research is available at www.ie.unimelb.edu.au/research/.

Mechanical Engineering

Mechanical engineering interacts with all branches of engineering and is increasingly involved with other disciplines, such as medicine and biology. The Department of Mechanical Engineering has a strong research program focused in the areas of biomechanical engineering and fluids and thermal sciences, with world-leading expertise in areas such as fluid mechanics, turbulence and biomechanics.

The Fluids and Thermal Sciences Group has projects in the areas of fundamental fluid mechanics, drag reduction and control, applied thermodynamics and internal combustion engines. The Biomechanical Group's research into gait analysis aims to assist children with cerebral palsy and to prevent the elderly from falls caused by tripping. Other projects include: investigating joint stress in knee osteoarthritis and hamstring muscle biomechanics during sprinting.

The Department is involved in the following research groups and centres:

- National Health and Medical Research Council (NHMRC) Centre of Clinical Research Excellence – Gait Analysis and Gait Rehabilitation
- Australian Research Council (ARC) Centre of Excellence – Design in Light Metals
- Advanced Centre for Automotive Research and Testing (ACART).

More information about Mechanical Engineering research is available at www.mech.unimelb.edu.au/research.

Chemical and Biomolecular Engineering

Chemical and biomolecular engineers continue to expand their understanding of chemical, physical and biological processes in order to address global issues. The Department of Chemical and Biomolecular Engineering has a large and diverse research program, which focuses on four key areas: environmental engineering; nano and biomolecular engineering; bioprocess engineering; and materials and minerals engineering. Examples of research activities include investigation into soil remediation in Antarctica, reduction of evaporation in water catchments, carbon capture and storage, targeted drug delivery and tissue engineering.

The Department is home to several major research centres and units:

- Particulate Fluids Processing Centre (PFPC)
- Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC)
- Centre for Nanoscience and Nanotechnology (CNST)
- CRC for Polymers.

Research groups include: the Geopolymer and Mineral Processing Group; the Polymer Science Group, the Solid Liquid Separations Group; the Complex Fluids Group; the Nanostructured Interfaces and Materials Group; the Dynamic Interfacial Forces Group, the Tissue Engineering Group and the Surface Chemistry Group.

More information about Chemical and Biomolecular Engineering research is available at www.chemeng.unimelb.edu.au/research.

Biomedical Engineering

New technologies have increased our understanding of how biological systems work, making biomedical engineering one of the most exciting and challenging areas in engineering today. Biomedical engineering is a truly interdisciplinary area, with staff participating in the program from across the School, working in the heart of Australia's premier clinical and bioresearch hub in Parkville.

We aim to pursue research and development opportunities where engineering expertise is essential to address clinically meaningful problems. Through our collaborations with NICTA's ICT for Life Sciences program, the Hugh Williamson Gait Analysis Laboratory at the Royal Children's Hospital, the Bionics Institute, Bio21, the Walter and Eliza Hall Institute, the Ludwig Cancer Institute, Murdoch Children's Research Institute, Bionic Vision Australia and others, we are delivering world-class research in the areas of bioinformatics, computational modelling, biomechanics and medical imaging to address issues such as immune system function, the spread of infection, epilepsy and cancer treatment.

More information about Biomedical Engineering research is available at www.bme.unimelb.edu.au/research.

Scholarship Opportunities

University of Melbourne 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. The University also acknowledges 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 International Fee Remission Scholarships
- Melbourne International Research Scholarships
- International Postgraduate Coursework Award
- International Postgraduate Research Scholarships
- Graduate Access Melbourne Bursaries
- Indigenous Scholarships
- Melbourne Global Grants
- Australian Postgraduate Awards
- Melbourne Research 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

Melbourne School of Engineering Scholarships

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

Undergraduate scholarship opportunities:

- 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.
- Tewksbury Aspiring Engineer Scholarship for Female 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.

Graduate coursework scholarship opportunities:

For students enrolled in professional Masters degrees:

- Master of Engineering (11 streams)
- Master of Information Technology (4 streams)
- Master of Information Systems
- Master of Spatial Information Science

- MSE Foundation Scholarships – Academic Merit
  - $20,000 scholarships awarded as a $10,000 bursary over two years, and $10,000 tuition fee waiver over 2 years for high achieving international students.
  - $10,000 scholarships awarded as a $10,000 bursary over 2 years for high achieving local students.
- MSE Foundation Graduate Access Scholarship Program
  - $10,000 scholarships awarded as a $10,000 bursary over 2 years to local students, who have experienced disadvantage during their undergraduate studies; or are from under-represented groups including women in engineering.
- MSE Foundation Master of Science (Computer Science) Scholarship
  - $10,000 scholarship for the Master of Science (Computer Science) program based on academic merit.
- JH Mirams Scholarship for specialised Masters students.
  - $5,000 scholarships to high achieving students who have applied for a specialised Masters program.

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

Enquiries to:
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

Detailed information about fees and funding support for international and local students including undergraduate and postgraduate local and international fee brochures, scholarships, loans and grants, youth allowance, austudy and abstudy, currency converters, the cost of living in Melbourne and financial aid, is available at http://www.futurestudents.unimelb.edu.au/admissions/fees.

Commonwealth supported places

The Master of Engineering program is generously supported with many Commonwealth Supported Places (CSPs) for local students, and a number of CSPs are also available in the Master of Information Systems, the Master of Spatial Information Science, the Master of Information Technology and the Master of Energy Systems programs. Full details about engineering courses and CSPs is available at http://www.eng.unimelb.edu.au/study/graduate/fees.html.

HECS-HELP and FEE-HELP Loans

If you are enrolled in a CSP you may also be eligible for HECS-HELP, the Australian Government's Higher Education Loan Program. HECS-HELP allows you to borrow the amount of your student contribution and pay the loan back once you are in the workforce and earning more than a specified amount. Alternatively, you can pay your student contribution upfront and may be eligible for a 10% discount. HECS-HELP is available to eligible Australian citizens and permanent humanitarian visa holders who are enrolled in a CSP. More information is available at http://studyassist.gov.au/sites/StudyAssist/.

If you are enrolled in an Australian fee place, you are required to pay the full cost of your tuition fees and may be eligible for a FEE-HELP loan from the Australian Government. FEE-HELP can cover all or part of your tuition fees. The Australian Government pays the amount of the loan directly to the University. You then repay your loan through the Australian taxation system, when your income is above the minimum repayment threshold. More information is available at http://studyassist.gov.au/sites/StudyAssist/.

Graduate Access Melbourne

Graduate Access Melbourne provides access to applicants whose personal circumstances have had a sustained adverse effect on their academic achievement at undergraduate level or who are members of a specified group known to be under-represented in higher education. Information about Graduate Access Melbourne is available at www.futurestudents.unimelb.edu.au/admissions/entry-requirements/other-entry-options/graduate-access-melbourne.

Women in Engineering

The Melbourne School of Engineering recognises that women are an under-represented group in engineering and encourages applications through Graduate Access Melbourne at www.futurestudents.unimelb.edu.au/admissions/applications/other-applications/how-to-apply. All local female applicants will be considered for a Graduate Access scholarship.

How to apply

Coursework programs

Students complete an application form available on the University's Future Students website at http://futurestudents.unimelb.edu.au/admissions.

Applications should include full transcripts (or certified copies) of all University study undertaken to date. An applicant whose first degree was studied in a language other than English is required to meet the Melbourne School of Engineering's English language requirements.

Credit for prior study

Credit for students with a first degree or prior study in engineering can be assessed upon application. Applicants must supply a copy of their prior university's subject descriptions with their application, for a credit assessment to be made.

Masters by Research and PhD

Before you apply find a supervisor:

As a research student you will work under the guidance of an academic supervisor. Your supervisor will provide advice and direction throughout your research project. Your PhD project is often part of a larger project run by your supervisor.

It is your responsibility to identify a supervisor you would like to work with. You must name a supervisor on your application, who must agree to your research proposal.

To search for a supervisor or project areas of interest, please visit the Engineering website at www.eng.unimelb.edu.au.

Scholarships

Applicants should be aware the average mark required for a scholarship is higher than the average mark for admission, which is 75%. Marks are adjusted to be comparable with the University of Melbourne standards of assessment.

Application dates

Applications are accepted at any time, but scholarship application deadlines should be noted:

- Local applicants – October 31
- International applicants – August 31.

The majority of scholarships are offered in rounds following these application dates. A small number of additional scholarships will be offered throughout the year.

Application guidelines

Applications should include full transcripts (or certified copies) of all your University study undertaken to date. An applicant whose first degree was studied in a language other than English is required to meet the Melbourne School of Engineering's English language requirements.

Information about research opportunities and the application process is available at www.eng.unimelb.edu.au/research/graduate.html.

English language requirements

All students studying at the University of Melbourne must satisfy the University of Melbourne English language entry requirements. Full details are available at: http://futurestudents.unimelb.edu.au/admissions/entry-requirements/language-requirements.

The IELTS, TOEFL and Pearson Test of English scores required for entry to graduate courses are listed below. Required scores must be achieved in one sitting. The Melbourne School of Engineering will accept graduate students with a slightly lower IELTS, TOEFL or Pearson Test of English score, as outlined in the 'alternative English language requirements' in the table below. Under the Engineering English Language Alternative Entry for graduates, coursework students enrol in University of Melbourne English language subject, "Presenting Academic Discourse" in the first semester of their studies. This adds a semester to the duration of their study program.

	IELTS* (academic English only)	TOEFL (paper-based test)*	TOEFL (internet-based test)*	Pearson Test of English (academic)
Normal English language requirements:	6.5 (no band less than 6.0)	577 + TWE 4.5	79 + Writing 21; Speaking 18; Reading 13; Listening 13	58-64 inclusive & no communicative skill below 50
Alternative English language requirements	6.00 with a TWE of 5.5	550 + TWE 4.0	60 + Writing 18	

Students who have achieved an overall IELTS band of 6.0 can also gain entry by successfully completing the University of Melbourne English Language Bridging Program (UMELBP). Details are available on the Hawthorn-Melbourne English Language Centre website at http://www.hawthornenglish.com/UMELBP.html.

Undergraduate Engineering and IT

Our programs have been designed to respond to the needs of industry and to provide students with an internationally competitive qualification.

Engineering majors are available in the:

- Bachelor of Biomedicine
- Bachelor of Environments
- Bachelor of Science

A breadth sequence in Engineering is available in the:

- Bachelor of Commerce

The Master of Engineering is also available to students who have completed a bachelor's degree at another university. Prerequisite studies in mathematics and science are required, details are in the University of Melbourne Handbook at https://handbook.unimelb.edu.au/view/current/MC-ENG.

Applicants with an engineering background may achieve up to 100 points of advanced standing, resulting in a course length of two years.* To be assessed for advanced standing, applicants must provide copies of subject descriptions from their University Handbook with their application.

* Students will undertake a 2.5-year Master of Engineering if they study Bioengineering or Chemical Engineering in the Bachelor of Commerce.

Engineering Pathways

School leavers

School leavers

exit to employment

Melbourne Model Degrees (3 years)

Bachelor of Biomedicine
Majors include:
- Bioengineering Systems

Bachelor of Environments
Majors include:
- Civil Systems
- Geomatics
- Environmental Engineering Systems

Bachelor of Commerce
Majors include:
- Bioengineering Systems*
- Chemical Systems*
- Civil Systems
- Computing and Software Systems
- Electrical Systems
- Mechanical Systems
- Environmental Engineering Systems

Bachelor of Science
Majors include:
- Bioengineering Systems
- Chemical Systems
- Civil Systems
- Computing and Software Systems
- Electrical Systems
- Geomatics
- Mechanical Systems

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.

Master of Engineering (2 years)

Specialisations:

- Biomedical
- Biomolecular
- Chemical
- Civil
- Electrical
- Environmental
- Geomatics
- Mechanical
- Mechatronics
- Software
- Structural

exit to employment with professional accreditation

IT Pathways

IT majors are available in the:

- Bachelor of Science

IT breadth sequences are available in the:

- Bachelor of Arts
- Bachelor of Commerce
- Bachelor of Environments
- Bachelor of Music

Engineering and IT start from day one, with foundation subjects in first year covering the fundamentals, and participation in workshops and projects that explore engineering and IT problem solving.

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

Undergraduate pathways

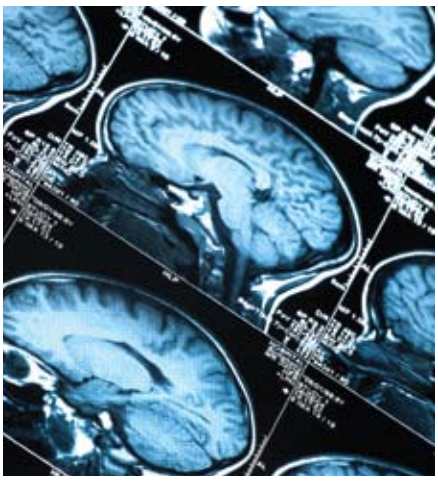
Engineering via the Bachelor of Biomedicine

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

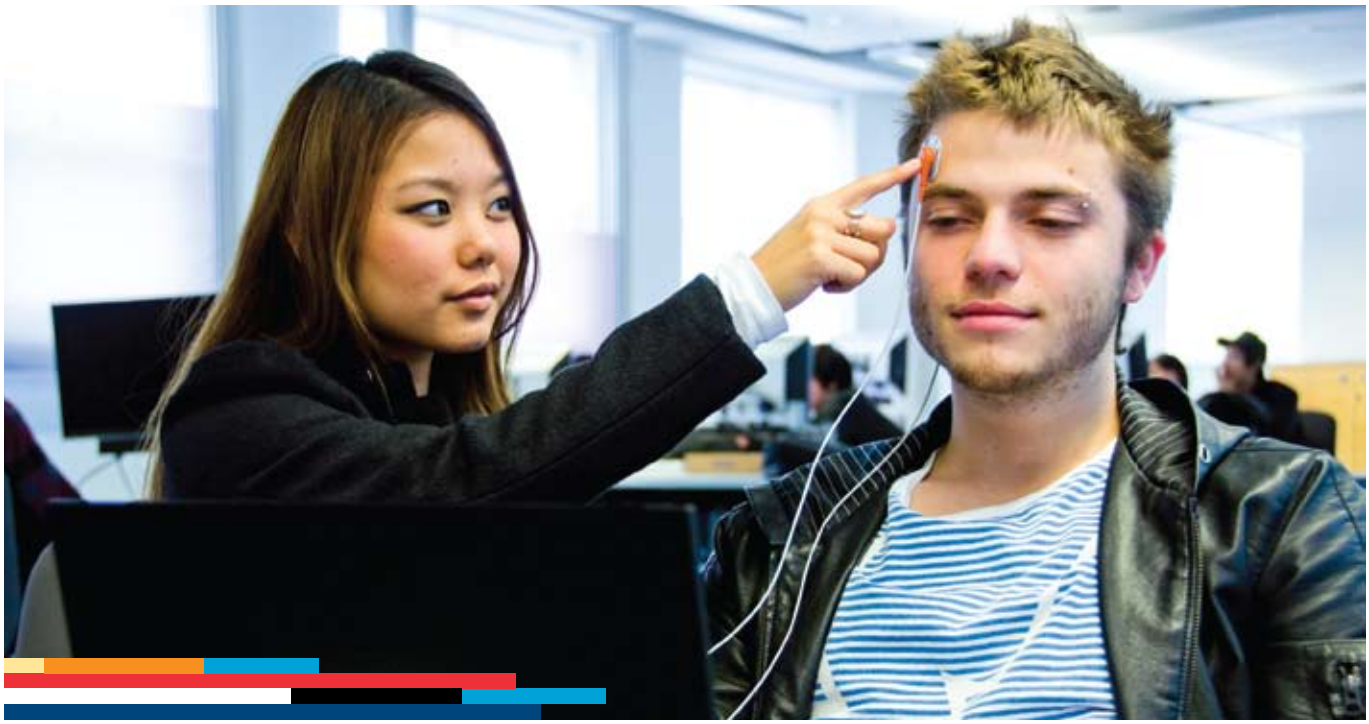
Find out more about the Bachelor of Biomedicine at www.bbiomed.unimelb.edu.au

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 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

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.

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

DURATION: 3 YEARS FULL-TIME (24 SUBJECTS)

FEE TYPE: CSP AND INTERNATIONAL FEE

CAMPUS: PARKVILLE

Engineering via the Bachelor of Environments

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

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

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

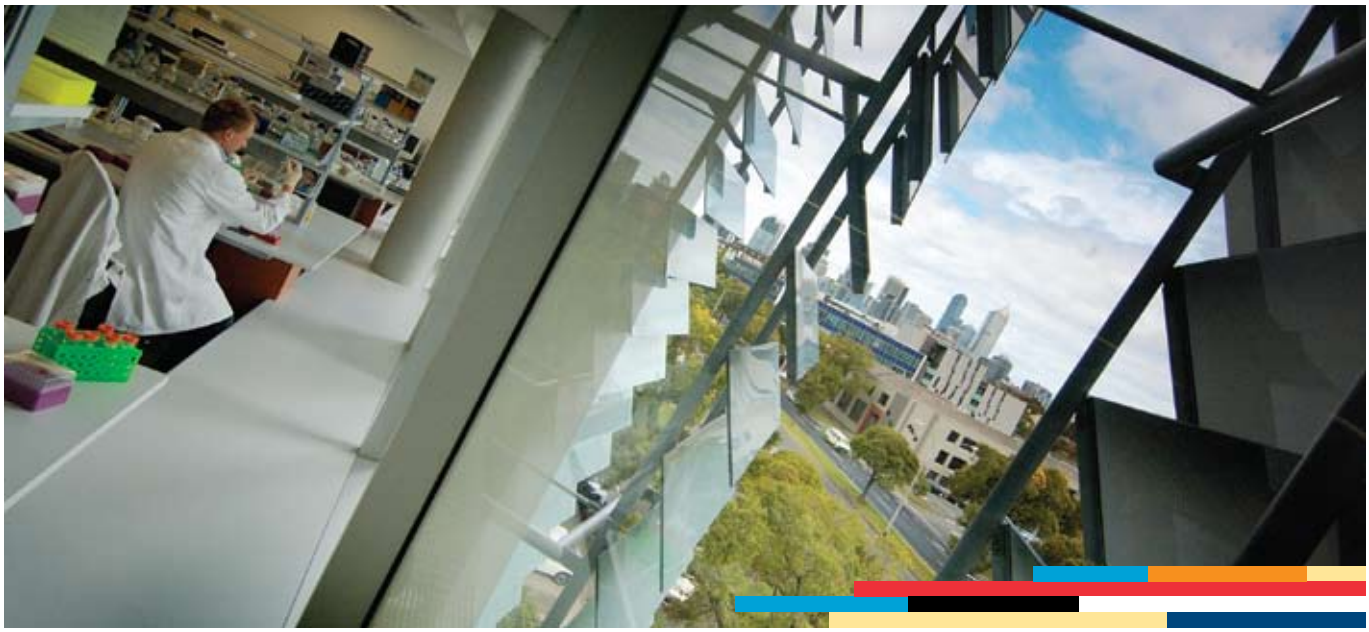
Find out more about the Bachelor of Science at www.bsc.unimelb.edu.au

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.



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]

Without programming experience[2]

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.

Further information for undergraduate applicants

Course information	http://futurestudents.unimelb.edu.au/courses/undergraduate
How to apply	http://www.futurestudents.unimelb.edu.au/admissions
Entry requirements	http://www.futurestudents.unimelb.edu.au/admissions/entry-requirements
English language requirements	http://www.futurestudents.unimelb.edu.au/admissions/entry-requirements/language-requirements (see also page 65)
Scholarships	http://www.eng.unimelb.edu.au/scholarships/ug_schol.html and http://futurestudents.unimelb.edu.au/admissions/scholarships (see also page 63)
Fees for international students	http://futurestudents.unimelb.edu.au/admissions/fees/international
Fees for local students	http://futurestudents.unimelb.edu.au/admissions/fees/undergraduate-domestic
Commonwealth Supported Places and HECS-HELP	http://studyassist.gov.au/sites/StudyAssist/
Careers and industry	http://www.eng.unimelb.edu.au/study/careers/
First year engineering	http://www.eng.unimelb.edu.au/study/undergraduate/

You can download a copy of the Engineering Undergraduate Study Guide at
http://www.eng.unimelb.edu.au/study/undergraduate/pdf/study-guide-ugrad.pdf

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