



THE UNIVERSITY OF  
WESTERN AUSTRALIA

FACULTY OF ENGINEERING, COMPUTING AND MATHEMATICS

# Professional Engineering at UWA



# What we are about



Engineering is a force to create profound change and improvement in society. At UWA, our goal is to create independent graduate engineers who are empowered to change the world and seek solutions to humanity's greatest challenges. We aim to push the limits of engineering research and learning within an atmosphere of cross-disciplinary collaboration.

## Real-world research

We take on projects of global significance, from inventing a needle microscope to pinpoint cancer cells to creating safer designs for oil and gas pipelines. Our research directly informs strategy, policy, training and operations in the real world. During your studies you will benefit from close interaction with our leading researchers and their links to industry.

## Highly skilled graduates

The Engineering program at UWA is internationally recognised and reviewed by Engineers Australia for accreditation. The Master of Professional Engineering is designed to produce graduates that are versatile, technically adept and qualified at an advanced level to

meet industry demand. Our graduates are sought-after by employers and go on to become outstanding leaders in their chosen profession.

## Forward-looking

It is an exciting time to join us as an engineering student. Not only have we accumulated over 100 years of achievement and a ranking in the top 1% of the world's universities, but we're also well underway with a \$250 million investment program at UWA for a revolutionary new Engineering Zone – a knowledge space that will reinforce the Faculty's reputation as an international engineering centre of excellence.

I invite you to explore our engineering program as well as our numerous extracurricular opportunities, study abroad options, and scholarships that will enable you to realise your career ambitions and make a lasting difference. Welcome to our Faculty.

## Professor John Dell

Dean  
Faculty of Engineering,  
Computing and Mathematics



“Chevron Australia works closely with The University of Western Australia (UWA) to strengthen research capacity, technology development and education and training projects. As part of this, the company funds the Chevron Chair in Gas Process Engineering and Chair in Geophysics at UWA, which are undertaking important research for the industry as well as opening career pathways. UWA represents a significant market share of new graduates hired by Chevron Australia. These individuals not only contribute directly to Chevron's projects in WA, they also have the opportunity to work around the globe on our diverse assets and projects.”

*Kaye Butler*  
General Manager Human Resources, Chevron Australia

# Eight reasons why UWA Engineering should be your number one choice:

## 01 Global reputation

UWA is ranked in the top 1% of the world's universities by the Academic Ranking of World Universities and has been at the forefront of education and research for over a century.

## 02 Outstanding location near Perth's CBD

Study in the heart of a city that combines the best of everything for Engineers – fantastic career opportunities via a vibrant mining and energy sector as well as a top lifestyle with beautiful beaches, surf culture and a Mediterranean climate. No wonder that Perth has been ranked among the 10 most liveable cities in the world by The Economist 2014.

## 03 Employability

We are proud to have launched the careers of many brilliant individuals. Our engineering and technology graduates are among the highest paid graduates in their field in Australia, earning an average starting salary of \$70,244 according to The Good Universities Guide 2014.

## 04 Research strength

UWA is one of Australia's elite Group of Eight research-intensive universities. Our Faculty's research teams have global partnerships with leading industry players and attract a research income of more than \$27 million a year.

## 05 Industry connections

We are committed to producing graduates who are well-prepared for their chosen career. We have many industry partnerships including Apache, BHP Billiton, Chevron, Clough, Lycopodium, Monadelphous and Rio Tinto. These industry links provide a range of employment opportunities through vacation work, internships, volunteer work and graduate careers.

## 06 Innovative and flexible learning

Our courses allow you to explore different fields of engineering and take broadening units before selecting your specialisation.

## 07 Engineering clubs and societies

From building race cars and helping overseas communities, to organising site visits, our student-run clubs cover just about every aspect of engineering and give you the chance to put your studies into practice in a social and fun environment.

## 08 Teamwork

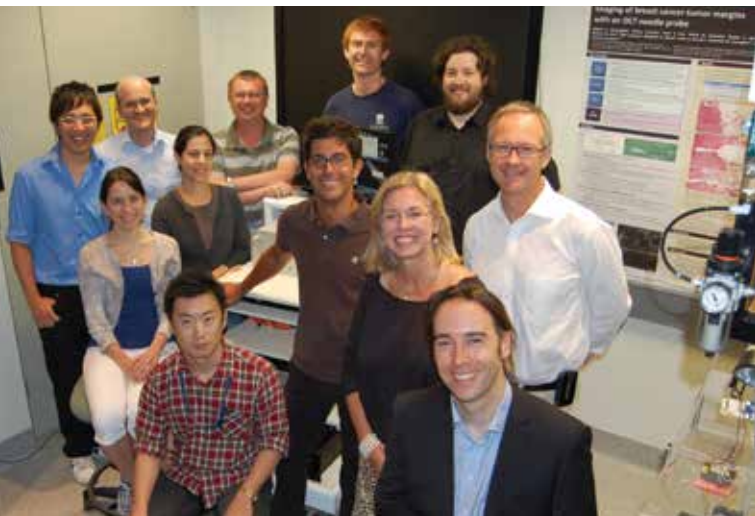
Our courses give you the opportunity to work in multidisciplinary teams of students to solve major real-world engineering problems that impact societies in Australia and internationally.

## Contents

<b>Make an impact</b>	<b>02</b>
<b>Student environment</b>	<b>03</b>
<b>Industry and careers</b>	<b>05</b>
<b>Study abroad</b>	<b>06</b>
<b>Engineering Pathway</b>	<b>07</b>
<b>Master of Professional Engineering</b>	<b>08</b>
Chemical Engineering	
Civil Engineering	
Electrical and Electronic Engineering	
Environmental Engineering	
Mechanical Engineering	
Mining Engineering	
Software Engineering	
<b>Engineering Science major</b>	<b>16</b>
<b>Admissions</b>	<b>17</b>

# Make an impact

UWA attracts and supports talented individuals who are committed to innovating in their field. The drive, ambition and output of our academic staff means our Faculty has an international reputation for excellence and you get a unique learning experience.



“Our team is developing the world’s smallest hand-held microscope in a needle to display 3D images detailed enough to detect cancer cells. Each year 1.4 million new cases of breast cancer are diagnosed. Our discovery will help guide surgeons to completely remove cancer more effectively in breast cancer surgery. So significant is this invention that we have received major support from Cancer Council WA and the Federal Government.”

**Associate Professor Robert McLaughlin,**  
Optical + Biomedical Engineering Laboratory



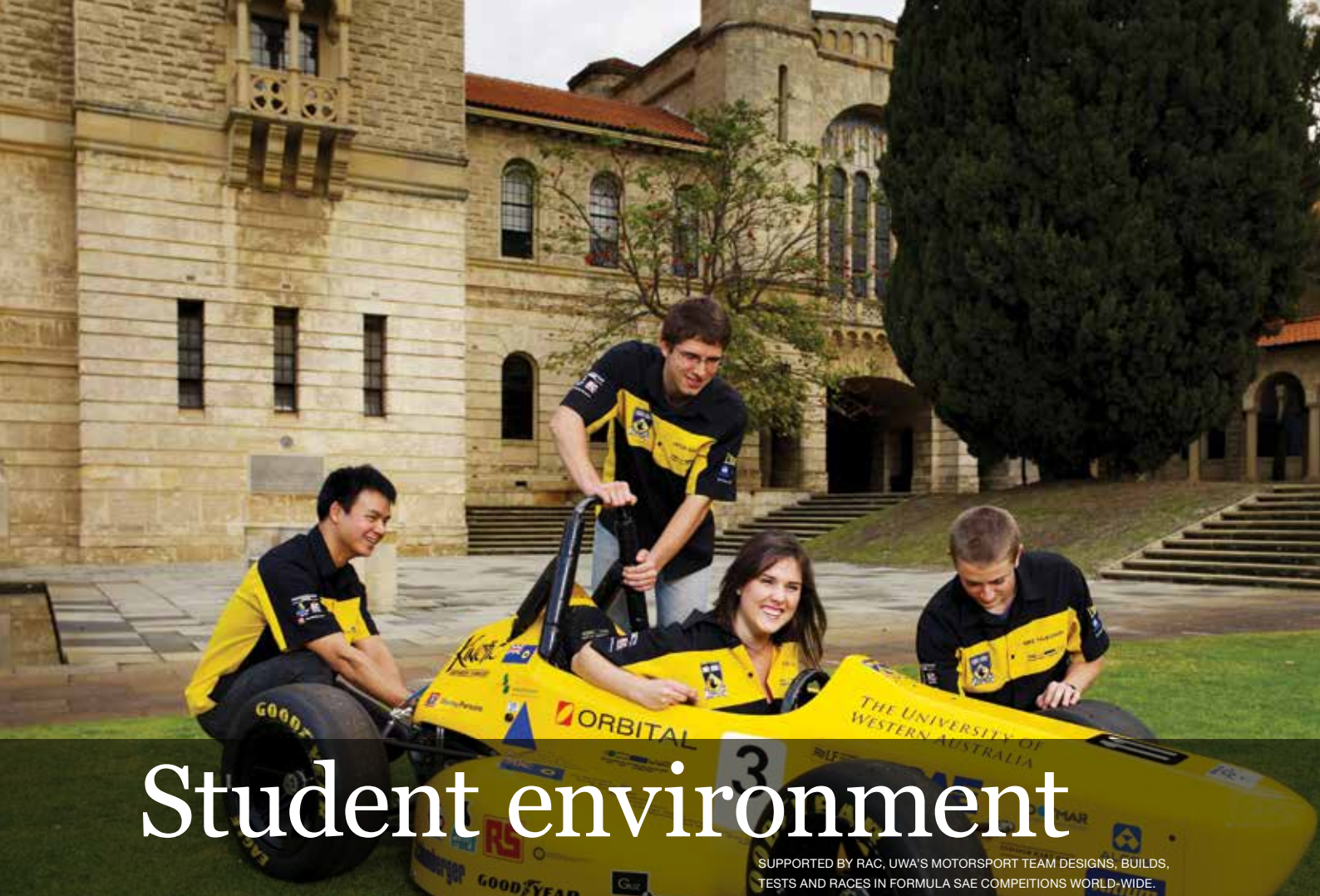
“I am passionate about how science and engineering can help create solutions for environmental as well as social problems. With ‘Waste for Life’, I’m working on projects in Argentina and Lesotho that help local cooperatives utilise eco-design to transform waste into products to alleviate poverty.”

**Caroline Baillie,**  
Chair of Engineering Education and co-founder of the ‘Engineering and Social Justice’ network and non-profit organisation ‘Waste for Life’



“My work focuses on engineering solutions for offshore systems such as pipelines, platforms and mooring systems, primarily for the oil and gas industry. The modelling facilities we have at UWA include the world’s busiest geotechnical centrifuges and a unique ‘O-tube’ cyclone simulator. Our research using these tools has led to new design methods to address the unique engineering challenges presented by the Australian offshore environment.”

**Professor David White,**  
Shell EMI Professorial Chair in Offshore Engineering,  
Centre for Offshore Foundation Systems



# Student environment

SUPPORTED BY RAC, UWA'S MOTORSPORT TEAM DESIGNS, BUILDS, TESTS AND RACES IN FORMULA SAE COMPETITIONS WORLD-WIDE.

## The full experience

Our engineering students and graduates are constantly involved in innovative, exciting and meaningful projects. Employers look for well-rounded individuals who embrace opportunities beyond their studies. As well as University-wide student clubs, you will have the choice of joining many dynamic engineering clubs.

We'll also help you start planning for your future career with guest lecturers, industry forums, careers fairs and one-on-one mentoring programs run by UWA's dedicated Careers Centre.

## Engineering clubs

- ✦ University Engineers' Club
- ✦ UWA Young Engineers' Club
- ✦ Engineers Without Borders
- ✦ Robogals
- ✦ The Australian Institute of Mining and Metallurgy
- ✦ Chemical and Process Engineering Club
- ✦ Computer Science
- ✦ The Institution of Mechanical Engineers UWA Chapter
- ✦ Environmental Engineers' Club
- ✦ Society of Petroleum Engineers
- ✦ UWA Motorsport Team
- ✦ The Renewable Energy Vehicle (REV) Project



## Robogals

Robogals is a student-run outreach organisation that aims to increase female participation in engineering, through fun and educational initiatives aimed at girls in primary and secondary school. Volunteers from our Faculty run robotics workshops across the State.

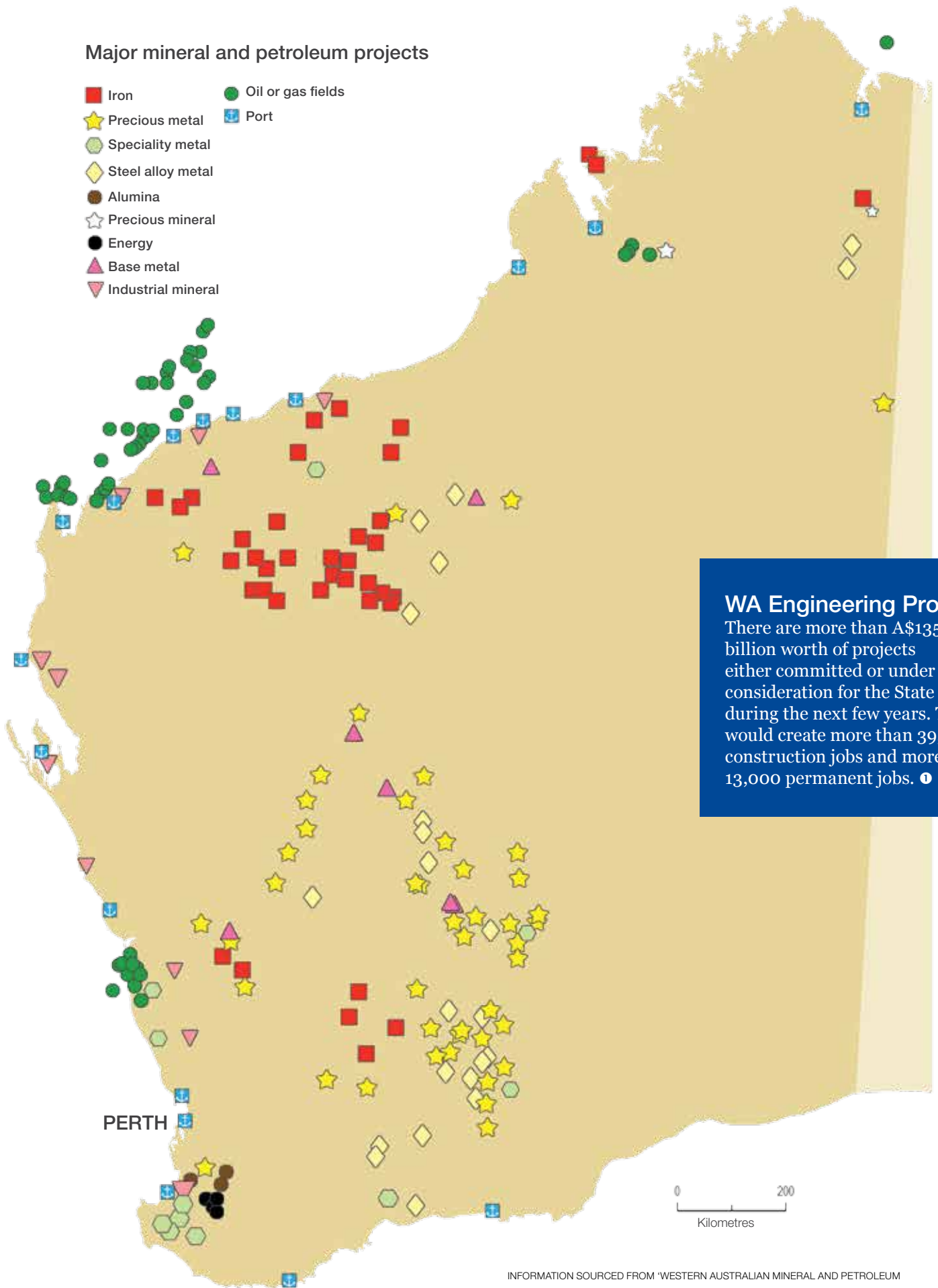
For more information about our student clubs visit [ecm.uwa.edu.au/students/clubs-and-societies](http://ecm.uwa.edu.au/students/clubs-and-societies)

## Engineers Without Borders

Engineers Without Borders (EWB) is an organisation that creates systematic change through humanitarian engineering. UWA's chapter provides you with unique opportunities to make a difference through outreach activities and real-world design challenges. This year, UWA students won the EWB Australia National Engineering Challenge with their design of a mosquito trap made from waste plastic bottles for a community in East Timor.

## Major mineral and petroleum projects

- Iron
- Oil or gas fields
- ★ Precious metal
- ⚓ Port
- ◊ Speciality metal
- ◊ Steel alloy metal
- Alumina
- ☆ Precious mineral
- Energy
- ▲ Base metal
- ▼ Industrial mineral



### WA Engineering Projects

There are more than A\$135 billion worth of projects either committed or under consideration for the State of WA during the next few years. These would create more than 39,000 construction jobs and more than 13,000 permanent jobs. ①

INFORMATION SOURCED FROM 'WESTERN AUSTRALIAN MINERAL AND PETROLEUM STATISTICS DIGEST 2012-2013, WA GOVERNMENT DEPARTMENT OF MINES AND PETROLEUM.

# Career advantage

Western Australia is at the hub of a vibrant mining and energy sector, which means engineering skills are in high demand.

## Your future

Join UWA's Engineering Faculty and you will study alongside a passionate, ambitious cohort of fellow students who together will become future innovators in their field.

Networking and engaging with industry are important components of the UWA experience. With our close industry contacts to major firms such as Apache, BHP Billiton, Chevron, Clough, Lycopodium, Monadelphous and Rio Tinto you will have a career head-start after you graduate.

These relationships have also enabled the creation of purpose-specific facilities at UWA such as the Monadelphous Integrated Learning Centre and the Clough Engineering Student Centre.

## Become a leader

UWA engineers are empowered to make it to the top of their chosen fields – many of our graduates go on to become CEOs and senior managers of major companies.

Engineers Australia named the following UWA graduates in their top 100 Australia's most influential engineers list in 2014: **Water Corporation CEO, Susan Murphy; McConnell Dowell Corporation CEO, David Robinson; Brookfield Multiplex Australasia CEO, John Flecker; Monadelphous Managing Director, Rob Velletri; Alcoa Australia Managing Director, Alan Cransberg; President of University College Dublin, Professor Andrew Deeks; WA Minister for Mines and Petroleum and Housing, Bill Marmion.**

## Benefits of WA

You can be confident that studying engineering at UWA will be an investment in your future career aspirations. Western Australia (WA) has the highest level of graduate engineering employment in Australia and some of the biggest projects this country has ever seen in an industry that is exciting and dynamic. **UWA graduates consistently gain full-time employment at a higher rate than graduates from other Western Australian universities.**

WA is the fastest growing state in Australia, and as 'Australia's engine room', has an abundance of iron ore, coal and natural gas deposits. The oil and gas sector of WA, in particular, is seeking skilled, professional engineering graduates across all fields.

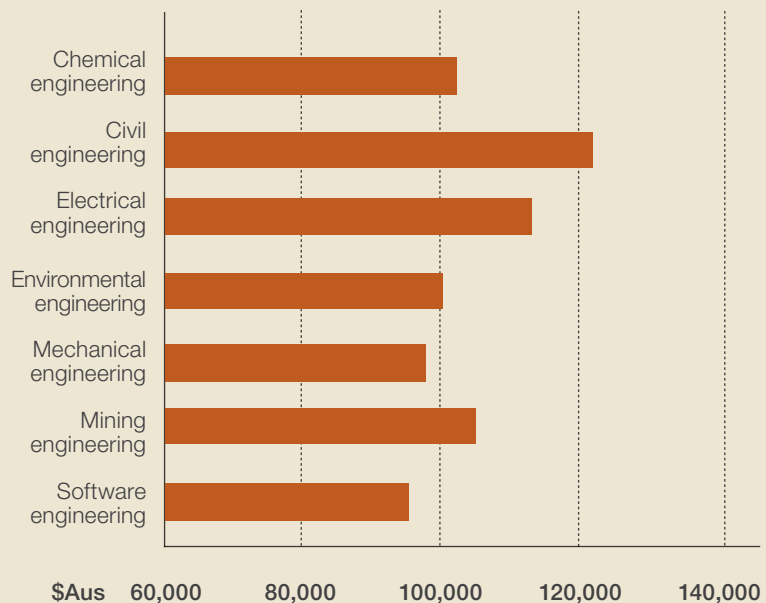
## Employment

Both here in Australia and internationally, employment opportunities are endless, with work available in the mining and resources industry, pharmaceutical manufacturing, power and water utilities, management and consultancy firms, and electronics, finance and telecommunications industries.

With excellent analytical and problem-solving skills, engineering graduates also have a strong base to branch out into different industries including senior management roles.

Find out more about where engineering has taken some of our graduates at [ecm.uwa.edu.au/courses/graduates](http://ecm.uwa.edu.au/courses/graduates)

## Average Australian salary, by specialisation<sup>2</sup>



<sup>1</sup> 2013 Prospect Magazine, WA Government Department of Mines and Petroleum and Department of State Development

<sup>2</sup> Data from March 2013 MyCareer job listings and PayScale.com



# Overseas study opportunities

With over 130 partner institutions around the world, you can tailor a UWA study abroad experience to suit both your studies and satisfy your wanderlust.

The UWA Student Exchange Program offers you an unparalleled global experience – the opportunity to study overseas at a renowned university for one or two semesters, with no additional tuition fees.

Whilst continuing to gain credit towards your UWA degree, you will not only benefit from an enriching learning experience that contributes

to character development, but you will create an international network, develop new friendships and gain a level of independence and confidence highly regarded by employers.

UWA's dedicated Study Abroad Office can provide all of the information you need to select the overseas university that is right for you. Some destinations you may

consider include Queen's University (Canada), Lund University (Sweden), UMB (Norway), The University of Sheffield (UK), National University of Singapore and University of Illinois (USA).

For more information visit [international.uwa.edu.au/students/exchange](http://international.uwa.edu.au/students/exchange)



“I chose UWA as I got the flexibility to study Engineering and continue with my Japanese language skills. I was able to do an exchange to Japan for a year. It was a chance to try something completely different. Plus I made some great friends and contacts all around the world.”

*Jessica Regan,  
BE (Chem.Eng)/BA (Japanese) and Clough Scholar*





# Become an Engineer

UWA'S CLOUGH STUDENT CENTRE IS A PURPOSE-DESIGNED SPACE OPEN 24/7 FOR ENGINEERING STUDENTS

The Engineering program at UWA has been developed in consultation with industry to equip students with the skills to succeed in their future careers.

To become a professionally qualified engineer, students complete five years of study, consisting of a three-

year undergraduate degree with an Engineering Science major, followed by a two-year Master of Professional Engineering.

Full course details can be found at [studyat.uwa.edu.au](http://studyat.uwa.edu.au)

**The pathway to professional engineering is now easier and more accessible than ever before at UWA.**

## How to become an engineer with UWA

**FIRST TIME UNIVERSITY STUDENTS**  
**UWA UNDERGRADUATE BACHELOR'S DEGREE**  
**(3 years) ❶**

In any discipline with a major in Engineering Science or equivalent. (See page 16 for more information).

**BACHELOR'S DEGREE GRADUATES**  
 Graduates with any bachelor's degree and prior studies in engineering, maths or physics.

**MASTER OF PROFESSIONAL ENGINEERING (2 years) ❷**

Professional Postgraduate degree

Specialisations:

- Chemical Engineering
- Civil Engineering
- Electrical & Electronic Engineering
- Environmental Engineering
- Mechanical Engineering
- Mining Engineering
- Software Engineering

## CAREER

Gain employment with a professional accreditation or explore further research opportunities.

❶ See Admissions page 17 for information about the Assured Entry Pathway. For information on the Computer Science and Mathematics majors, see the Computing and Mathematics booklet.  
 ❷ The MPE course duration will be 2-3 years for graduates without previous studies in engineering or students without required units from prior study. Recognition of prior learning and/or application for credit ('advanced standing') will be assessed by the University on a case-by-case basis at the time of application.



# Master of Professional Engineering

UWA'S CENTRIFUGE SUPPORTS INDUSTRY ADVANCES IN DEEP-WATER ENGINEERING AND EXPLORATION.

## Specialisations:

- ↘ Chemical Engineering
- ↘ Civil Engineering
- ↘ Electrical & Electronic Engineering
- ↘ Environmental Engineering
- ↘ Mechanical Engineering
- ↘ Mining Engineering
- ↘ Software Engineering

The Master of Professional Engineering (MPE) is a postgraduate engineering qualification of usually two years duration. The course will equip you to practice as a professional engineer, seek employment in industries requiring a high degree of numeracy, including finance and consulting, or pursue further research studies in engineering.

## Who can apply?

The MPE is suitable for students who want to obtain a qualification that will enable them to practice as an Engineer in Australia and internationally, for those that want to change careers and become an engineer, or for engineers that want to change engineering specialisation. If you don't already have an

undergraduate engineering degree, we can recommend a tailored program of conversion study.

## Course structure

This Master's program allows you to study core units in a particular specialisation of engineering along with a mix of advanced technical units, professional units, a research project, a design project and an industry placement. There is a strong focus on industry relevant project and research work to develop your leadership and management skills for your future career.

## Oil and gas careers

Students interested in a career in the oil and gas industry should opt to specialise in Chemical Engineering, Civil Engineering or Mechanical Engineering. Option units available within these specialisations include Petroleum Engineering, Gas Processing, Coastal and Offshore Engineering and Offshore Geomechanics.

## Accreditation

The Master of Professional Engineering has been assessed for accreditation by Engineers Australia, the national accreditation body. As is standard practice for new courses, it has provisional accreditation until the required number of students graduate in 2014/15. In addition, our graduates are recognised internationally through the Washington Accord of the International Engineering Alliance.

## Professional Practicum

The Master's program is focussed on delivering hands-on industry-related learning. As part of your engineering studies you will complete a total of 12 weeks work experience. This can be done with an engineering firm of your choice, and should be relevant to your MPE specialisation.



# Chemical Engineering<sup>o</sup>

Chemical engineers invent and design the methods and equipment to transform raw materials into useful products such as fuels, plastics, pharmaceuticals, textiles, foods and cosmetics.

Through the Chemical Engineering specialisation at UWA you will gain an in-depth understanding of topics such as advanced oil and gas processing technologies, combustion science and technologies, mineral processing technologies, advanced reaction engineering and catalysts, and flow phenomena relevant to chemical processes.

## Careers

Career options within the specialisation are extensive and exist in petroleum, minerals processing, petrochemical, iron

and steel manufacturing, mining, biotechnology, speciality chemicals, electronic materials, and fertiliser and food production. Other employment options include government agencies and state authorities concerned with gas, electricity, water supply and environmental protection.

① Students specialising in Chemical Engineering will be required to complete two additional units (Process Synthesis and Design, and Unit Operations and Unit Processes) in order to be eligible for professional accreditation with the Institution of Chemical Engineers (IChemE).

## Option units:

- Transport Phenomena
- Combustion Science and Technology
- Gas Processing —Flow Assurance and Gathering
- Gas Processing —Treating and LNG Production
- Process Instrumentation and Control
- Contaminant Fate and Transport
- Extractive Metallurgy
- Advanced Engineering Mathematics
- Modern Control Systems
- Petroleum Engineering
- Renewable Energy
- Interdisciplinary Design Project

## Course outline

ADVANCED THERMO - DYNAMICS	PARTICLE MECHANICS & SOLIDS HANDLING	NUMERICAL METHODS & MODELLING	ENGINEERING DESIGN PROJECT 1	ENGINEERING RESEARCH PROJECT 1	PROJECT MANAGEMENT & ENGINEERING PRACTICE	OPTION UNIT	OPTION UNIT
ADVANCED REACTION ENGINEERING & CATALYSTS	REACTION ENGINEERING	CONTROL ENGINEERING	ENGINEERING DESIGN PROJECT 2	ENGINEERING RESEARCH PROJECT 2	RISK, RELIABILITY & SAFETY	OPTION UNIT	OPTION UNIT

## Oil and gas networks

UWA engineering graduate Aman Chauhan is working for Shell on one of the largest oilfields in Sub-Saharan Africa. He sent us the below photograph of an elephant in his on-site back garden.

“If you want to study in energy then Perth is the best place in Australasia. UWA is very affiliated with industry. During my studies I was introduced to people from Shell – you cannot underestimate the power of networking. In Australia I’ve worked on offshore projects like the Gorgon gas project. In Gabon it is all onshore projects and about optimisation and maximising recovery. We’ve got a few hundred wells and so you never know what challenge is going to confront you. As an Engineer you get trained to deal in uncertainty and this is the part of the job I most enjoy.”

*Aman Chauhan,  
Principal Reservoir Engineer, Shell*





# Civil Engineering

Civil engineering deals with the design, construction and maintenance of the physical and naturally-built environment, including roads, bridges, canals, harbours, airports, dams and buildings.

With the Civil Engineering specialisation at UWA you may choose to study sub-disciplines such as geotechnical engineering, earthquake engineering, structural engineering, surveying, construction engineering and transportation engineering.

## Careers

Career opportunities exist in both the public and private sectors in construction, infrastructure, consulting, transport, project management, mining, environmental control, water, waste and energy. Civil engineering graduates are also valued in commercial and corporate sectors such as finance, banking and accountancy.

## Option units

- Structural Dynamics
- Transportation Engineering
- Underground Construction
- Offshore Geomechanics
- Introduction to Design of Offshore Systems
- Hydrology
- Coastal and Offshore Engineering
- Environmental Geotechnics
- Interdisciplinary Design Project

## Course outline

APPLIED GEOMECHANICS	STRUCTURAL CONCRETE	NUMERICAL METHODS & MODELLING	ENGINEERING DESIGN PROJECT 1	ENGINEERING RESEARCH PROJECT 1	PROJECT MANAGEMENT & ENGINEERING PRACTICE	OPTION UNIT	OPTION UNIT
CIVIL HYDRAULICS	STRUCTURAL STEEL	FINITE ELEMENT METHODS	ENGINEERING DESIGN PROJECT 2	ENGINEERING RESEARCH PROJECT 2	RISK, RELIABILITY & SAFETY	OPTION UNIT	OPTION UNIT

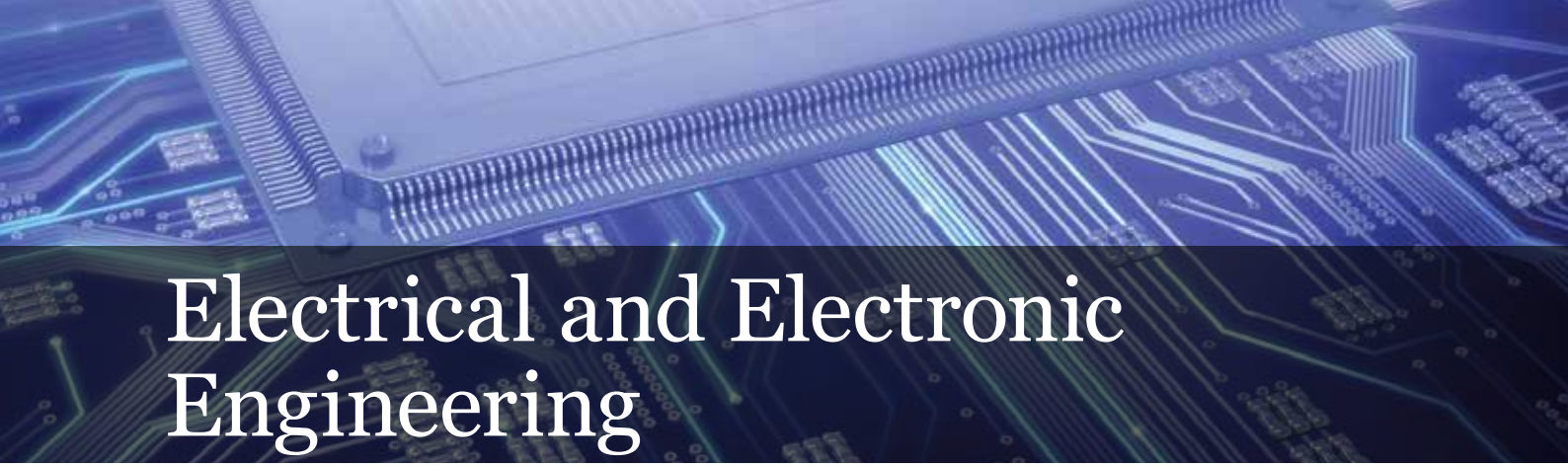


## Doing something different

Damien Flynn is a UWA Civil Engineering graduate who has used his engineering skills to branch out and take on leadership roles in various industries.

“A UWA Engineering degree was an excellent course for determining how to approach and solve very complex problems. This has been applicable to every role I have had in my career. I’ve worked in mergers and acquisitions for a building materials company, managed cost reduction on a diamond mine, led continuous improvement in a steel company and led the corporate strategy function of an automotive parts company. I’ve worked in Australia, New Zealand, Canada and throughout the United States. I now work for gategroup, an independent global provider of products, services and solutions related to an airline passenger’s onboard experience. Our extensive range of offerings ensures a comfortable experience for 300+ million people on the move each year.”

*Damien Flynn,*  
Chief Commercial Officer, gategroup Airline Solutions, North America



# Electrical and Electronic Engineering

Electrical and electronic engineering spans from the nanometres-thick scale of advanced electronic devices to the kilometres-long scale of power transmission, and everything in between.

Through the Electrical and Electronic Engineering specialisation at UWA you will learn to solve problems concerned with the generation and transmission of information and electric power, and the design and testing of electrical and electronic devices, circuits and systems.

You will also consider the context of the broader system application within which all of this falls, including economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability constraints.

## Careers

Career opportunities exist in innovative fields such as developing sustainable energy solutions, designing technologies to improve healthcare, creating systems that support industry or communities, or designing electronics that transform lives.

## Option units

- Advanced Communications
- Analogue Electronics
- Digital Microelectronics Systems Design
- Power Electronics

- Power System Analysis
- Process Instrumentation and Control
- Optical Engineering, Photonics and Biomedical Imaging Systems
- Semiconductor Nanoelectronics
- Modern Control Systems
- Robotics
- Computer Vision
- Artificial Intelligence and Adaptive Systems
- Mobile and Wireless Computing
- Numerical Methods and Modelling
- Renewable Energy
- Finite Element Methods
- Interdisciplinary Design Project

## Course outline

CIRCUITS & ELECTRONIC SYSTEMS	DIGITAL & EMBEDDED SYSTEMS	ADVANCED ENGINEERING MATHEMATICS	ENGINEERING DESIGN PROJECT 1	ENGINEERING RESEARCH PROJECT 1	PROJECT MANAGEMENT & ENGINEERING PRACTICE	OPTION UNIT	OPTION UNIT
COMMUNICATIONS SYSTEMS	SIGNAL PROCESSING	CONTROL ENGINEERING	ENGINEERING DESIGN PROJECT 2	ENGINEERING RESEARCH PROJECT 2	RISK, RELIABILITY & SAFETY	OPTION UNIT	OPTION UNIT

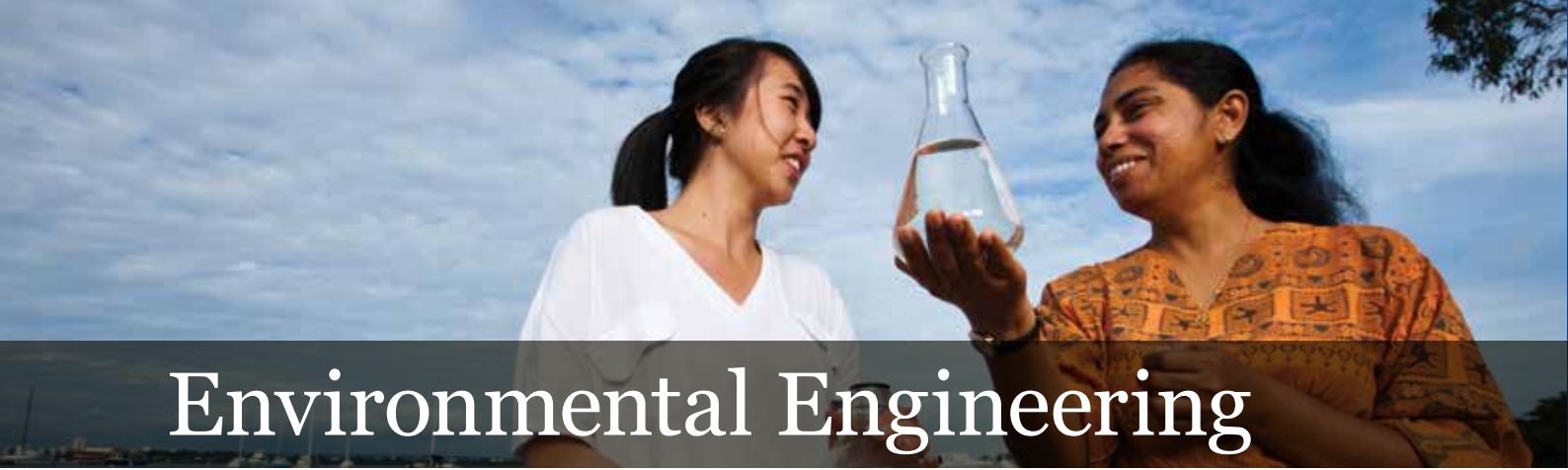
## Making mining safer with robots

Angeline Kings-Lynne is a UWA Engineering graduate who is working as Manager of Controls and Automation at Transmin.

“Transmin makes large scale machinery, primarily for the mining industry. My department automates these machines, to make mining safer and more efficient. In effect, my team gets to work with giant robots! I’m not sure where my future career will lead me, but I’d like to stay working with ground breaking technologies and interesting environments for the rest of my career.”

*Angeline Kings-Lynne,  
Manager Controls and Automation, Transmin Pty Ltd*





# Environmental Engineering

Environmental engineers apply their understanding of natural systems with engineering skills to find creative solutions to pressures facing our environment and sustainable development.

With the Environmental Engineering specialisation at UWA you will gain an in-depth understanding of environmental management and design, ecological engineering and design, environment modelling, contaminant fate and transport, hydrology, physical oceanography, environmental fluid mechanics, and advanced environmental systems and engineering.

## Careers

As an environmental engineer you will be highly sought after by employers in the public and private sectors including regulatory authorities, mining and construction companies, development organisations, consultancies and government agencies.

## Option units

- Environmental and Resource Economics
- Wastewater Engineering: Treatment and Resource Recovery
- Advanced Geographic Information Systems
- Advanced Engineering Mathematics
- Coastal and Offshore Engineering
- Environmental Geotechnics
- Renewable Energy
- Geotechnology of Mine Waste

## Course outline

CONTAMINANT FATE AND TRANSPORT	HYDROLOGY	SCIENTIFIC MODELLING	ENGINEERING DESIGN PROJECT 1*	ENGINEERING RESEARCH PROJECT 1	PROJECT MANAGEMENT & ENGINEERING PRACTICE	OPTION UNIT	OPTION UNIT
FLUID TRANSPORT, MIXING AND DISPERSION	ECO-ENGINEERING	NUMERICAL METHODS AND MODELLING	ENGINEERING DESIGN PROJECT 2	ENGINEERING RESEARCH PROJECT 2	RISK, RELIABILITY & SAFETY	OPTION UNIT	OPTION UNIT

\*or Interdisciplinary Design Project

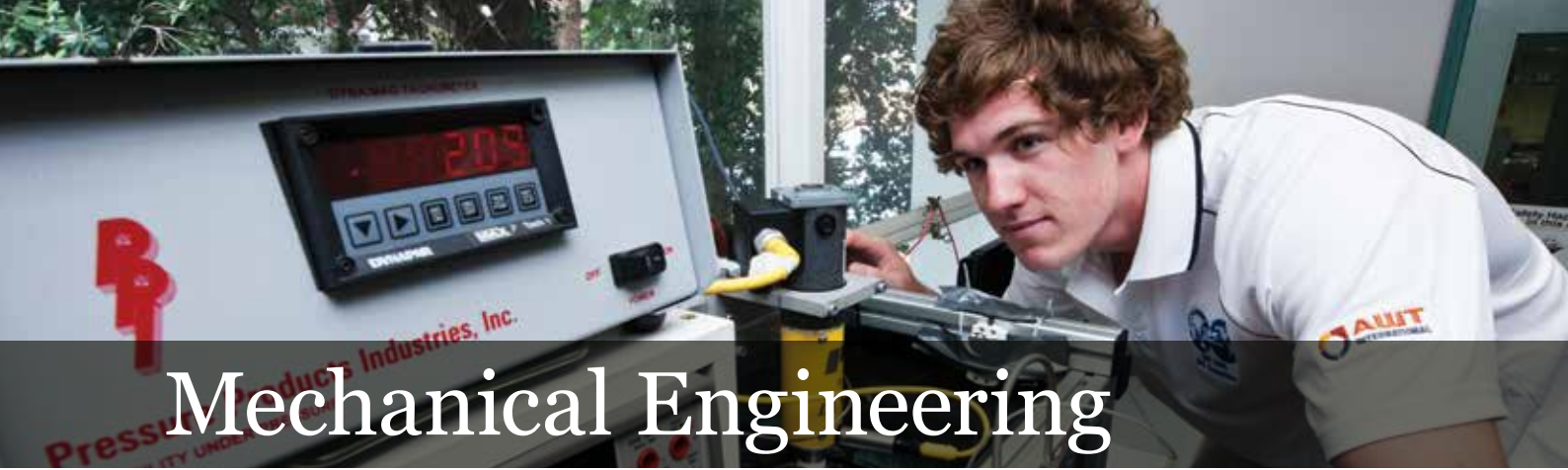


## Developing environmental and social benefits

Kathy Thomas has just landed a job with Geotech Pty Ltd, a Melbourne-based environmental and geotechnical consultancy.

“My real passion for engineering came about when we did a project on constructing a sanitary system in Cambodia that not only provided sanitation to a community that was susceptible to water borne diseases, but also converted the waste into energy. Seeing that the skills I developed could make a combined environmental and economic benefit is what really excites me about engineering. At UWA there is a focus on group projects and presentation skills which sets UWA graduates apart from other graduates with their confidence and professionalism in presentation. In my new role I’m really excited to become involved in a range of projects, from wastewater systems and dams, to rails, and basements.”

*Kathy Thomas,*  
Graduate Project Engineer, Geotech Engineering Pty Ltd



# Mechanical Engineering

Mechanical engineering is one of the broadest engineering disciplines and involves the production and use of heat and power for the design, invention, and operation of machines and devices of all types.

The Mechanical Engineering specialisation at UWA covers core theories, methods and practices used in sound and vibration, control, tribology, fluids and materials.

## Careers

As a mechanical engineer you will develop broad-based knowledge which will enable you to move easily between industries. Career pathway options range from offshore and

petroleum engineering through to the building, minerals, construction, power, manufacturing and processing industries, where you will design and oversee the development, installation, operation and maintenance of machinery, solve practical engineering problems and improve efficiency.

## Option units

- Particle Mechanics and Solids Handling
- Transport Phenomena

- Introduction to Design of Offshore Systems
- Digital and Embedded Systems
- Coastal and Offshore Engineering
- Modern Control Systems
- Petroleum Engineering
- Renewable Energy
- Robotics
- Interdisciplinary Design Project
- Advanced Vibration and Sound
- Design and Failure Analysis of Materials

## Course outline

APPLIED ENGINEERING THERMO-DYNAMICS	MEASUREMENT AND NOISE	NUMERICAL METHODS & MODELLING	ANALYSIS AND DESIGN OF MACHINE COMPONENTS	ENGINEERING DESIGN PROJECT 1	ENGINEERING RESEARCH PROJECT 1	PROJECT MANAGEMENT & ENGINEERING PRACTICE	OPTION UNIT
DEGRADATION OF MATERIALS	DYNAMICS, VIBRATION AND SOUND	CONTROL ENGINEERING	FINITE ELEMENT METHODS	ENGINEERING DESIGN PROJECT 2	ENGINEERING RESEARCH PROJECT 2	RISK, RELIABILITY & SAFETY	OPTION UNIT

## Optimising resources

Amy Moonen, a UWA Mechanical Engineering graduate, now works for Woodside Energy Ltd, Australia's largest publicly listed oil and gas exploration company.

“I became passionate about engineering once I realised the breadth of careers that were available. At UWA I enjoyed a range of learning styles (hands-on labs, lectures, tutorials, group work), and appreciated that I didn't have to specialise too early. My current role at Woodside involves optimising production from the integrated NWS Production System – which includes 3 gas processing platforms, one oil processing FPSO, and an onshore gas plant as well as Domestic gas, Condensate and LPG processing. My job is very dynamic, and I look forward to the challenge of ongoing problem solving.”

*Amy Moonen*

*NWS Production Planner, Woodside Energy Ltd*





# Mining Engineering

Mining engineering encompasses all the processes involved in extracting ores from the earth, including activities such as deposit evaluation, mine design, mine production, and waste disposal.

The Mining Engineering specialisation at UWA integrates exposure to geology, finance and management, as well as detailed knowledge of surface mining, underground mining, rock mechanics and mine design.

You will acquire the skills needed to analyse and design the most suitable mining method for a project, the best equipment to efficiently perform the task and the most appropriate blasting technique. You will also take on the challenge of minimising environmental impact.

## Career

As a mining engineer you may work as a technical specialist with a service company, as a consultant (in Australia or overseas), in mine management and production, in banking or finance, in research, or in the government sector.

## Option units

- Introductory Financial Accounting
- Environmental and Resource Economics
- Economic Management and Strategy

- Employment Relations
- Globalisation and Organisational Change
- International Employment Relations
- Extractive Metallurgy
- Numerical Methods and Modelling
- Introduction to Human Resource Management
- Management and Organisations
- Organisational Behaviour and Leadership

## Course outline

GEOTECHNOLOGY OF MINE WASTE	ROCK MECHANICS	SURFACE MINING	UNDERGROUND MINING 1	ENGINEERING DESIGN PROJECT 1*	ENGINEERING RESEARCH PROJECT 1	PROJECT MANAGEMENT & ENGINEERING PRACTICE	OPTION UNIT
MINERAL RESOURCES	ENVIRONMENTAL GEOTECHNICS	MINING MANAGEMENT	UNDERGROUND MINING 2	ENGINEERING DESIGN PROJECT 2	ENGINEERING RESEARCH PROJECT 2	RISK, RELIABILITY & SAFETY	OPTION UNIT

\*or Interdisciplinary Design Project



## Travelling the world

Wayne Rogers, a UWA Mining Engineering graduate, is now working in Vancouver for a leading international mining consultancy.

“I’ve had the opportunity to work on mine sites all over the world – Australia, Africa, South America, Papua New Guinea, America and now Canada. After graduating, I worked for Rio Tinto in WA’s Pilbara. I now work in the consultancy side of things for AMC in Canada doing technical-based projects like pit design and financial modelling. I chose UWA because of the reputation it had for Mining Engineering. The proximity to Iron Ore in WA also helped with getting a job. My class was really focused and I still keep in contact with the Head of Mining Engineering.”

*Wayne Rogers*

*Senior Mining Engineer, AMC Mining Consultants*



# Software Engineering

Software engineering involves the design, development, testing, deployment, maintenance and evaluation of complex computer software systems.

Software engineers require a diverse set of skills including design, modelling, negotiation, team management, estimation and programming. The specific tasks they perform evolve quickly, reflecting new areas of specialisation and changes in technology.

The Software Engineering specialisation at UWA has a solid foundation in software requirements, design, implementation, testing and professional engineering standards.

It also includes advanced topics in mobile computing, cloud computing and artificial intelligence. Upon graduation you will be a capable problem solver, designing and delivering software solutions.

## Careers

As a software engineer you may develop robotic software to be used in large mining equipment, create mathematical modelling programs to track the spread of disease, use computer-aided techniques to review,

test and validate financial data and calculations, or analyse the security of IT security frameworks in large corporations.

## Option units

- Control Engineering
- Numerical Methods and Modelling
- Robotics
- Interdisciplinary Design Project

## Course outline

ARTIFICIAL INTELLIGENCE & ADAPTIVE SYSTEMS	CLOUD COMPUTING	COMPUTATIONAL MODELLING	SOFTWARE PROCESSES	DIGITAL & EMBEDDED SYSTEMS	ENGINEERING DESIGN PROJECT 1	ENGINEERING RESEARCH PROJECT 1	PROJECT MANAGEMENT & ENGINEERING PRACTICE
COMPUTER VISION	MOBILE & WIRELESS COMPUTING	SOFTWARE REQUIREMENTS AND DESIGN	SOFTWARE TESTING & QUALITY ASSURANCE	OPTION UNIT	ENGINEERING DESIGN PROJECT 2	ENGINEERING RESEARCH PROJECT 2	RISK, RELIABILITY & SAFETY

## Mapping for Google

Edwin Tay is a UWA Engineering graduate who is working for Google in Sydney.

“UWA has a great reputation and attracts high achieving students. My fellow students really facilitated my learning as they challenged me and we worked together to come up with new ideas. Software Engineering opens up many different work opportunities. I’ve been working at Google since January 2014. My current role involves lots of coding and product building. I’m mainly focused on Google maps and helping people to put a map on their website. There is a lot to keep up with, but it is always exciting. The people at Google are awesome to work with. The office is very open and we’ve got a juice bar and games room on site. Software Engineering is a fast-moving, fluid industry and so it is hard to gauge where I will be and what I will be working on in future years.”

*Edwin Tay*  
Software Engineer, Google



# Engineering Science Major

The Engineering Science major is your pathway to the Master of Professional Engineering and a global career as a professional engineer.

The Engineering Science major provides you with fundamental engineering knowledge and develops your scientific, communication and problem solving skills through a combination of practical, hands-on courses, industry projects and theoretical foundations.

In the third year of your Engineering Science major you will focus on a particular area of Engineering,

preparing you for further study at postgraduate level leading to professional accreditation.

The Engineering Science major can be studied as a degree-specific major within the Bachelor of Science or Bachelor of Philosophy (Honours) or as a second major with any of the University's undergraduate degrees.

You will also have the opportunity to complete four broadening units to ensure that you're equipped with the knowledge and skills that employers are seeking.

Duration: 3 years full-time (24 units)

Full course details can be found at [studyat.uwa.edu.au](http://studyat.uwa.edu.au)

## Engineering Science major

Degree-specific major: BP004 Bachelor of Science  
BP005 Bachelor of Philosophy (Honours)

Year	Level	Unit 1	Unit 2	Unit 3	Unit 4	
YR1	Level 1: Students complete two core units and three complementary units in the Engineering Science major.	Global Challenges in Engineering	Physics for Scientists and Engineers OR Chemistry - Structure & Reactivity OR Object-oriented Programming and Software Engineering ①	Mathematical Methods 1	Elective/Second Major Unit	
		Material Behaviour from Atoms to Bridges	Broadening Unit A or B	Mathematical Methods 2	Elective/Second Major Unit	
YR2	Level 2: Students complete two core units and one complementary unit in the Engineering Science major ②	Motion	Computer Analysis and Visualisation	Broadening Unit A or B	Elective/Second Major Unit	
		Energy	Broadening Unit A or B	Broadening Unit A or B	Elective/Second Major Unit	
YR3	Level 3: Students choose one of the following specialisations and its corresponding units. This choice will determine which specialisation you will study in the Master of Professional Engineering (MPE).	Elective/Second Major Unit	Elective/Second Major Unit	Elective/Second Major Unit	Elective/Second Major Unit	
		<b>MECHANICAL ENGINEERING</b>				
		Fluid Mechanics	Solid Mechanics	Mechanisms & Machines	Materials & Manufacturing	
		<b>CHEMICAL ENGINEERING ③</b>				
		Fluid Mechanics	Mass & Energy Balances	Heat & Mass Transfer	Chemical Process Thermodynamics & Kinetics	
		<b>CIVIL ENGINEERING</b>				
		Geomechanics	Solid Mechanics	Hydraulics	Structural Analysis	
		<b>MINING ENGINEERING</b>				
		Geomechanics	Solid Mechanics	Data Collection & Analysis	Resource Extraction	
		<b>ENVIRONMENTAL ENGINEERING ④</b>				
Geomechanics	Data Collection & Analysis	Hydraulics	Environmental Systems			
<b>ELECTRICAL AND ELECTRONIC ENGINEERING</b>						
Electronic Materials & Devices	Signals & Systems	Electric Machines	Circuits and Electronics			
<b>SOFTWARE ENGINEERING</b>						
Networks and Security	High Performance Computing	Circuits and Electronics	Programming and systems (this unit must be taken in YR2)			

■ Degree-specific Major Unit   ■ Complementary Unit   ■ Elective /Second Major Unit   ■ Broadening Unit

Course structure diagrams for illustrative purposes only. Refer to the UWA Handbook ([www.handbooks.uwa.edu.au](http://www.handbooks.uwa.edu.au)) for full details

- ① Students who are interested in Chemical Engineering will select the Chemistry unit and students who are interested in Software Engineering will select the Programming unit. All other students will select the Physics unit.
- ② Students interested in the Software specialisation will take an additional Level 2 core unit, Programming & Systems.
- ③ Students are also required to complete the units Process Synthesis & Design and Unit Operations & Unit Processes either as electives in their undergraduate degree or as part of the MPE.
- ④ Students are also required to complete the unit Frontiers in Biology either as an elective in their undergraduate degree, or as part of the MPE.

# Admissions

## Postgraduate: Master of Professional Engineering

### Domestic applicants

- A UWA bachelor's degree with a major in Engineering Science ❶; or
- A recognised bachelor's degree or equivalent, with the equivalent of a UWA weighted average mark of 65 per cent, and prior studies in engineering, maths or physics.

### International applicants

In addition to the admission requirements listed above, you must meet the University's required level of English Language Competency (**visit: [studyat.uwa.edu.au/elc](http://studyat.uwa.edu.au/elc)**).

International students should also visit [international.uwa.edu.au/students/esos](http://international.uwa.edu.au/students/esos) for more information about the study environment, course fees and refund policy, support services and schooling obligations for dependent children.

## Undergraduate: Engineering Science

### Domestic applicants TISC entry Assured Entry Pathway

Students whose goal is to study engineering should apply for the Assured Entry Pathway (TISC code UWENG). To be considered for this pathway you must achieve an entry score (ATAR or equivalent) of at least 92.

### Other Bachelor's degrees

Applicants who expect to get an ATAR of 80 or above are advised to apply to study the Engineering Science major in the Bachelor of Science (TISC code UWSCI) or as a second major in one of UWA's other standard bachelor degrees.

### Bachelor of Philosophy (Honours)

The Engineering Science major can also be studied within the Bachelor of Philosophy (Honours). You must achieve an entry score (ATAR or equivalent) of at least 98 and use TISC code UWPHE. Please note, places are limited and entry is highly competitive.

All applicants must demonstrate English Language Competence. For more information on English language requirements, visit [studyat.uwa.edu.au/elc](http://studyat.uwa.edu.au/elc)

### Prerequisites

- WACE Mathematics 3C/3D; and
- WACE Mathematics Specialist 3C/3D; and
- WACE Physics 3A/3B; and
- WACE Chemistry 3A/3B;

### Or

- WACE Mathematics 3C/3D with up to four specified units taken in the first year depending on the number of missing prerequisite subjects.

On completion of your bachelor's degree you will be able to apply for entry to the Master of Professional Engineering. Successful completion of this course will qualify you as a professional engineer.❷

### International applicants

- A minimum Australian Tertiary Admissions Rank (ATAR) of 92 or equivalent for the Assured Entry Pathway; or
- A minimum ATAR of 80 for entry into a UWA three-year Bachelor degree course; or
- A minimum ATAR of 98 for the Bachelor of Philosophy (Honours), or equivalent.

Additionally, applicants must satisfy UWA's English Language Competence requirement (see [studyat.uwa.edu.au/elc](http://studyat.uwa.edu.au/elc)) and meet the prerequisites for the Engineering Science major.

Please refer to [studyat.uwa.edu.au/courses/engineering-science](http://studyat.uwa.edu.au/courses/engineering-science) for more details on prerequisites and minimum scores. Students with previous tertiary level qualifications will be considered for advanced standing (credit).

❶ Students not in the Engineering Assured Entry Pathway (AEP) will be required to complete their bachelor's degree with a minimum UWA weighted average mark of 60 per cent to enter the Master of Professional Engineering.

❷ The Master of Professional Engineering has been granted provisional accreditation at the level of Professional Engineer by Engineers Australia. As is standard practice for new courses, accreditation is provisional until graduation of the first cohort of students from the MPE in 2014/2015.



THE UNIVERSITY OF  
WESTERN AUSTRALIA

The University of Western Australia



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