The Engineering Pavilion
The new Curtin Engineering Pavilion Complex is the result of collaboration between Curtin, the Australian Government and industry partners. The Australian Government contributed $20.5 million through the Education Investment Fund; industry partners contributed more than $2 million, and Curtin has contributed $10 million to bringing the complex to life.

Industry partners of the Curtin Engineering Pavilion Complex are: distinguished partner Woodside; principal partners KBR, Rio Tinto and Verve Energy, and supporting partners Lycopodium, Monadelphous, Thiess and WestTec.

Distinguished partner | Principal partners | Supporting partners
--- | --- | ---
Woodside | KBR, Rio Tinto and Verve Energy | Lycopodium, Monadelphous, Thiess and WestTec

Bright, innovative engineers
Bright, innovative prospects
Bright, innovative teaching
The Engineering Foundation Year
How to apply
Scholarships and double degrees
Engineering options
Chemical Engineering
Civil and Construction Engineering
Computer Systems Engineering
Electrical Power Engineering
Electronic and Communication Engineering
Mechanical Engineering
Mechatronic Engineering
Petroleum Engineering
Software Engineering
Metallurgical Engineering
Mining Engineering
Environmental Engineering - Mining
Curtin Engineering career planner

Bright, innovative engineers
Today, shifting demographics, globalisation and rapid advances in technology mean changes in our world that challenge the nature of engineering - demanding far broader skills than simply the mastery of scientific and technical disciplines.

The Curtin Engineer can meet these challenges. The Curtin Engineer has not only a solid theoretical grounding but is professionally accomplished, culturally aware and displays a strong practical focus.

Starting in first year, the Curtin Engineer has worked in cross-disciplinary and multicultural teams. Through innovative and practical teaching methods, peer interaction and industry engagement, the Curtin Engineer has developed the technical, communication and real-world skills to meet the challenges of this dynamic profession head on.

Curtin University
Curtin is the largest and most culturally diverse university in Western Australia. With seven campuses across the Asia-Pacific region Curtin gives students the benefits of a truly international environment. Close to public transport and just six kilometres from the centre of Perth, Curtin’s main Bentley campus is 116 hectares (287 acres) and comprises a mix of old and new architecture nestled amongst beautiful landscaped gardens and lawns. There are 40 hectares of sporting fields, a fully equipped gym, tennis courts, an indoor recreation centre and the new multi-purpose Curtin Stadium.

In addition, a variety of services are available on campus to make student life easier and more convenient.

FACILITIES
New investments in infrastructure on campus ensure students have access to world-class facilities during their studies.

The Engineering Pavilion is the newest addition to Curtin’s state-of-the-art learning spaces. The Pavilion features an interactive, engaging learning environment. Offering open-plan areas for practical design work; smaller meeting rooms for group work; and exhibition space for students to engage with industry.

The Curtin Resources and Chemistry Precinct is the result of significant investment from the minerals and energy sectors. The Precinct attracts high-calibre projects and creates the perfect foundation for high-impact and industry relevant research.

Western Australian School of Mines
Curtin’s Western Australian School of Mines is located 600 kilometres east of Perth in Kalgoorlie-Boulder: a thriving inland city of more than 30,000 people in the heart of Western Australia’s Goldfields region providing access to mining professionals from some of Australia’s largest gold and nickel producers. The Kalgoorlie Campus offers a range of internationally recognised undergraduate and postgraduate studies in mining engineering, metallurgical engineering, mine surveying, mining geology and mining environmental engineering.

Ground-Breaking Research
Curtin is committed to providing cutting-edge research to the world market and is now in the top bracket of universities for industry-funded research. Curtin Engineering supports the University’s four key areas of research focus - energy, health, sustainable development and ICT and emerging technologies - each relying on the skills of engineering and the solutions they provide to today’s most pressing challenges.
Employers prize Curtin Engineering graduates because they are career-ready, have a global outlook and bright, innovative prospects in the world of engineering.

**BRIGHT, INNOVATIVE TEACHING**

**Curtin Bachelor of Engineering**

All students start their engineering degree with a common first year – the National Award Winning Engineering Foundation Year - building a solid base of fundamental concepts common to all areas of engineering. Students go on to choose an engineering specialisation based on their area of interest and career aspirations.

**TIME TO EXPLORE OPTIONS**

The Engineering Foundation Year allows students to learn more about their options, providing time to fully explore career and study pathways. At the end of first year students choose a career direction – selecting from a broad range of in-demand areas within the engineering profession.

**FRIENDSHIP AND SUPPORT**

First year students are timetabled together in groups of around 20, so they have many opportunities to work in families, cohesive teams building friendships and support networks. Larger lectures are balanced by the familiarity of these timetabled groups.

Students have ample opportunity to seek extra academic assistance in all core units. ‘Clinic’ rooms in the Studio are open for students to visit during business hours each week. Tutors are available to assist students with concepts and problems they may be experiencing. Aimed at reducing barriers to students seeking tutorial assistance – the clinics are informal and attendance is not monitored.

**A SPACE OF THEIR OWN**

The Engineering Foundation Year Studio consists of a social space for students, an open-design office style common area, small project meeting rooms, clustered labs and ‘clinic’ rooms. Students spend considerable time located within these innovative facilities as they move from laboratory classes to small project teams, and individual study spaces. The Studio acts as the hub of first year students’ social and academic network - an environment that mirrors real engineering professional practice.

**LEARNING TOGETHER**

Team-teaching is used throughout the first year to deliver the units. Each unit is guided by a unit panel of academic staff that comprises a mix of representatives from across the engineering disciplines and, in a number of cases, from the Sciences, Mathematics and Humanities. Students learn from experts in their field with lecturers and tutors often drawn from leaders in research, government and industry. A mix of lecture-style classes, smaller seminar-style classes and group work give students the opportunity to engage with staff and their fellow students, who all bring their own fresh perspectives.

**Sample timetable - Engineering Foundation Year**

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<tbody>
<tr>
<td>8 am</td>
<td></td>
<td>Lecture 1</td>
<td>Design &amp; Process Design studio</td>
<td>Engineering Materials Lab</td>
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<tr>
<td>9</td>
<td>Self study</td>
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<tr>
<td>10</td>
<td>Self study</td>
<td>Engineering Materials Lab</td>
<td>Self study</td>
<td>Engineering Maths 140 Lecture 1</td>
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<tr>
<td>11</td>
<td>Design &amp; Process</td>
<td>Lecture 2</td>
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<td>Design &amp; Process Design workshop</td>
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<td>12</td>
<td>Lecture 1</td>
<td>Engineering Materials Lecture 1</td>
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<td>Engineering Materials Tutorial</td>
<td>Self study</td>
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<td>Engineering Maths 140 Lecture 1</td>
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<td>3</td>
<td>Engineering Maths 140 Tutorial</td>
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<td>4</td>
<td>Electrical Systems Lecture 1</td>
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<td>5</td>
<td>Electrical Systems Lab</td>
<td>Engineering Maths 140 Lab</td>
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**BRIGHT, INNOVATIVE PROSPECTS**

Employers prize Curtin Engineering graduates because they are career-ready, have a global outlook and the real-world skills to meet the challenges of whatever path they may pursue in the future.

**BEYOND THE CLASSROOM**

At Curtin the classroom is just one place where students can grow and learn. From work placements to clubs and professional associations, there are new opportunities every day to stretch and develop interests.

There are many clubs that students can get involved in to enrich the university experience for example: Association of Chemical Engineering Students, Computer Science Students Association, Engineers Without Borders and the Curtin Engineering Club.

**PROFESSIONAL WORK EXPERIENCE**

Engineering students are exposed to industry throughout their degree, with opportunities to put the knowledge gained through their studies into practice by taking part in industry field trips, work-based projects and work experience programs.

**INTERNATIONAL TRAVEL OPPORTUNITIES**

Students can gain international experience and build invaluable personal and professional networks by studying a semester or two of their degree at one of Curtin’s overseas partner universities. Curtin has partnerships all over the world – in countries such as Canada, China, Germany, Sweden, UK and the USA. Grants of up to $5000 to assist with travel are available (conditions apply). For a complete list of current exchange opportunities please visit studyabroad.curtin.edu.au

**Real experiences**

Ashley Hunt
Bachelor of Engineering
Chemical Engineering

“A great attraction of studying at Curtin is the huge range of industries and work environments available for graduate placement. I have done work with Rio Tinto and am going to work in Holland for a 3-month placement.”

**INDUSTRY PARTNERSHIP**

Academic standards are high and all programs carry full professional status. External specialists from the Western Australian and International engineering industry, government bodies and professional organisations appointed by Curtin regularly review all programs ensuring their quality as well as national and international recognition. The engineering community provides various industry advisory panels, financial sponsorship and direct input through participation in lectures and student site visits.

**The Engineering Foundation Year Studio is highly effective both as a platform for learning, and as a vehicle for networking and the development of a vibrant community.**
EDUCATIONAL REQUIREMENTS

Australian citizens and permanent residents

Degree: Bachelor of Engineering (with majors listed in the course description)

Prerequisites: At least three of the following courses. Mathematics 3C/3D, Mathematics Specialist 3C/3D, Physics 3A/3B and Chemistry 3A/3B. Engineering Studies 3A/3B desirable.

STAT: Not accepted.

ATAR (formerly TER) 2011: 80

Study mode: Full-time and part-time

Duration: 4 years full-time or equivalent part-time.

Intakes: February and July.

Campus: Bentley.

English competency: Applicants must meet the English language competency requirements. STAT may be used to meet College university English competency requirements combined with other relevant qualifications.

International students

For specific requirements please visit international.curtin.edu.au

ALTERNATIVE PATHWAYS

Vocational education qualifications

Students who have completed a TAFE Diploma or its equivalent in an allied engineering field may be admitted to this course with advanced standing.

Previous tertiary qualifications

Students who have successfully completed units at an Australian or overseas university may meet the requirements for entry.

Bachelor of Science

The Bachelor of Science (Multidisciplinary Science) major gives students the opportunity to combine rigorous study in more than one science discipline of their choice - biology, chemistry, computing, geology, mathematics or physics. The program can be used as an alternative pathway for students who do not meet subject prerequisites for other courses in science and engineering.

Enabling course

The one year Enabling Course, taught in collaboration with Conning and Tuquet Colleges, provides the background for students who do not meet the minimum university entrance requirements for entry into a degree in science or engineering. Subjects include maths, human biology, physics and chemistry. Upon completion of the Enabling Course student can apply for entry to Bachelor of Engineering however entry is competitive. Students are guaranteed a place in the Bachelor of Science (Multidisciplinary Science).

HOW TO APPLY

Australian citizens and permanent residents

All applications to commence study in first semester are made online through the Tertiary Institutions Service Centre (TISC). Applicants should enter the Bachelor of Engineering TISC code on the TISC application form. Note that once at Curtin students choose an Engineering specialisation after first year.

See tisc.edu.au

Fees

Students offered a Commonwealth Supported Place may be eligible to access HECS HELP (for further details visit goingtouni.gov.au). Web: fees.curtin.edu.au

International students

International students are those who are not an Australian citizen or New Zealand citizen, or are not an Australian Permanent Resident or holder of a Permanent Humanitarian Visa. International students are required to fill out an International Application for Admission Form.

To apply for the Bachelor of Engineering enter the following information on the Admission Form:

Course Title: Bachelor of Engineering Major Area of Study: Engineering specialisation (eg Chemical Engineering)

Course CRICOS Code: For the Engineering Course CRICOS Code see international.curtin.edu.au

Applications can be submitted directly to the Curtin International Office or to a Curtin overseas representative. For more information contact the Curtin International Office.

SCHOLARSHIPS

Curtin offers a number of scholarships for those wishing to pursue an undergraduate degree in engineering. Scholarships are either merit or needs based. Merit scholarships recognise academic achievement and needs-based scholarships provide support to students whose socio-economic, cultural, geographical or personal circumstances may adversely affect their ability to succeed at university. Curtin also offers the Women in Engineering Scholarship for female students who show leadership potential and wish to pursue a career in engineering. Scholarships can offer exciting benefits such as networking opportunities, overseas study or on-the-job experience. For more information visit: scholarships.curtin.edu.au

DOUBLE DEGREES

A double degree is a combination of two Curtin bachelor degrees that allows students to specialise in two fields. A double degree increases skills and gives graduates the competitive advantage in the workforce. And while it may double opportunities, it doesn’t take double the time to complete. Double degrees in Engineering and either Commerce or Science can be finished in five years. See double degree options listed under each engineering option.

Contact: admissions@curtin.edu.au

Fees

For 2012 indicative International Onshore Fees please visit courses.curtin.edu.au

For 2012 indicative International Onshore Fees please visit courses.curtin.edu.au

Fees please visit international.curtin.edu.au

How to apply

To apply for the Bachelor of Engineering students must have English competency and necessary pre-requisites, a sufficiently high ATAR score or satisfy alternative entry requirements or international student entry requirements.

Sample course structure - Bachelor of Engineering

Year 1: Engineering Foundation Year

Semester 1
- Electrical Systems 100
- Engineering Foundations: Design and Processes 100
- Engineering Materials 100
- Engineering Mathematics 110 or 120

Semester 2
- Engineering Foundations: Principles and Communication 100
- Engineering Mathematics 120 or 140
- Engineering Mechanics 100
- Engineering Programming 100
- Engineering Chemistry or Engineering 100 or Physics 100
- Optional Unit

End of Year 1: Choose an engineering specialisation

Chemical Engineering
- Civil and Construction Engineering
- Computer Systems Engineering
- Electrical Power Engineering
- Electronic and Communication Engineering
- Mechanical Engineering
- Mechatronic Engineering
- Petroleum Engineering
- Software Engineering

Year 2, 3 and 4

Units towards engineering specialisation (600 credits)

See specialisation for sample course structures.

Honours

Honours is embedded in the program and is awarded based on performance throughout those 4 years. As Honours degree can serve as a platform for pursuit of a PhD in a wider range of scientific disciplines.
CHEMICAL ENGINEERING

Chemical engineers develop and manage the extraction and conversion from raw materials of products such as petroleum, gas, fertilisers and metals. They determine the chemical process required and then design the plant that will enable these to be carried out sustainably, safely, economically and on a large scale.

Course details
All engineering students study the Engineering Foundation Year. In second year students choose to specialise in one of three streams: chemical engineering; oil and gas, or biosystems engineering.

Chemical engineering
Examine the development, design and operation of processes and plant for extraction, conversion and recovery of materials - among the more familiar are petroleum refining, gas processing, petrochemical and polymer production, fertiliser manufacture, cement and lime production, minerals and metal extraction and refining, paper and board manufacture, sugar refining, food processing, production of industrial products.

Oil and gas
Examine the development, design and operation of processes and plant - specifically, to the extraction, conversion and recovery of oil and gas systems. Explore theory and application of various disciplines required to evaluate, develop and exploit oil and gas accumulations. Engineering companies design and build plants for oil and gas industries.

Biosystems
Examine bio-molecular and molecular processes, product design, sustainability and biological systems analytics. Examine biological systems, the engineering principles and bioprocess fundamentals - essential for the development, design and operation of processes and plants that extract, process and recover materials. Graduates work in the traditional chemical engineering industry and the evolving biotech industry (including the health industry).

Real world experience
Before graduating, students complete 12 weeks of engineering work experience during summer vacations. Students are also required to complete Senior First Aid training.

Career opportunities
Graduates are employed in international mineral or oil and gas processing industries, directly by processing companies, as well as by the many consulting groups that service the industry. Graduates are in high demand within the consulting engineering groups and smaller companies.

Professional recognition
Graduates fulfill the stage one competencies required by Engineers Australia (EA) to obtain the pathway to chartered professional engineer status (CPEng). The course is also accredited by the Institution of Chemical Engineers (UK) at masters level.

Sample course structures

### Chemical engineering stream

**Year 1**
- Engineering Foundation Year

**Year 2**
- Process Principles 227
- Fluid Mechanics 230
- Chemistry 101
- Process Heat Transfer 228
- Process Mass Transfer 221

**Year 3**
- Fluid and Particle Processes 322
- Process Plant Engineering and Simulation 322
- Reaction Engineering 325
- Process Synthesis and Sustainable Development 201
- Research Project 341

**Year 4**
- Process Principles 427
- Fluid Mechanics 430
- Biochemical Engineering 420
- Process Synthesis and Sustainable Development 420
- Research Project 441

### Oil and gas stream

**Year 1**
- Engineering Foundation Year

**Year 2**
- Process Principles 227
- Fluid Mechanics 230
- Chemistry 101
- Process Heat Transfer 228
- Process Mass Transfer 221

**Year 3**
- Engineering Sustainable Development 301
- Introduction to Refinery Engineering 101
- Hydrocarbon Phase Behaviour 230
- Biochemical Engineering 325
- Oil-Water Treatment 330
- Process Plant Engineering 430
- Process Economics 430
- Process Instrumentation and Control 328

**Year 4**
- Advanced Heat and Mass Transfer 422
- Biosystems Engineering 420
- Petroleum Production Technology 424
- Research Project 442

### Biosystems stream

**Year 1**
- Engineering Foundation Year

**Year 2**
- Process Principles 227
- Fluid Mechanics 230
- Chemistry 101
- Process Heat Transfer 228
- Process Mass Transfer 221

**Year 3**
- Engineering Sustainable Development 301
- Introduction to Offshore Platforms and Transport 301
- Process Synthesis and Sustainable Development 325
- Offshore Process Design 330
- Environmental Engineering 325
- Process Instrumentation and Control 328

**Year 4**
- Advanced Heat and Mass Transfer 422
- Biosystems Engineering 420
- Petroleum Production Technology 424
- Research Project 442

For options and electives, see handbook.curtin.edu.au

Sample course structure

### Civil and construction engineering

Civil and construction engineers are problem solvers, delivering the built environment that shapes the lives of people and societies - bridges, roads, water supply and disposal, transport and every type of building.

CIVIL AND CONSTRUCTION ENGINEERING

### Practical teaching methods
The course involves project work based on laboratory, library research and field work and partial assessment completed through seminars.

### Real world experience
Before graduating, students complete 12 weeks of engineering work experience during summer vacations. Students are also required to complete Senior First Aid training.

### Course details
All engineering students study the Engineering Foundation Year. In second year students develop key structural concepts such as materials, stress analysis and hydraulics. The third year includes applied engineering units in structural analysis and design, materials, construction engineering, hydraulics and professional practice.

### Civil and construction engineers
Civil and construction engineers are responsible for the conception, planning, design, construction, and operation of facilities essential to modern life, ranging from skyscrapers and transit systems, to offshore structures to hydro-electric schemes. They oversee feasibility studies, design, quality, construction, project scheduling, and cost control of projects at the heart of our society.

### Professional recognition
Graduates fulfill the stage one competencies required by Engineers Australia as the pathway to chartered professional engineer status (CPEng).

### Practical teaching methods
The course involves project work based on laboratory, library research and field work and partial assessment completed through seminars.

### Real world experience
Before graduating, students complete 12 weeks of engineering work experience during summer vacations. Students are also required to complete Senior First Aid training.

### Career opportunities
Graduates find employment with consulting engineers, large contractors, specialist subcontractors and government authorities in Australia and internationally. Experienced engineers may also establish their own consultancies in their fields of expertise and professional competences.

### Professional recognition
Graduates fulfill the stage one competencies required by Engineers Australia as the pathway to chartered professional engineer status (CPEng).

For options and electives, see handbook.curtin.edu.au

Double degree options Civil Engineering and Commerce, Economics, Management or Finance.

Double degree options Civil Engineering and Economics, Management or Finance.

Bright, innovative prospects
Thomas Seeyer
Bachelor of Engineering
(Civil and Construction Engineering)

It was my dream since high school to complete a degree in civil engineering. I found that a non-conventional way, choosing to do a diploma first and then enrolling at Curtin. I always appreciated Curtin’s practical, hands-on approach to learning and experience, and was proud to attend the same uni my father attended some 30 years prior. Since graduation I have represented Curtin at the IPWEA conference and have returned to my employer to establish a relationship between industry and education, and I look forward to building on that in years to come.
Computer Systems Engineering

These systems can include robots or robot manufacturing, autopilots and guidance systems, as well as control of performance monitoring of industrial plants. Additionally, systems can include automotive fuel injection, and information appliances such as smart phones, notebook computers and mp3 players. The computer system engineer develops jointly the hardware and software platforms to work optimally together and can focus on problems or challenges which result in new state-of-the-art products, which integrate computer capabilities.

Course details

All engineering students study the Engineering Foundation Year. This specialised study includes office and factory automation, automatic inventory, computer-aided design systems, intelligent embedded and distributed systems, real time processing, computer architecture, hardware software co-design, computer communications and the design and management of computer systems.

Real world experience

Before graduating, students complete 12 weeks of engineering work experience during summer vacations. Students are also required to complete Senior First Aid training.

Career Opportunities

The proliferation of computer systems and their applications in industry has led to a significant and growing demand for people capable of designing, programming, configuring and operating computer installations and automated systems. Some industries that employ computer engineers include: research, automobile, health care, agriculture and water treatment, and retail.

Professional Recognition

Graduates fulfill the stage one competencies required by Engineers Australia (EAust) as the pathway to chartered engineer status (CPEng).

Sample course structure

Year 1

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<tr>
<th>Engineering Foundation Year</th>
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<tbody>
<tr>
<td>Semester 1</td>
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<tr>
<td>Electrical Circuits 203</td>
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<tr>
<td>Mathematics 277</td>
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<tr>
<td>Foundations of Digital Engineering 201</td>
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<tr>
<td>Control Systems 201</td>
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Year 2

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<tr>
<th>Engineering Systems Engineering 201</th>
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<td>Semester 1</td>
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<td>Control Systems 301</td>
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With the rapid progress of information technology, the role of communications is becoming even more crucial for increasing industry efficiency and competition.

Modern computing is predominantly distributed involving interactions of back-to-back-connected processors, so that computing and networking are intrinsically linked. The role of the communications engineer is to design such networks, encompassing all hardware, software and firmware functions.

Course details

All engineering students study the Engineering Foundation Year. Students go on to examine analogue and digital communication systems, information processing, telecommunications and computer communication networks, signal and image processing and control and instrumentation, as well as electronic communications.

Real world experience

Before graduating, students complete 12 weeks of engineering work experience during summer vacations. Students are also required to complete Senior First Aid training.

Career opportunities

Electronic and communication engineers are involved with implementing protocols for transmitting data frames, detecting and correcting transmission errors, sharing communication capacity on high-speed media, and routing data packets to specific destinations within the networks. The growth in computer networking in terms of sales volume is more than 20 per cent each year. The corresponding demand for network communication engineers is currently for outstanding supply.

Professional Recognition

Graduates fulfill the stage one competencies required by Engineers Australia (EAust) as the pathway to chartered-engineer status (CPEng).

Sample course structure

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The electronics and communication fields represent two of the fastest growing technology areas both in Australia and internationally and job opportunities in the fields are vast.

Since fossil fuels are a finite resource, the development of alternative sources of electrical energy such as solar and wind is vital.

As well as meeting the demands of energy hungry world, these new sources of energy must be non-polluting, environmentally friendly and safe for future generations.

Course details

All engineering students study the Engineering Foundation Year. A new area of interest covered in the program is power electronics – the study of the control of electrical currents via the computer. Graduates in electrical power engineering are in a unique position to contribute to the design, implementation and ongoing development of the power industry. The final year of study is oriented toward industrial applications.

Practical teaching methods

The fully accredited course encompasses theoretical, computer simulated and practical components.

Real world experience

Before graduating, students complete 12 weeks of engineering work experience during summer vacations. Students are also required to complete Senior First Aid training.

Career Opportunities

The proliferation of computer systems and their applications in industry has led to a significant and growing demand for people capable of designing, programming, configuring and operating computer installations and automated systems. Some industries that employ computer systems engineers include: research, automobile, health care, agriculture and water treatment, and retail.

Professional Recognition

Graduates fulfill the stage one competencies required by Engineers Australia (EAust) as the pathway to chartered-engineer status (CPEng).

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Course details

All engineering students study the Engineering Foundation Year. Students go on to examine analogue and digital communication systems, information processing, telecommunications and computer communication networks, signal and image processing and control and instrumentation, as well as electronic communications.

Real world experience

Before graduating, students complete 12 weeks of engineering work experience during summer vacations. Students are also required to complete Senior First Aid training.

Career opportunities

Electronic and communication engineers are involved with implementing protocols for transmitting data frames, detecting and correcting transmission errors, sharing communication capacity on high-speed media, and routing data packets to specific destinations within the networks. The growth in computer networking in terms of sales volume is more than 20 per cent each year. The corresponding demand for network communication engineers is currently for outstanding supply.

Professional Recognition

Graduates fulfill the stage one competencies required by Engineers Australia (EAust) as the pathway to chartered-engineer status (CPEng).
### MECHANICAL ENGINEERING

Mechanical engineers design products and machines of every description – whether they make things, perform tasks or produce power.

To enable the design of products and machines, mechanical engineers must have a sound understanding of force and motion alongside knowledge of material behaviours and manufacturing techniques. Mechanical engineers also have special expertise in fluid flow, heat transfer, mechanical design, manufacturing processes, industrial technology, material development, management and control systems.

**Course details**

All engineering students study the Engineering Foundation Year. The course is fundamentally oriented to create learning and skills development opportunities in these areas along with hands-on experience to produce graduates who are career-ready and able to undertake problem-solving challenges in the workplace. The course is complemented by a research/design specialised project in the final year of study.

**Career opportunities**

Graduates are highly sought after across a wide range of engineering enterprises – from small companies to consultancies and large multi-national companies. They work in such areas as energy production; transportation; materials science; food production; prototype development and micro-machines. Graduates are widely regarded for their knowledge, skill and adaptability by employers.

**Professional Recognition**

Graduates fulfil the stage one competencies stipulated by Engineers Australia (EAust) as the pathway to chartered professional engineer status (CPEng).

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### MECATHRONIC ENGINEERING

Mechatronics is one of the more recent developments in the engineering discipline that combines basic mechanical engineering problem-solving and design skills with the expertise of digital electronics and computer systems to produce ‘smart’ products, or to advance industrial production through automation and the use of robotics.

**Course details**

All engineering students study the Engineering Foundation Year. Students develop a range of technical skills in digital electronics, drive technologies, mechanics (the study of force and motion) and software. From second year, student engage in hands-on project work and become involved in the design, building and testing of mechatronic systems, including small mobile robots.

In fourth year students undertake a major mandatory research or design project.

**Real world experience**

Before graduating, students complete 12 weeks of engineering work experience during summer vacations. Students are also required to complete Senior First Aid training.

**Career opportunities**

Graduates work in fields ranging from mechanical design to software engineering. Graduates will also underpin the growing development of ‘smart’ systems in industries ranging from mining to agriculture logistics.

**Professional recognition**

Graduates fulfil the stage one competencies stipulated by Engineers Australia (EAust) as the pathway to chartered professional engineer status (CPEng).

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### Sample course structure

#### Year 1

**Engineering Foundation Year**

- Semester 1: Engineering Graphics 232
- Semester 2: Engineering Law 202

#### Year 2

- Semester 1: Engineering Graphics 232
- Semester 2: Engineering Law 202

#### Year 3

- Semester 1: Dynamics Systems 334
- Semester 2: Mechanical Design 337

#### Year 4

- Semester 1: Mechanical Project 491
- Semester 2: Mechanical Project 493

For options and electives, see handbook.curtin.edu.au

### Double degree options

Mechanical Engineering and Commerce (Economics, Management of Finance)

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**Bright, innovative teachers**

Dr Euan Lindsay is President of the Australasian Association for Engineering Education and has a strong track record in supporting excellence in engineering education. He has won numerous teaching awards such as the Carrick Institute’s Early Career Award for Teaching Excellence and the IEEE Education Society’s Transactions on Education Best Paper Award. In 2005, he was chosen as one of the 30 most inspirational young engineers in Australia.

“Engineering is vital for Australia’s future and well-trained engineers are needed to build hospitals, schools, roads and bridges. They are also needed to develop the new technologies of the future, such as those that will be required to tackle climate change.”

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**Innovative projects**

Engineering students can join the Curtin Motorsport Team. Each year the team work together to design and manufacture a formula one style (open wheel) race car to compete in the annual FSAE. A competitive. Students gain practical skills as well as essential team-work and communication skills.

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**Curtin Motorsport Team**

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**Real world experience**

Students in both Mechanical and Mechatronic engineering courses complete 12 weeks of engineering work experience during summer vacations. Students are also required to complete Senior First Aid training.
PETROLEUM ENGINEERING

The world is running out of oil and gas, but irrespective of booms or busts, upstream petroleum engineers are always in demand. Enhanced oil recovery methods are now needed to produce the remaining oil and gas from existing reservoirs.

Course details
All engineering students study the Engineering Foundation Year. Students continue their studies exploring issues involving fluid flow through reservoirs and basic geology. Concepts in chemical engineering and thermodynamics are covered to ensure understanding of fluid movement due to changes in reservoir pressure, temperature and flow of different liquids. Fluid dynamics and understanding the oil and gas reservoir are also examined on a micro scale and macro scale. Crude oil processing and transport, drilling and well engineering are studied, along with the methods used to better image the reservoirs in 3D while determining optimum plans to extract the liquids. In fourth year, economics, risk and project management topics introduce students to global economic trends and ways of extracting more oil and gas for the good of the community, while also assisting company profit margins.

Software engineers incorporate the latest technology in the design and implementation of large-scale software systems for commercial purposes. They manage the production of the programs, test the system, and ensure that the production is documented correctly.

Due to the sheer size and complexity of most software requirements, the development process involves teams of professionals with specialist skills working together. The software engineer must also undertake management tasks including meeting with clients to determine their requirements, develop specifications, and work within financial constraints.

Course details
All engineering students study the Engineering Foundation Year. This is followed by a solid foundation in software design, development and testing. Students are then exposed to the latest technologies and methodologies. Software engineers must also undertake a year-long industry-based project.

Practical teaching methods
Lectures are accompanied by practical study in fluid and reservoir rock laboratories, geodynamic lab work and field trips to both service company offices and drilling sites.

Career opportunities
Graduates will be well rewarded financially in one of the highest paid engineering jobs, enjoy extensive travel opportunities and, as one of the most technically challenging jobs, benefit from being part of a pioneering worldwide community of professionals. Graduates are equipped to find employment in the upstream (reservoir/drilling/supply) petroleum exploration and production industry.

Professional recognition
Graduates fulfil the stage one competencies required by Engineers Australia (EAust) as the pathway to chartered-engineer status (CPEng).

Sample course structure

<table>
<thead>
<tr>
<th>Year</th>
<th>Engineering Foundation Year</th>
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<tbody>
<tr>
<td></td>
<td>Semester 1: Fundamentals 423</td>
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<td></td>
<td>Semester 2: Petroleum Geology 401</td>
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<tr>
<td>Year 1</td>
<td>Engineering Sustainable Development 201</td>
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<tr>
<td></td>
<td>Introduction to Petroleum Engineering 101</td>
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<td></td>
<td>Geology 101</td>
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<tr>
<td>Year 2</td>
<td>Engineering Sustainable Development 200</td>
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<td>Geology 101</td>
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<td>Geology 101</td>
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<td>Year 4</td>
<td>Engineering Sustainable Development 200</td>
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<td>Geology 101</td>
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For options and electives, see handbook.curtin.edu.au

Software engineering

Software engineers are in demand throughout the world, and graduates will have the opportunity to work for major companies or to practice as an industrial consultant. Examples of industries where graduates work include banking and finance, insurance, transportation, defence, manufacturing, telecommunications, medical research, petroleum industry.

Career opportunities
Software engineers are in demand throughout the world, and graduates will have the opportunity to work for major companies or to practice as an industrial consultant. Examples of industries where graduates work include banking and finance, insurance, transportation, defence, manufacturing, telecommunications, medical research, petroleum industry.

Professional recognition
Professional accreditation is granted by the Australian Computer Society (ACS). Graduates also fulfil the stage one competencies required by Engineers Australia (EAust) as the pathway to chartered-engineer status (CPEng).

Sample course structure

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<tr>
<th>Year</th>
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<tr>
<td></td>
<td>Semester 1: Microsoft Fundamentals 101</td>
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<td>Semester 2: Microsoft Fundamentals 101</td>
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<tr>
<td>Year 1</td>
<td>Microsoft Office 2013 201</td>
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For options and electives, see handbook.curtin.edu.au

Innovative networks

Lecturers from industry ensure students are not only exposed to the latest technical and industry developments but also help establish valuable links and networks – examples include: Sontos for well testing operations, Woodside for the Advanced Reservoir and Engineering unit; and ModuSpec for Occupational Health and Safety issues. The Department also works with international partners such as Chevron, Shell US, Saudi Aramco and Petrobras of Brazil.

Innovative careers

Brad Williamson, Microsoft Corporation, Redmond Washington

“As a software design engineer with the Windows Network Developer Platform group in Seattle, we provide Windows developers with the set of APIs that help write application to communicate across the network – my job involves designing, coding and testing software, writing technical documentation and working with program management to define and prioritise software features.”
A century of mining tradition
The Western Australian School of Mines was established over 100 years ago and has a strong international reputation for excellence in education and research in mining. Courses are conducted both on Curtin’s main campus in Perth and at the Kalgoorlie-Boulder campus located in the heart of Australia’s mining industry. Graduates are highly sought after by industry and consistently receive amongst the highest starting salaries of any graduates in Australia with virtually a 100 percent employment rate. wams.curtin.edu.au

Mining is critical to the Western Australian economy and the wealth of the country. Mining engineers plan and direct the engineering aspects of extracting minerals from the earth.

Career opportunities
Mining engineering is a multifaceted discipline that offers a broad range of career paths including mine design and evaluation, operations management, corporate management, financial analysis, equities market, merchant banking and consulting. Many mining engineers aspire to become mine managers, where they assume overall responsibility for the whole operation. They are highly regarded by overseas companies and many have been recruited directly to work in international locations.

Professional recognition
Graduates from the school one competencies required by Engineers Australia (E Aust) as the pathway to chartered professional engineer status (CPEng) and the Australasian Institute of Mining and Metallurgy. After a set period of time in the industry, apply to the Department of Industry and Resources of WA to sit for examinations qualifying them for an Underground Mine Manager’s Certificate and for a Mine Manager’s Certificate and for a First Class Mine Manager’s Certificate of Competency.

Environmental engineering - Mining
This unique multidisciplinary engineering program is for those wishing to work towards finding environmentally responsible solutions to important engineering problems facing the global mining industry.

Sample course structure

Year 1
Semester 1
- Geology 111
- Communication Skills 116
- Mining and Metallurgy 131
- Engineering Mathematics 130 or 136
- Select Optional Unit

Semester 2
- Electrical Systems 100
- Geotechnical Engineering 252
- Mining and Society 232
- Geographical Mapping 132
- Engineering Mechanics 100
- Select Optional Unit

Year 2
Semester 1
- Thermodynamics 251
- Mining Systems 233
- Soil Mechanics 233
- Mine Planning and Economics 233
- Materials Handling 233
- Select Optional Unit

Semester 2
- Geology 212
- Environmental Impact Assessment 231
- Metallurgical Processes 252
- Mining and Society 232
- Geotechnical Engineering 431
- Mining Research Project 431

Year 3
Semester 1
- Hydrogeology and Hydrology 301
- Metallurgical Processes 301
- Metallurgical Engineering 301
- Mine Surveying and Design 301
- Environmental Systems 301
- Environmental Geology 301

Semester 2
- Chemistry 301
- Environmental Engineering 431
- Metallurgical Processes 431
- Mining Research Project 431
- Mining Systems 381
- Management of And Environmental 362

Year 4
Semester 1
- Geology 411
- Construction Skills 416
- Engineering Mathematics 432
- Environmental Engineering 431
- Metallurgical Engineering 431
- Select Optional Unit

Semester 2
- Thermodynamics 251
- Mechanical Engineering 252
- Strength of Materials 232
- Mine Planning and Economics 232
- Materials Handling 233
- Select Optional Unit

Sample course structure

Year 1
Semester 1
- Geology 111
- Geographical Mapping 132
- Engineering Mathematics 130 or 136

Semester 2
- Electrical Systems 100
- Geotechnical Engineering 252
- Mining and Society 232
- Geographical Mapping 132
- Engineering Mechanics 100
- Select Optional Unit

Year 2
Semester 1
- Thermodynamics 251
- Mining Systems 233
- Soil Mechanics 233
- Mine Planning and Economics 233
- Materials Handling 233
- Select Optional Unit

Semester 2
- Geology 212
- Environmental Impact Assessment 231
- Metallurgical Processes 252
- Mining and Society 232
- Geotechnical Engineering 431
- Mining Research Project 431

Year 3
Semester 1
- Hydrogeology and Hydrology 301
- Metallurgical Processes 301
- Metallurgical Engineering 301
- Mine Surveying and Design 301
- Environmental Systems 301
- Environmental Geology 301

Semester 2
- Chemistry 301
- Environmental Engineering 431
- Metallurgical Processes 431
- Mining Research Project 431
- Mining Systems 381
- Management of And Environmental 362

Year 4
Semester 1
- Geology 411
- Construction Skills 416
- Engineering Mathematics 432
- Environmental Engineering 431
- Metallurgical Engineering 431
- Select Optional Unit

Semester 2
- Thermodynamics 251
- Mechanical Engineering 252
- Strength of Materials 232
- Mine Planning and Economics 232
- Materials Handling 233
- Select Optional Unit

Metalurgical engineering focuses on the extraction of metals from ores through the application of scientific and engineering principles – gold, iron ore, alumina, coal, mineral sands, nickel, copper and others.

Metalurgical engineers are responsible for the selection, design and development of the best process to treat a particular ore, the efficient operation of the processing plant to convert ore into more valuable forms of metal or dispose of waste in an environmentally acceptable manner.

Course details
Through the four year engineering course, students have the opportunity to study at the Bentley campus as well as in the dynamic mining centre of Kalgoorlie-Boulder at Curtin’s Western Australian School of Mines. As the course progresses, increasing emphasis is placed on mining technology, which entails the study of soil and rock mechanics, mine environmental engineering, materials transport, methods of working, mine planning and evaluation.

Graduates are likely to be involved in mine site rehabilitation, the design of tailings dams and waste rock disposal, and the preparation of impact statements, and the management and reporting of mine site environmental requirements.

Course details
Metalurgical engineers are chartered professionals engineering duty and deal with problems facing the global mining industry.

Real world experience
Students in Metallurgical, Mining and Environmental Mining engineering courses complete 32 weeks of engineering work experience during summer vacations, before graduating. Students are also required to complete Senior First Aid training.

Graduates are highly sought after by industry and consistently receive amongst the highest starting salaries of any graduates in Australia with virtually a 100 percent employment rate.

A year in the life of a mining student at Curtin’s Western Australian School of Mines

Practical teaching methods
Class sizes are relatively small and students benefit from interaction not only with highly qualified staff but also with industry experts who visit to lecture on specialist topics. This first-hand experience and contact with the mining industry and its personnel provides a level of knowledge and awareness of the industry unavailable elsewhere.

Real world experience
Third and fourth year students participate in camps and field trips throughout the Goldfields and Pilbara regions to visit mine sites and gain first-hand experience within the industry.
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