Technical and Para-professional Engineering Career Information

Challenger TAFE offers a variety of Diploma and Advance Diploma Engineering course at a Technical and Para Professional level. Listed below are some of the different engineering streams that are on offer, plus other engineering fields you may be interested in.

Engineering Cadetships

An engineering cadetship is an employment-based training program supported by a formal contract between the employer, cadet and a TAFEWA college. Cadets usually attend the workplace 4 days a week, with 1 day at a TAFE college, but this can be altered to suit the needs of the employer.

Industry-endorsed Training

The engineering cadetships offered by TAFEWA are supported by the Commonwealth and State governments through the Western Australian Department of Education and Training.

The program provides cadets with a unique opportunity to engage with the latest engineering technology supported by local engineering companies.

Benefits to Cadets

- learn as you learn throughout the two-year cadetship

- negotiate your training and assessment to meet your current employment needs and future career aspirations

- graduate with nationally recognised and portable Certificate and Diploma qualifications

- use support provided by the State Government through the ApprentiCentre

- engage in engineering competitions, expos and events

Cadetship Opportunities

To gain a cadetship, you will need to apply to an employer. You can also register your interest by submitting an expression of interests and CV with the Apprenticentre (www.det.wa.edu.au/apprenticentre) and they will put you in touch with a suitable employer.

Structured Training

Cadets undertake a combination of instruction and work-based projects, coupled with site visits and workplace assessment. Peer tutoring is strongly encouraged and cadets will give short presentations about their work and areas of specialisation.

Cadetships are available for Certificate IV, Diploma and Advanced Diploma engineering qualifications.

Click on Danielle to find out about Engineering Cadetships

Infrastructure

Structural Engineering

Structural Engineers design and manage the infrastructure of our cities and regions. They are experts in the creative use of structural materials, particularly concrete, steel, timber and metals.

Structural Engineers are specialist Civil Engineers who plan, design, or manage:

- structures such as wharves, downstream process plants

- offshore oil platforms and upstream processing plants

- transport systems including harbours, airports and railways.

Civil Engineering Civil Engineers design, construct and manage:

- water resources (storage systems, desalination plants, dams, pipelines; irrigation and canal systems, hydroelectric schemes)

- high-rise towers, commercial buildings and major developments such as the Australian Marine Complex in Henderson

- gas and water supplies and sewerage systems.

To become a civil or structural engineer associate, structural design draftsperson or technical officer, you can complete your Diploma or Advanced Diploma course full time, part-time or as part of an engineering cadetship.

Click on Julie to find out an Advance Diploma in Civil Engineering got her a career

Click on the picture to read about the quailfication

Environmental Engineering

Environmental Engineers work with Civil Engineers and Environmental Scientists to look for ways to protect and sustain our natural resources. They look at sustainable practices including alternative energy sources and recycling.

Environmental Engineers investigate:

- the impact of our activities on the environment

- problems and solutions in rehabilitating land

- methods to assess and fix contaminated sites

Environmental Engineering graduates from TAFE find employment in local government, the mining, construction, marine and defence industries. There are career opportunities to design and monitor air and water quality systems; remediate contaminated construction or mining sites or protect the biodiversity around mining, process operations and construction works.

Click on Kirsten to see how an Advance Diploma of Environmental Engineering got her a career

Click on the picture to find out more information on the qualification

Electrical

There is hardly any aspect of our modern life that is not dependent upon electrical energy, from hairdryers to cars to computers. Electrical Engineers design and build systems and equipment for the generation, transmission, distribution or control of electricity for household or industrial purposes.

The role of an Electrical Engineer may include:

- designing complex entertainment systems used for concerts and events

- Improving computer equipment to regulate electrical power

- monitoring communication systems to control power generation

- maintaining electrical systems for commercial or Navy vessels

- solving electrical circuitry problems

Electrical engineers are developing non-polluting, alternate ways of creating electrical energy through wind, solar and other environmentally friendly means.

Click on the picture for more information about the Electrical Systems and Drafting quailfication

Industrial Electronic Systems and Instrumentation Engineering
Electronics

The electronics and communication fields of engineering are two of the fastest growing technology areas in the world. Job opportunities in these fields abound.

Electronic or Communications Engineers deal with the process of transmitting information using equipment such as satellites, optical fibres and computers.

With the development of modern computing and new electronic equipment, Electronics Engineering is a rapidly growing and diverse field.

Electronic engineering involves designing

electronic circuits to analyse, transmit, convert and store information. The role of the Electronics or Communications Engineer may involve:

- designing networks, hardware, firmware and software to link offices and factories

- designing computer-driven robots for manufacturing processes

- improving electronically automated booking systems for airlines or sporting events

Click on the picture for information about the qualification

Instrumentation and Control Engineering

Instrumentation and Control Engineers focus on controlling, measuring and monitoring industrial and manufacturing processes. This may include automated processes for controlling the speed, flow or temperature within a production plant.

Control engineers focus on the use of electrical signals to operate equipment including the:

- smooth and effective running of production lines

- control of the quantity and quality of manufactured products

- control of pressure, temperature and flow rates on production lines

Click on Luke to find out how a Diploma of Electrotechnology (Industrial Electronics and Instrumentation) helped him get a job as a Junior Technican

Systems Engineering
Software Engineers or Computer Systems Engineers design programs and the software systems that drive production, platforms and equipment. An example of simple systems include car fuel injection, smartcards, dishwasher and microwave oven controllers and reticulation systems. Complex computer systems include autopilot navigation and landing systems, communication and weapon systems and performance monitoring or process plants.

Computer Systems Engineers ensure both the hardware and software platforms work together safely and efficiently.

Typically, software engineers deal with the software requirements of large organisations. The job role may involve:

- designing software systems for television stations

- developing new robotic equipment

- providing software for designing bridges

- integrating communication and weapons systems for submarines

- designing animal movement trackers

- testing systems for remotely operated vehicles

- developing interactive computer games

- supervising programmers

Technical

With a Diploma and/or Advanced Diploma of Engineering - Technical, you can begin a career as an engineer associate, a technician, a designer, draftsperson or technical officer. The Diploma and Advanced Diploma courses offer the practical and technical skills at a para professional level.

You will learn to:

- use a range of engineering computing software
- plan, schedule and manage engineering projects
- apply electrical and electronics fundamentals
- apply a range of engineering principles and practices

There is also the opportunity to specialise in non-destructive testing, mechatronics, design and drafting, piping design, maintenance or welding technology

Non Destructive Testing

Diploma of Engineering â€“ Technical Mechanica Non Destructive Testing

This Diploma prepares engineering associates for work as technicians or technical officers working on a range of materials to determine their conformance to specifications or the appearance of or the potential for flaws or defects.

You will learn to:

- use of common engineering materials
- apply metallurgy principlesselect and apply mechanical engineering methods
- perform magnetic particle testing
- perform radiographic testing
- perform ultrasonic thickness testing

Non Destructive testing is performed where ever there is the potential for weak points such as in welds or where fractures in metals may occur, load bearing beams, floor pans, ship hulls, etc. Many organisations require the services of non destructive testers including those involved in welding and fabrication and metal manufacturers Click on Mark to find out how is completing a Diploma of Engineering Technical NDT while working

Click here for further information on the qualification

Mechanical Engineering

Mechanical Engineers turn energy into power and motion. This includes household and industrial equipment, engines and pumps through to air conditioning and ventilation systems in buildings and boats.

They work closely with other engineering fields including those working in power generation or chemical processing as manufacturing engineers.

Mechanical engineers are highly sought after in the defence industry as they have the skills to design more responsive and efficient systems on ships including improved noise dampening and ventilation systems through to improving vessel speed and handling by motor and propulsion designs

Click on Chris to find out how a Mechanical Engineering qualification help land him a job as a mechanical Design Draftperson

Mechatronic Engineering

Mechatronic engineers and technicians combine mechanical and electrical engineering ideas to design and automate mechanical processes. Automation increases the speed and accuracy which is vitally important in the shipbuilding, mining and manufacturing industries. Their designs may also be used in situations where human labour may be dangerous such as in confined spaces.

Mechatronic engineering is a rapidly growing field. There are career opportunities in industrial robotics, biomechanics and the medical industry in designing and developing devices.

The role of the Mechatronic Engineer may require:

- developing sensors to detect heat or fire

- designing safer anti-skid braking and engine management systems for vehicles

- manufacturing new machinery for underwater exploration

- designing and developing automated consumer products such as close circuit monitoring equipment

Process Engineering Process plant engineers investigate materials and metal alloys and design or develop the equipment that turns it into finished products. Process engineering may have chemical backgrounds or other engineering specialisations depending on the industry they are employed in.

Click on the picture for information on the qualification

Mine / Surveying Engineering

Mining engineers are responsible for the planning, design and operation of mines. They have a good understanding of geology, surveying, civil and mechanical engineering as well as computing and environmental science. The may also work with geologist to locate and extract ore bodies and mineral deposits.
Surveying Diploma and Advanced Diploma of Surveying (Mining and Engineering)

With a qualification in Mining and Engineering surveying you will gainpractical skills and knowledge involved in the collection of data related to the set out and monitoring of mining operations as well as road, railways and other engineering structures.

You will learn to:

- use GPS and other surveying equipment and the relevant software

- apply surveying practices for projects including open pit mine operations

- produce engineering drawings and mine plans using computer aided design practices

- design mines

- read and interpret maps

- perform survey relevant computations

- apply mining geology operations

- This course meets the academic requirements of the Spatial Science Institute (Engineering and Mining Commission) thus there is an emphasis on skills and knowledge related to applied engineering and mining surveying.

Oil and Gas

Diploma and Advanced Diploma of Engineering (Oil and Gas)

These qualifications are designed to provide a broad background to the oil and gas industry to give you the skills to work in a range of semi professional technical positions including drilling, and oil refining.

You will learn to:

- apply chemical principles relevant to oil and gas engineering situations

- apply physical and petroleum specific geology

- use surface production operations and equipment

- consider the environmental effects of engineering activities

- apply drilling operationsApply geophysical techniques for hydrocarbon exploration

This qualification has the flexibility for learners to gain skills in a range of resource areas including chemical hydrocarbon and oil refining to drilling. As with all TAFEWA courses participants in the qualification and apply for Recognition of Current Competency (RCC) based on skills they have already gained through their working experiences.
Resources
Metallurgy
Metallurgists or metallurgical engineers focus on the extraction of metals from ores using scientific and engineering principles. These practices need to consider process efficiency and environmental sustainability. Metallurgical Engineering can also include the development of composite materials such as combinations of metals and non metals to make light durable materials for jets, space craft or other vehicles.

Manufacturing Engineering Manufacturing engineers generally have a mechanical or process background and work to support the running of production organisations. The support staff to schedule maintenance programs, fine tune and fault find processes as well as manage projects