

# MECHATRONICS, MANUFACTURING AND ELECTRONICS ENGINEERING

Course	Intake details	Admission	Employment opportunities	Further study
<b>Engineering Technology</b> <b>Bachelor of Engineering Technology (Mechanical and Manufacturing or Mechatronics)</b>	3 Years Dandenong February/July \$16,000 pa	Equivalent Academic IELTS 6.0 Equivalent Year 12 Must be 18 years of age at course commencement	Technical supervisor Production manager Systems engineer Maintenance engineer Project engineer Technical team leader Commissioning engineer Plant engineer	Relevant postgraduate studies

CRICOS 075246B, Course BET001

Alternative pathways into this course are available - see page 30



ENGINEERS  
AUSTRALIA

<b>Robotics and Mechatronics</b> <b>Advanced Diploma of Engineering Technology (Robotics and Mechatronics)</b>	2 Years Dandenong February \$11,300 pa + \$840 MF	Equivalent Academic IELTS 5.5 Equivalent Year 12	Production technicians Sales engineers Diagnostic commissioning technicians System designers	Bachelor of Business (major choices) at Holmes Institute See page 18
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CRICOS 057756G, Course 21622VIC



ENGINEERS  
AUSTRALIA

<b>Mechanical Design</b> <b>Advanced Diploma of Engineering Technology (Mechanical Design)</b>	2 Years Dandenong February \$11,300 pa + \$840 MF	Equivalent Academic IELTS 5.5 Equivalent Year 12	Drafting assistant Designer Production planner Technical assistant Engineering technician Engineering assistant	Bachelor of Engineering at Deakin University Bachelor of Business (major choices) at Holmes Institute See page 18
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CRICOS 062843K, Course 21622VIC

Please note: This is a manufacturing engineering course, not an automotive course. Please see page 44 for automotive courses.



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\*MF Materials fee

## Overview

Acquire specialist knowledge and skills in the exciting world of mechanical or mechatronics engineering. This new degree focuses on industry and project-based learning, to produce work-ready engineering technologists with industry-relevant skills. It can lead to post-graduate study and the opportunity to become a professional engineer through the Engineers Australia accredited conversion masters degree program.

As an engineering technologist you will apply your problem-solving skills and knowledge of scientific fundamentals to the design, testing, inspection, adaptation, commissioning, management or operation of equipment, machinery, plant and sustainable systems.

Students will choose from 2 strongly related streams, mechanical and manufacturing or mechatronics engineering, which have a common first three semesters and then branch into separate units. The Mechanical and Manufacturing stream is a mechanical engineering technology program which has a significant manufacturing focus. The Mechatronics stream combines a study of mechanical engineering with electronics

to enable graduates to more effectively work in the field of electronically controlled machinery such as robots and industrial plant.

- Engineering mathematics
- Engineering scientific principles
- Engineering design and practice
- Material science
- Engineering statics and dynamics
- Engineering computer aided design (CAD)
- Manufacturing processes
- Industrial automation
- Mechatronics stream
- Programming concepts
- Instrumentation principles
- Design of fluid power engineering systems
- Programmable logic controllers
- Engineering practice (mechatronics)
- Fluid mechanics
- Data acquisition systems
- Mechanical and manufacturing stream
- Mechanical drive systems
- Programmable logic controllers
- Computer aided design (CAD)/ computer aided manufacturing (CAM) and engineering practice
- Fluid mechanics
- Advanced manufacturing systems
- Thermodynamics
- Machine condition monitoring

This 2-year course provides high-level training for the manufacturing industry at the engineering associate level, specialising in robotics and mechatronics manufacturing. Students learn to design, engineer and maintain automated manufacturing equipment, robotics and related control and communication systems. Modern manufacturing employers require highly skilled and innovative graduates to design, install and maintain automated manufacturing and robotic systems. This is a para-professional program accredited with Engineers Australia. It provides a high level of training in a range of topics to equip students with advanced skills and knowledge including: engineering drawing, workshop practices, sciences for modern engineering, mathematics, electro mechanical devices, modern robots, industrial digital electronics; industrial programmable logic controllers (PLC), manufacturing, industrial automation; manufacturing control concepts and emerging technology science.

- Apply principles of mechanics to engineering problems
- Program, operate and select a robotics system

- Plan and manage a robotics system
- Plan for the implementation of mechanical drive systems
- Set up mechatronics engineering systems
- Interface control system to industrial processes and analyse data from data acquisition system (SCADA)
- Interface and program mechatronics engineering systems
- Produce engineering components by operating a Computer Numerical Control (CNC) manufacturing cell
- Apply mathematical solutions to engineering problems
- Apply scientific principles to engineering problems
- Use power tools/hand held operations
- Design fluid power controlled engineering systems
- Set up fluid power controlled engineering systems
- Operate computing packages
- Set up manufacturing processes for engineering applications
- Implement control processes using Programmable Logic Controllers (PLC)
- Manage projects
- Operate as a team member to conduct manufacturing, engineering or related activities
- Apply basic fabrication techniques
- Produce basic engineering sketches and drawings

This course focuses on the manufacture, maintenance, modification and installation of mechanical equipment and systems. Computer aided design and drafting is an important part of the program and is complemented by mechanical design projects that deliver a high level of training. Career options are available in the fields of manufacturing and mechanical engineering, computer aided design (CAD)/ computer aided manufacturing (CAM), fluid power, toolmaking (press tools or plastic mould making) and computer numerical control (CNC). Completion of this program can provide rewarding opportunities the engineering industry at the engineering associate level, in higher level technician roles and engineering management. The manufacturing and engineering area is the largest employment sector in Australia and employer demand for engineering graduates is high.

- Use computer aided drafting systems
- Use advanced 2D and 3D computer aided drafting techniques

- Apply computer based solid modelling techniques
- Create assemblies using solid models
- Create and modify surfaces for simple consumer products
- Set up manufacturing processes for engineering applications
- Apply computer aided manufacturing (CAM) processes
- Apply computer aided manufacturing (CAM) 2D programming
- Apply computer aided manufacturing (CAM) lathe programming
- Program a 3D milling machine centre
- Program 4th axis application
- Create advanced programs for computer numerical control (CNC) machine centres
- Apply materials science principles to engineering applications
- Implement advanced materials science principles to engineering applications
- Apply fluid mechanic principles in mechanical engineering
- Design mechanical engineering systems
- Program, operate and select a robotics system
- Plan and manage a robotics system
- Apply thermodynamic principles in engineering
- Design mechanical machines
- Manage projects
- Provide leadership across the organisation

# MECHATRONICS, MANUFACTURING AND ELECTRONICS ENGINEERING

Course	Intake details	Admission	Employment opportunities	Further study
<p><b><i>Mechanical Trade</i></b></p> <p><b>Diploma of Engineering Technology/Certificate III in Engineering (Mechanical Trade)</b></p> <p>CRICOS 056301B Course 21621VIC CRICOS 061885G Course MEM30205</p> <p><b>Certificate III can be taken alone as a 1 year course.</b></p>	<p>2 Years Dandenong February/July Students may also have the option of commencing at any point during the year if necessary.</p> <p>\$11,500 pa + \$840 MF</p>	<p>Equivalent Academic IELTS 5.5 Equivalent Year 12</p>	<p>Toolmaker Machinist Fitter Engineering assistant Technician Engineering technical officer</p>	<p>Bachelor of Business at Holmes Institute</p> <p>See page 18</p>
<p><b><i>Fabrication Trade</i></b></p> <p><b>Diploma of Engineering Technology/ Certificate III in Engineering (Fabrication Trade)</b></p> <p>CRICOS 056301B, Course 21621VIC CRICOS 065403K, Course MEM30305</p> <p><b>Certificate III can be taken alone as a 1 year course.</b></p>	<p>2 Years Dandenong February/July Students may also have the option of commencing at any point during the year if necessary.</p> <p>\$11,500 + \$840 MF</p>	<p>Equivalent Academic IELTS 5.5 Equivalent Year 12</p>	<p>Welder (first class) metal Fabricator Boilermaker Engineer Structural steel tradesperson Sheet metal tradesperson</p>	<p>Bachelor of Business at Holmes Institute</p> <p>See page 18</p>
<p><b><i>Engineering – various streams</i></b></p> <p><b>Certificate IV in Engineering</b></p> <p>CRICOS Pending, Course MEM40109</p> <p>Duration includes Certificate III in Engineering</p>	<p>1.5 Years Dandenong February/July Students may also have the option of commencing at any point during the year if necessary.</p> <p>\$11,500 Yr 1 + \$420 MF \$5,800 Yr 2 + \$420 MF</p>	<p>Equivalent Academic IELTS 5.5 Equivalent Year 12</p>	<p>Maintenance Toolmaker CNC Programmer Mechanical Tradesperson</p>	<p>Advanced Diploma of Engineering Technology (Mechanical Design or Robotics and Mechatronics) at Chisholm Diploma of Engineering Technology/Certificate III in Engineering Technology (Mechanical Trade or Fabrication trade)</p>

\*MF Materials fee

## Overview



This course provides broad based training in the skills and knowledge required for employment as a mechanical tradesperson in the metals and engineering industry. Successful completion of this program will enable students to gain the specialist skills of a fitter (general), a fitter and turner or a metal machinist (first class). This course prepares students to set up and operate manufacturing tools and computer controlled machines to cut and shape steel and other materials to manufacture products. Students also learn to assemble and install machinery. The qualification is a great start to your career, particularly if you like practical, hands on work. Mechanical tradespeople are in high demand in the manufacturing industry and can command high wages. Students learn to analyse, diagnose, design and execute judgements with respect to mechanical and manufacturing solutions.

- Perform lathe operations
- Interpret technical drawing
- Use tools for precision work
- Apply mathematical techniques in a manufacturing engineering or related environment

- Perform routine manual metal arc welding
- Perform milling operations
- Perform grinding operations
- Program and monitor programmable logic controllers (PLC), robots and other computerised equipment
- Maintain pneumatic systems
- Maintain hydraulic systems
- Modify fluid power control systems
- Install pipe work and pipe work assemblies
- Dismantle, replace and assemble engineering components
- Program computer numerical control (CNC) wire cut machines
- Perform Electro-Discharge Machining Operations (EDM)
- Program numerical control (NC)/ computer numerical control (CNC) machining
- Perform precision jig boring operations
- Select and maintain bearing and rotary shaft assemblies
- Produce basic engineering sketches and drawings
- Apply fabrication techniques
- Perform basic welding and thermal cutting processes to fabricate engineering structures
- Produce basic engineering components and products using fabrication and machining
- Apply pneumatic principles in engineering

This course provides the broad-based training required by a tradesperson in the metal fabrication Industry. Successful completion of this program will enable students to gain specialist skills in sheet metal, boilermaking, and structural steel fabrication. The Diploma covers the design, manufacture and maintenance of mechanical equipment and systems using metal fabrication technology. Use of computer aided design software is a core part of this program. Fabrication trades people are in high demand, and graduates will have higher level technician skills enabling them to apply theoretical concepts to solve complex technical engineering problems. Study includes: mechanical and thermal cutting; reading drawings, marking out/welding/assembly, computer numerical control (CNC) brake pressing operations, computer numerical control (CNC) profile cutting, fabrication of light and heavy components, computing and computer aided drafting.

- Perform advanced welding using gas tungsten arc welding process
- Perform complex lathe operations
- Apply fabrication, forming and shaping techniques
- Apply welding principles
- Perform geometric development
- Weld using gas metal arc welding process
- Weld using manual metal arc welding process
- Perform general machining
- Mark off/out structural fabrications and shapes
- Select and maintain bearing and rotary shaft assemblies
- Produce basic engineering sketches and drawings
- Apply basic fabrication techniques
- Perform basic welding and thermal cutting processes to fabricate engineering structures
- Produce basic engineering components and products using fabrication and machining
- Establish and manage maintenance procedures
- Apply pneumatic principles in engineering
- Perform basic machining processes
- Use power tools/hand held operations

This course allows students to develop a higher skill level in manufacturing engineering, enabling them to enter more highly skilled positions, and positions of higher responsibility. Learn specialist skills when you choose from streams such as Mechatronics, Computer Numerical Control (CNC) Programming, Fluid Power and Fabrication/Welding. The Mechatronics stream involves the electronic control of the manufacturing process integrated with fluid power. The Computer Numerical Control (CNC) programming is the application of machine programming languages to design and manufacture metal products using computer controlled machinery. In this stream, students learn how to produce machined components to a high degree of accuracy in a workshop environment using milling machines, CNC lathes and CNC machining centres.

In the Fluid Power stream, students learn how to install and maintain mechanical equipment and machine tools used in mechanical and production engineering. In addition, they learn how to design, install, maintain and diagnose faults in fluid power equipment. Fluid power is the control of industrial plant and equipment using pneumatics and hydraulics.

In the Fabrication and Welding stream, course content includes: metal fabrication, welding processes, welding metallurgy, fabrication inspection, in service inspection and welding design. Metal Fabrication is the forming of metal, usually steel plate, into various forms either by welding or other forms of metal joining processes.

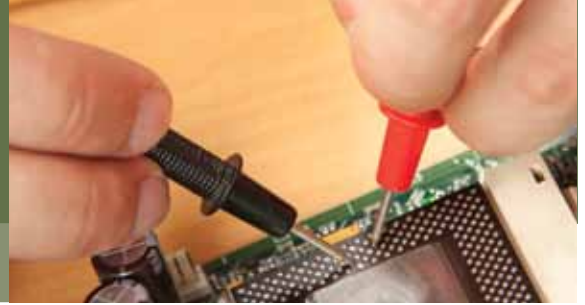
- Monitor quality of production welding/fabrications
- Operate computer controlled machines/processes
- Perform electro-discharge machining operations (EDM)
- Perform complex lathe operations
- Operate computer controlled machines/processes
- Set computer controlled machines/processes
- Organise and analyse information
- Operate computing packages
- Weld using manual metal arc welding process
- Create 2D code file using computer aided manufacturing system

# MECHATRONICS, MANUFACTURING AND ELECTRONICS ENGINEERING

Course	Intake details	Admission	Employment opportunities	Further study
<p><b><i>Electronics Engineering</i></b></p> <p><b>Advanced Diploma of Electronics and Communications Engineering/Certificate III in Electronics and Communications</b></p> <p>CRICOS 073856C, Course UEE60210 CRICOS 073857B, Course UEE30910</p>	<p>2 Years Dandenong February/July</p> <p>\$10,400 pa + \$595 MF</p>	<p>Equivalent Academic IELTS 5.5 Equivalent Year 12</p>	<p>Engineering assistant Technical officer Technician Tradesperson (radio, television repairer)</p> <p>Graduates are employed in design, manufacturing, testing, servicing, and technical sales within the electronics industry.</p>	<p>Related University Degrees</p>
<p><b>Certificate III in Electronics and Communications</b></p> <p>CRICOS 073857B, Course UEE30910</p>	<p>1 Year Dandenong February/July</p> <p>\$10,400 + \$380 MF</p>	<p>Equivalent Academic IELTS 5.5 Equivalent Year 11</p>	<p>Electronics technician</p>	<p>Advanced Diploma of Electronics and Communications Engineering</p>

\*MF Materials fee

## Overview



This course provides students with a range of high level skills focused on installing, commissioning and repairing electronic systems. Students learn prototyping, design of electronic circuits, testing, computer aided design, diagnosis, fault finding, and modification of systems. The course also develops skills in project management, research and technical report writing. Graduates are highly sought after in the manufacturing and electronic design industries at the technical officer and engineering assistant level. Hands-on, practical work is integrated throughout the program as students build electronics projects. Students also gain work experience by completing the workplace simulation components of the course, giving them an insight into the electronics industry.

- Develop design briefs for electrotechnology projects
- Design and develop electronics/computer systems projects
- Dismantle, assemble and fabricate electrotechnology components

- Use engineering applications software
- Commission computer systems
- Design embedded controller systems
- Use advanced computational processes to provide solutions to engineering problems
- Set up wireless capabilities of communications and data storage devices
- Repairs for electronic apparatus by replacement of components
- Troubleshoot DC Power supplies with single phase input
- Troubleshoot digital subsystems
- Troubleshoot amplifiers
- Troubleshoot frequency dependent circuits
- Develop software solutions in microcontroller based systems
- Find and repair faults in complex power supplies
- Develop solutions to analogue electronic problems
- Design and develop advanced digital systems
- Develop solutions to audio electronic problems
- Fault find micro-controller based hardware
- Solve problems in electronic circuit
- Design printed circuit boards

This course provides students with a range of skills focused on installing and repairing electronic systems. Graduates are qualified to work on a wide variety of electronic equipment, including video and television systems, audio systems, alarm systems and control systems. Students develop skills in fault finding and diagnosis, modification of systems, setting up wireless networks and setting up electronics systems.

- Dismantle, assemble and fabricate electrotechnology components
- Solve problems in extra-low voltage single path circuits
- Solve problems in multiple path DC circuits
- Carry out basic repairs to electronic apparatus by replacement of components

- Troubleshoot DC power supplies with single phase input
- Troubleshoot digital subsystems
- Troubleshoot amplifiers
- Troubleshoot frequency dependent circuits
- Find and repair faults in complex power supplies
- Troubleshoot basic amplifiers
- Solve fundamental problems in electronic communications systems
- Apply lead-free soldering techniques
- Source and purchase material/parts for installation or service jobs
- Provide quotations for installation or service jobs
- Use engineering applications software
- Set up wireless capabilities of communications and data storage devices
- Select and arrange equipment for wireless networks
- Set up and test residential audio/video equipment
- Find and repair faults in electronic apparatus
- Fault find micro-controller based hardware