

## Broad Field 6 Engineering

**Engineering** is the study of the design, composition, manufacture, maintenance and functioning of machines, products, systems and structures. It also includes the measurement and mapping of the earth's surface and its natural and constructed features.

The theoretical content of Broad Field 6 Engineering includes:

- physical science
- mathematical science
- materials science
- mechanics
- thermodynamics
- systems analysis
- land information technology
- engineering and manufacturing technology
- principles of design and drafting

The main purpose of this broad field of study is to develop an understanding of the conversion of materials and energy, and the measurement and representation of objects.

Fields of study in this broad field are classified into the following narrow fields:

- |    |                                       |
|----|---------------------------------------|
| 61 | Surveying and Cartography             |
| 62 | Civil Engineering                     |
| 63 | Electrical and Electronic Engineering |
| 64 | Mechanical Engineering                |
| 65 | Metallurgical and Mining Engineering  |
| 66 | Printing                              |
| 67 | Automotive Engineering                |
| 68 | Textiles, Clothing and Footwear       |
| 69 | Other Engineering                     |

Exclusions:

Architecture and Building are excluded from this broad field as they are more concerned with the construction of buildings than with general engineering. They are sufficiently specialised to form a distinct and separate broad field, Broad Field 7 Architecture and Building.

## Narrow Field 61

### Surveying and Cartography

**Surveying and Cartography** is the study of measuring and graphically representing natural and constructed features of the environment.

The focus of courses in surveying and cartography is site investigation, land boundaries, land information systems, hydrography and the representation of the earth's features.

Courses of study in Surveying and Cartography aim to develop:

- an understanding of the theory and technology of surveying in determining location and position
- an understanding of cadastral law
- an understanding of land information management systems for maintaining accurate and up to date information on land use
- an understanding of the theory and technology of map design and construction
- the ability to organise, cost and complete the tasks required in survey projects and map production

Fields of study in this narrow field are classified into the following detailed fields:

- 611 Surveying
- 612 Cartography

#### 611 Surveying

**Surveying** is the study of measuring and representing the shape, contour, locations and dimensions of the constructed and natural features of the earth, in the form of reports and plans.

Subjects studied include:

Cadastral Practice  
Civil Engineering Drawing  
Geodesy  
Land Law  
Photogrammetry and Remote Sensing  
Programming  
Survey Computations  
Survey Drafting

Skills learnt include:

- researching existing records and maps to assist in determining survey requirements
- measuring, reducing and adjusting data for various types of surveys
- using surveying instruments such as electronic distance measurers and theodolites to determine the position of points on the earth's surface

- developing and applying survey and design procedures for preparing survey plans
- presenting land information in plan and report formats

Examples of qualifications include:

- 1 611 Master of Surveying  
Master of Applied Science in Surveying
- 2 611 Graduate Diploma in Remote Sensing  
Graduate Diploma in Hydrographic Surveying
- 3 611 Bachelor of Surveying  
Bachelor of Applied Science in Mine and Engineering Surveying  
Bachelor of Land Information in Surveying
- 5 611 Associate Diploma in Applied Science in Surveying  
Associate Diploma in Survey Drafting  
Certificate of Technology in Survey Drafting
- 6 611 Certificate in Surveying  
Certificate in Land and Engineering Survey Drafting

## 612 Cartography

**Cartography** is the study of graphically representing the constructed and natural features of the earth in the form of maps.

Subjects studied include:

- Computer Assisted Mapping
- Geography
- Geology
- Map Design and Drafting
- Photogrammetry
- Reprographics
- Surveying
- Terrain Analysis

Skills learnt include:

- applying graphic communication techniques to map production
- preparing, editing and revising maps and charts
- preparing finished maps for reproduction and publication
- using techniques such as remote sensing, photogrammetry and land information systems to prepare maps

Examples of qualifications include:

- 3 612 Bachelor of Applied Science in Cartography  
Bachelor of Arts in Cartography
- 4 612 Diploma of Cartography
- 5 612 Associate Diploma of Engineering in  
Cartography  
Associate Diploma of Applied Science in  
Cartography  
Associate Diploma of Cartography
- 6 612 Certificate of Cartography

## Narrow Field 62

### Civil Engineering

**Civil Engineering** is the study of planning, designing, testing and directing the construction of large scale buildings and structures, and transport, water supply, pollution control and sewage systems. It includes economic, functional and environmental considerations in the design and construction.

The focus of courses in Civil Engineering is the planning and design of infrastructures, construction techniques and materials, soil mechanics and project management.

Courses of study in Civil Engineering aim to develop:

- an understanding of the theory and technology of civil engineering and their application to the construction process
- an understanding of the effects of soils, water and stress on structures
- an understanding of the environmental impact of civil engineering projects
- the ability to design, organise and co-ordinate civil engineering projects

Fields of study in this narrow field are classified to the following detailed field:

621 Civil Engineering

#### 621 Civil Engineering

**Civil Engineering** is the study of planning, designing, testing, and directing the construction of large scale buildings and structures, and transport, water supply, pollution control and sewerage systems. It incorporates economic, functional and environmental considerations in the design and construction.

Subjects studied include:

Building Construction  
Civil Engineering Drawing and Design  
Computing  
Engineering Cost Management  
Engineering Materials  
Fluid Mechanics  
Geomechanics  
Hydraulics  
Hydrology  
Mathematics  
Physics  
Stress and Structural Analysis

Skills learnt include:

- analysing the composition and strength of various engineering materials

- analysing sites and applying the principles of soil mechanics to determine construction methods
- applying the principles of fluid mechanics and hydraulics to the design and construction of watercourses and dams
- designing civil engineering projects
- preparing and interpreting specifications, drawings and plans

Examples of qualifications include:

- 1 621 Master of Applied Science in Civil Engineering  
Master of Engineering in Structural Engineering
- 2 621 Graduate Diploma in Water Engineering  
Graduate Diploma of Engineering in Municipal Engineering  
Graduate Diploma in Structural Computations
- 3 621 Bachelor of Engineering in Civil Engineering  
Bachelor of Engineering in Structural Engineering
- 5 621 Associate Diploma of Engineering in Civil Engineering  
Associate Diploma of Engineering in Municipal Engineering  
Certificate of Technology in Civil Engineering
- 6 621 Certificate of Structural Engineering

## Narrow Field 63

### Electrical and Electronic Engineering

**Electrical and Electronic Engineering** is the study of planning, designing, developing, testing, installing and maintaining electrical and electronic equipment, machinery and systems. It includes designing and maintaining computers and equipment for communication, navigation, entertainment, and electrical power generation and distribution.

The focus of courses in Electrical and Electronic Engineering is electrical and electronic systems, machinery and equipment.

Courses of study in Electrical and Electronic Engineering aim to develop:

- an understanding of the theory and technology of electrical and electronic engineering
- an understanding of the installation, testing, maintenance and repair of electrical and electronic equipment, machinery and systems
- an understanding of electrical safety and safety regulations
- an understanding of electrical and electronic wiring, circuitry and componentry
- the ability to organise, co-ordinate, and complete the tasks required in the design, testing, installation, maintenance and repair of electrical and electronic systems and equipment

Fields of study in this narrow field are classified into the following detailed fields:

631	Electrical and Electronic Engineering Science
632	Powerline Installation and Maintenance
633	Electrical Fitting
634	Automotive Electrics
635	Refrigeration and Air-Conditioning Mechanics
636	Electrical Mechanics
637	Communications Equipment Installation and Maintenance
638	Electronic Equipment Servicing
639	Electrical and Electronic Engineering, nec

#### 631 Electrical and Electronic Engineering Science

**Electrical and Electronic Engineering Science** is the study of planning, designing, developing and maintaining electrical and electronic equipment, machinery and systems. It includes designing computers and equipment for communication, navigation, entertainment and power generation.

Subjects studied include:

Communication Systems  
 Computer Engineering  
 Computer Systems Instrumentation  
 Control Systems  
 Digital Techniques  
 Electromagnetics  
 Electromechanical Systems

Electronic Circuits  
 Energy Generation  
 Engineering Drawing and Design  
 Engineering Materials  
 Mathematics  
 Network and Signal Theory  
 Physics  
 Systems Engineering

Skills learnt include:

- designing electrical and electronic circuits and systems
- preparing and interpreting specifications, drawings and regulations
- analysing the performance of electrical and electronic systems

Examples of qualifications include:

- 1 631 Master of Engineering Science in Computer Engineering  
Master of Engineering in Electrical and Electronic Engineering
- 2 631 Graduate Diploma in Telecommunications  
Graduate Diploma of Engineering in Communication Systems
- 3 631 Bachelor of Engineering in Electrical Engineering  
Bachelor of Computer Systems Engineering
- 5 631 Associate Diploma of Engineering in Electronic Engineering  
Associate Diploma in Digital Systems  
Advanced Certificate in Electrical Engineering
- 6 631 Certificate in Electronics Engineering  
Trade Certificate in Electrical Drafting
- 7 631 Certificate in Microprocessor System Techniques

### 632 Powerline Installation and Maintenance

**Powerline Installation and Maintenance** is the study of installing, repairing, maintaining and monitoring overhead and underground electrical power distribution networks.

Subjects studied include:

Electrical Theory  
Cable Joining  
Powerline Construction  
Powerline Maintenance  
Electrical Safety

Skills learnt include:

- installing, maintaining, and repairing overhead and underground electric powerlines and aerial equipment
- monitoring and testing power cable quality and performance
- testing the adequacy of various types of powerline insulation
- splicing and jointing conductors, and adjusting tensions
- locating faults in powerlines

Examples of qualifications include:

- 6 632 Trade Certificate in Electrical Lineswork  
Certificate in Electrical Cable Joining

### 633 Electrical Fitting

**Electrical Fitting** is the study of maintaining, diagnosing faults in and repairing electrical equipment and their components.

Subjects studied include:

Circuits  
Electrical Drawing  
Electrical Fitting and Machining  
Electrical Principles  
Electrical Theory  
Electric Motors

Skills learnt include:

- tracing and diagnosing faults in electrical circuits and appliances
- examining and interpreting blueprints, wiring diagrams and specifications
- installing and repairing wiring systems and components
- using equipment including lathes, drilling machines, hand tools and welding equipment

Examples of qualifications include:

- 6 633 Apprenticeship in Electrical Fitting  
Trade Certificate in Electrical Fitting and Turning
- 7 633 Certificate in Electrical Fitting and Armature Winding

### 634 Automotive Electrics

**Automotive Electrics** is the study of installing, maintaining, repairing and diagnosing faults in electrical wiring and components in automotive vehicles.

Subjects studied include:

Automotive Circuits  
Capacitance  
Cells and Batteries  
Charging Systems  
Electrical Theory  
Electronic Fuel Injection  
Ignition Systems  
Magnetism  
Vehicle Lighting Systems

Skills learnt include:

- adjusting engine control systems and timing
- installing and repairing electrical wiring and components including alternators, starter motors and capacitors in automobiles
- testing and locating automotive electrical faults

Examples of qualifications include:

- 5 634 Advanced Certificate in Automotive Electrics
- 6 634 Trade Certificate in Automotive Electrical Fitting  
Trade Certificate in Automotive Electrical Apprenticeship in Automotive Electrics
- 7 634 Certificate in Automotive Electrics

### 635 Refrigeration and Air-Conditioning Mechanics

**Refrigeration and Air-Conditioning Mechanics** is the study of installing, maintaining, diagnosing faults in and repairing domestic, commercial and industrial refrigeration and air-conditioning equipment.

Subjects studied include:

Commercial Refrigeration  
Compressors, Condensers and Evaporators  
Electrical Theory  
Fabrication Processes  
Fluid Systems and Controls  
Heating and Ventilation  
Industrial and Domestic Airconditioning  
Industrial and Domestic Refrigeration  
Refrigerant Flow Controls  
Refrigeration Drawing

Skills learnt include:

- installing, maintaining and repairing refrigeration and air-conditioning equipment
- checking for leaks using gas or fluid
- adjusting installed systems for optimum operating efficiency

Examples of qualifications include:

- 5 635 Associate Diploma of Refrigeration and Air Conditioning  
Certificate of Technology in Air Conditioning
- 6 635 Trade Certificate in Refrigeration Mechanics  
Certificate in Air Conditioning Mechanics  
Trade Certificate in Heating, Ventilation and Air Conditioning
- 7 635 Certificate in Refrigeration and Air Conditioning

### 636 Electrical Mechanics

**Electrical Mechanics** is the study of installing, maintaining, re-routing, repairing and diagnosing faults in electrical wiring and related equipment in domestic, commercial and industrial establishments, ships and trains.

Subjects studied include:

Capacitors and Capacitance in AC/DC Circuits  
Earthing  
Electrical Practice  
Electrical Theory and Principles  
Power Supply and Distributors  
SAA Wiring Rules  
Testing and Fault Finding in Equipment  
Welding

Skills learnt include:

- replacing defective components and reassembling electrical units
- reading and interpreting wiring diagrams to determine layout of wiring systems
- installing, maintaining and repairing electrical wiring systems and fittings including light switches, switchboards and earthing systems
- testing circuit continuity using a variety of instruments to ensure electrical compatibility and safety

Examples of qualifications include:

- 6 636 A Grade Certificate in Electrical Mechanics  
B Grade Certificate in Electrical Mechanics  
Apprenticeship in Electrical Mechanics
- 7 636 Certificate in Electrical Mechanics

### 637 Communications Equipment Installation and Maintenance

**Communications Equipment Installation and Maintenance** is the study of installing, maintaining, operating, repairing and diagnosing faults in telecommunications equipment, appliances, instruments and systems.

Subjects studied include:

Amplifiers  
Communications  
Electrical Principles and Theory  
Electronics  
Information Technology  
Modulation and Demodulation  
Receivers and Transmitters  
Transmission Lines and Antennae

Skills learnt include:

- operating and adjusting broadcast station equipment
- installing, maintaining and repairing telephone, radio and computer transmission equipment
- testing and replacing faulty equipment
- installing underground cables for telephone and other communications transmissions

Examples of qualifications include:

- 5 637 Broadcast Station Operators Certificate of Proficiency
- 6 637 Trade Certificate in Telecommunications
- 7 637 Traineeship Certificate in Telecommunications Installer  
Broadcast Station Operators Certificate

### 638 Electronic Equipment Servicing

**Electronic Equipment Servicing** is the study of maintaining, diagnosing faults in and repairing computers, radio and television receivers, audio, video, and other electronic equipment.

Subjects studied include:

- Amplifiers
- Audio and Radio Circuitry
- Digital and Analogue Systems
- Electrical Theory and Principles
- Electronic Components
- Electronic Networks
- Instrument Electronics
- Receiver Techniques
- Transducers

Skills learnt include:

- reading and interpreting circuit diagrams
- wiring, installing and testing electronic equipment
- diagnosing and locating faults, and replacing and repairing faulty componentry

Examples of qualifications include:

- 5 638 Technician Certificate in Colour Television Receivers
- 6 638 Trade Certificate in Radio and Television Mechanics
- 7 638 Certificate in Colour Video Display Systems  
Certificate in Electronic Servicing  
Radio Servicing Certificate

### 639 Electrical and Electronic Engineering, nec

**Electrical and Electronic Engineering, nec** is the study of all Electrical and Electronic Engineering not elsewhere classified in Narrow Field 63 Electrical and Electronic Engineering.

Examples of qualifications include:

- 3 639 Bachelor of Engineering in Microelectronics
- 5 639 Certificate of Technology in Medical Electronics
- 6 639 Trade Certificate in Industrial Electronics  
Apprenticeship in Meter Mechanics
- 7 639 Certificate of Semiconductor Electronics  
Certificate of Industrial Electronics  
Certificate in Basic Electronics

## Narrow Field 64

### Mechanical Engineering

**Mechanical Engineering** is the study of planning, designing, developing, producing and maintaining, machines, mechanical plants and systems, and metal products. It includes designing and maintaining machines which generate energy, produce goods and services, control pollution, dispose of waste, and move goods and materials.

The focus of courses in Mechanical Engineering is machines, mechanical systems and metal products.

Courses of study in Mechanical Engineering aim to develop:

- an understanding of the theory and technology of mechanical engineering
- an understanding of planning, designing, installing, maintaining and repairing plant, machinery and tools
- an understanding of fabricating, casting and welding metals
- an understanding of the technology and techniques of assembling, maintaining and repairing aircraft parts and systems
- the ability to organise, co-ordinate and complete the tasks required in the design, installation, testing, maintenance and repair of machines, plant, equipment and tools

Fields of study in this narrow field are classified into the following detailed fields:

- 641 Mechanical Engineering Science
- 642 Toolmaking
- 643 Metal Fitting, Turning and Machining
- 644 Sheetmetal Working
- 645 Boilermaking and Welding
- 646 Metal Casting and Patternmaking
- 647 Aircraft Maintenance Engineering
- 648 Precision Metal Working
- 649 Mechanical Engineering, nec

Exclusions:

Automotive Engineering is excluded from this narrow field as it is sufficiently specialised to form a separate and distinct narrow field, Narrow Field 67 Automotive Engineering.

#### 641 Mechanical Engineering Science

**Mechanical Engineering Science** is the study of planning, designing and developing machines, mechanical plants and systems.

Subjects studied include:

- Applied Mechanics
- Automatic Control
- Dynamics
- Electrical Engineering
- Engineering Materials
- Fluid Mechanics
- Mathematics

Mechanical Engineering Drawing and Design

- Physics
- Stress Analysis
- Thermodynamics
- Tribology

Skills learnt include:

- analysing the effects of stresses and strains on machinery, plant and equipment
- operating and maintaining mechanical systems
- designing and drafting mechanical components
- undertaking materials investigation and analysis

Examples of qualifications include:

- 1 641 Master of Engineering Science in Mechanical Engineering  
Master of Applied Science in Mechanical Engineering
- 2 641 Graduate Diploma of Engineering in Plant Management  
Graduate Diploma in Maintenance Engineering  
Graduate Diploma in Welding Technology
- 3 641 Bachelor of Engineering in Mechanical Engineering
- 5 641 Certificate of Technology in Mechanical Design Drafting  
Associate Diploma of Fabrication Engineering  
Associate Diploma in Mechanical Engineering  
Advanced Certificate in Mechanical Engineering
- 6 641 Trade Certificate in Mechanical Engineering
- 7 641 Certificate in Mechanical Drawing  
Certificate of Industrial Hydraulics

## 642 Toolmaking

**Toolmaking** is the study of making and repairing tools, dies, jigs, fixtures and other precision parts.

Subjects studied include:

- Die Sinking
- Foundry Engineering and Practices
- Jigs and Fixtures
- Metallurgy
- Precision Machining
- Press Tools
- Print Reading
- Tool and Die Construction
- Tool Drawing
- Toolmaking Theory

Skills learnt include:

- utilising the properties of various metals, alloys and plastics for toolmaking
- operating hand and machine tools used for precision toolmaking
- reading and interpreting blueprints and specifications in order to determine dimensions and tolerances of articles to be manufactured

Examples of qualifications include:

- 5 642 Certificate of Technology in Tool Design  
Advanced Certificate in Toolmaking
- 6 642 Trade Certificate in Toolmaking
- 7 642 Pre-Apprenticeship Certificate in Toolmaking  
Certificate in Jig Drafting

## 643 Metal Fitting, Turning and Machining

**Metal Fitting, Turning and Machining** is the study of setting up machining tools, production machines and textile machines, operating machining tools and machines to shape metal stock and castings, and fitting and assembling the fabricated metal parts into products.

Subjects studied include:

- Brazing
- Grinding and Shaping
- Jobbing
- Lathe Work
- Machine Servicing and Maintenance
- Numerical Control Machining
- Precision and Programmable Machining
- Print Reading and Interpretation
- Production Fitting and Tooling
- Screw and Gear Cutting
- Workshop Drawing

Skills learnt include:

- machining including turning, gearcutting, milling and computer controlled machining
- assembling and fitting manufactured parts and sub-assemblies
- setting up and operating machine tools to shape metal stocks
- reading and interpreting blueprints and job specification cards in order to determine suitable materials, methods and sequences of operation and machine settings

Examples of qualifications include:

- 6 643 Trade Certificate in Fitting and Machining  
Trade Certificate in Plant Mechanics  
Trade Certificate in Diesel Fitting
- 7 643 Pre-Apprenticeship Certificate in Fitting and Machining  
Certificate in Farm Mechanics  
Certificate of Mechanical Fitting  
Certificate of Fitting and Turning

## 644 Sheetmetal Working

**Sheetmetal Working** is the study of cutting, shaping and joining sheetmetal using hand and power tools and machines, and assembling and installing sheetmetal products.

Subjects studied include:

- Coppersmithing
- Electric Arc Welding
- Marking Off
- Metal Fabrication and Design
- Oxy Welding

Sheetmetal Calculations and Drawing  
Sheetmetal Practice  
Ventilation Drawing and Technology

Skills learnt include:

- examining detailed drawings and specifications to determine job material and equipment requirements
- cutting, shaping and finishing sheetmetal products using various tools and techniques
- marking out stock using templates, gauges and other measuring instruments

Examples of qualifications include:

- 5 644 Advanced Certificate in Sheetmetal Working  
6 644 Trade Certificate in Coppersmithing  
Trade Certificate in Sheetmetal Working  
Trade Certificate in Metal Spinning  
7 644 Certificate in Sheetmetal Work  
Certificate in Sheetmetal

## 645 Boilermaking and Welding

**Boilermaking and Welding** is the study of marking off, cutting, shaping and joining metals. It includes constructing and repairing steelwork structures, pressure pipes, ships and boilers.

Subjects studied include:

Cutting and Gauging  
Engineering Drawing  
Fabrication Techniques  
Fitting and Machining  
Foundry Skills  
Layout and Marking Off  
Metallurgy  
Plate and Pipe Work  
Structural Steelwork  
Welding Techniques and Technologies

Skills learnt include:

- examining metals to determine method of welding required
- using appropriate welding techniques to join metals
- inspecting welds to determine strength, precision and possible defects
- cutting, forming and assembling boilers

Examples of qualifications include:

- 5 645 Certificate of Technology in Welding  
Advanced Certificate in Metal Fabrication  
6 645 Certificate in Boiler Inspection  
Certificate in Welding Supervision  
Trade Certificate in Metal Fabrication  
7 645 Certificate in Metal Fabrication  
Certificate in Boilermaking  
Certificate in Welding

ABS Classification of Qualifications

## 646 Metal Casting and Patternmaking

**Metal Casting and Patternmaking** is the study of planning and fabricating mould patterns and cores, and founding metals.

Subjects studied include:

Casting Technologies  
Core Moulding Processes  
Foundry Practice  
Moulding Techniques  
Non-Ferrous Technologies  
Pattern Costing and Standards  
Pattern Design and Production  
Properties of Metals  
Shrinkage and Contraction

Skills learnt include:

- moulding, coremaking and casting ferrous and non-ferrous alloys
- interpreting drawings to estimate the weight of castings
- designing and fabricating metallic and non-metallic patterns, moulds and cores
- determining the appropriate materials and techniques for moulding and casting metals

Examples of qualifications include:

- 5 646 Associate Diploma in Foundry Technology  
Technician Certificate in Foundry Practice  
6 646 Trade Certificate in Foundry  
Trade Certificate in Patternmaking  
Apprenticeship in Moulding and Coremaking  
7 646 Certificate in Patternmaking

## 647 Aircraft Maintenance Engineering

**Aircraft Maintenance Engineering** is the study of assembling, maintaining and repairing airframes, engines, electrical and mechanical instruments, and related aircraft systems.

Subjects studied include:

Aircraft Engine Overhaul  
Aircraft Hydraulics and Pneumatics  
Aircraft Instrument and Electrical Systems  
Aircraft Structures  
Airworthiness  
Aviation Science and Technology  
Control Mechanisms  
Gas Turbine Principles  
Helicopter Airframe Structures  
High Speed Flight  
Landing Gear  
Propeller Principles

Skills learnt include:

- conducting diagnostic tests to determine the nature of radio and instrument malfunctions
- testing, maintaining and servicing aircraft engines, airframe components and systems
- repairing and replacing defective parts and components

Examples of qualifications include:

- 6 647 Trade Certificate in Aircraft Maintenance Engineering  
Trade Certificate in Aircraft Mechanical Maintenance  
Trade Certificate in Aircraft Mechanics

### 648 Precision Metal Working

**Precision Metal Working** is the study of designing, fabricating, assembling, maintaining and repairing precision instruments.

Subjects studied include:

Balance and Balance Springs  
Drawing  
Fitting  
Lathe Work  
Machining  
Tool and Cutter Grading  
Welding

Skills learnt include:

- repairing parts and sub-assemblies of locks, timepieces and small arms using precision instruments
- assembling and disassembling precision instruments using hand tools, measuring instruments and magnifying aids
- calibrating instruments using standard weights and measures
- making and repairing blades for various saws
- engraving ornamental inscriptions on fine metal work and jewellery

Examples of qualifications include:

- 6 648 Certificate in Saw Doctoring  
Trade Certificate in Saw Doctoring and Making  
Trade Certificate in Locksmithing  
Apprenticeship in Watchmaking  
Trade Certificate in Watchmaking

### 649 Mechanical Engineering, nec

**Mechanical Engineering, nec** is the study of all Mechanical Engineering not elsewhere classified in Narrow Field 64 Mechanical Engineering.

Examples of qualifications include:

- 2 649 Graduate Diploma in Metal Finishing and Surface Protection  
5 649 Advanced Certificate in Electrolytic Finishing  
Technician Certificate in Mechanical Metal Finishing  
6 649 Apprenticeship in Electroplating  
Trade Certificate in Farriery  
Trade Certificate in Industrial Blacksmithing  
7 649 Certificate in Metal Finishing  
Pre-Apprenticeship Certificate in Farriery

## Narrow Field 65

### Metallurgical and Mining Engineering

**Metallurgical and Mining Engineering** is the study of locating, assaying and extracting minerals from the earth, refining metals, and producing and analysing the properties of alloys, ceramics, polymers and other materials.

The focus of courses in Metallurgical and Mining Engineering is extractive techniques, analysis and refinement of minerals, and materials science.

Courses of study in Metallurgical and Mining Engineering aim to develop:

- an understanding of the theory and technology of metallurgical and mining engineering
- an understanding of the extraction, processing and refinement of minerals
- an understanding of the treatment and manufacture of metals, alloys, ceramics, polymers and other materials
- an understanding of the management, regulatory and safety aspects of mineral and metallurgical production
- the ability to organise, co-ordinate and maintain mining and processing operations

Fields of study in this narrow field are classified into the following detailed fields:

- 651 Metallurgical Engineering Science
- 652 Mining Engineering Science
- 659 Metallurgical and Mining Engineering, nec

#### 651 Metallurgical Engineering Science

**Metallurgical Engineering Science** is the study of assaying, producing and refining materials, including metals, alloys, ceramics and polymers. It includes developing and implementing extraction and treatment procedures.

Subjects studied include:

Ceramics and Polymers  
 Chemistry  
 Crystal Growth  
 Electrochemistry and Corrosion  
 Environmental Principles  
 Extractive Metallurgy  
 Materials Analysis and Testing  
 Materials Science  
 Mineral Processing  
 Physics  
 Stress Analysis  
 Structure and Properties of Materials

Skills learnt include:

- analysing the structure, composition and properties of ceramic, metallic, polymeric and composite materials
- developing techniques for producing and processing materials
- applying chemical and metallurgical techniques to the commercial production of metals and alloys

Examples of qualifications include:

- 1 651 Master of Applied Science in Metallurgy  
 Master of Applied Science in Materials Engineering
- 2 651 Graduate Diploma in Extractive Metallurgy  
 Graduate Diploma in Materials Technology
- 3 651 Bachelor of Applied Science in Metallurgy  
 Bachelor of Engineering in Ceramics Engineering  
 Bachelor of Metallurgical Engineering
- 5 651 Associate Diploma in Metals Technology  
 Associate Diploma of Applied Science in Metallurgy  
 Certificate in Metallurgy
- 7 651 Certificate in Assaying

**652 Mining Engineering Science**

**Mining Engineering Science** is the study of planning, developing, assessing and directing the extraction of minerals, oil and gas from the earth.

Subjects studied include:

Aerial Photogrammetry and Field Mapping  
 Drilling and Blasting  
 Geomechanics  
 Materials Handling  
 Mine Surveying  
 Mine Plant Design  
 Mineral Processing  
 Mining Methods  
 Mining Safety, Health and Legislation  
 Ore Petrology  
 Ore Reserve Estimation  
 Thermofluids  
 Tunnelling

Skills learnt include:

- applying the principles and practices of management and safety to the efficient operation of mines
- developing methods of controlling gas and oil extraction
- surveying, designing and constructing mines
- surveying mineral deposits to assess the economic feasibility of mining

Examples of qualifications include:

- 1 652 Master of Applied Science in Mining and Mineral Technology  
 Master of Mining Engineering
- 2 652 Graduate Diploma of Mining  
 Graduate Diploma of Engineering in Petroleum Engineering
- 3 652 Bachelor of Engineering in Geological Engineering  
 Bachelor of Applied Science in Mining Engineering
- 5 652 Associate Diploma of Applied Science in Coalmining  
 Certificate of Technology in Extractive Industry
- 6 652 Certificate in Coalmining
- 7 652 Certificate in Mine Deputy  
 Certificate in Mining

**659 Metallurgical and Mining Engineering, nec**

**Metallurgical and Mining Engineering, nec** is the study of all Metallurgical and Mining Engineering not elsewhere classified in Narrow Field 65 Metallurgical and Mining Engineering.

Examples of qualifications include:

- 1 659 Master of Applied Science in Materials Science
- 2 659 Graduate Diploma in Materials Science
- 3 659 Bachelor of Applied Science in Materials Science
- 7 659 Certificate in Quarry Supervision

## Narrow Field 66

### Printing

**Printing** is the study of reproducing texts and pictorial works onto any media from original plates and masters, and producing finished publications. It includes the study of operating printing machinery.

The focus of courses in Printing is printing techniques, surfaces and materials, design, composition and layout, and binding and finishing techniques.

Courses of study in Printing aim to develop:

- an understanding of different printing techniques and their applications
- an understanding of the various technologies used in the printing and finishing process
- an understanding of design, layout and colour matching
- the ability to cost, organise and complete the production of commercial printing to acceptable standards

Fields of study in this narrow field are classified into the following detailed fields:

661	Compositing
662	Graphic Reproduction
663	Printing Machining
664	Binding and Finishing
665	Screen Printing
669	Printing, nec

#### 661 Compositing

**Compositing** is the study of typesetting and page layout in preparation for printing.

Subjects studied include:

Block and Plate Preparation  
 English Grammar and Use  
 Hand, Photo and Machine Composition  
 Layout and Design  
 Typesetting  
 Typography

Skills learnt include:

- designing and preparing page layouts
- typesetting, imposition and proofing
- identifying and classifying type and lettering for layouts
- interpreting mark-up instructions and standards of presentation
- using processing techniques including bromide make-up, diffusion transfer techniques, film make-up and camera work

Examples of qualifications include:

- 6 661 Trade Certificate in Printing Composition  
 Apprenticeship in Printing Composing
- 7 661 Certificate in Printing Composing

#### 662 Graphic Reproduction

**Graphic Reproduction** is the study of reproducing drawings, photographs, paintings, and other pictorial material for printing.

Subjects studied include:

Camera and Electronic Imaging  
 Computer Graphics  
 Film Combining and Retouching  
 Graphic Reproductive Technology  
 Image Preparation  
 Photoengraving and Gravure Platemaking  
 Plate and Cylinder Preparation  
 Scanning and Retouching

Skills learnt include:

- reproducing images from film to plates and cylinders
- integrating graphic reproduction with the major printing processes
- assessing the suitability of master copies for print processes
- examining proofs to verify quality of plates and cylinders

Examples of qualifications include:

- 6 662 Apprenticeship in Graphic Reproduction  
Trade Certificate in Graphic Reproduction

### 663 Printing Machining

**Printing Machining** is the study of setting up, operating and monitoring printing presses. It excludes the operation of screen printing machines.

Subjects studied include:

Colour Printing  
Flexography and Gravure Printing  
Lithography  
Rotary Printing  
Stereotyping  
Webb Offset Printing

Skills learnt include:

- using letterpress and lithograph printing processes
- sensitising and desensitising plates and cylinders
- operating ordinary, small and automatic presses
- using flexographic and gravure printing techniques
- monitoring press operations to check print quality and to check for malfunctions

Examples of qualifications include:

- 6 663 Apprenticeship in Printing Machining  
Trade Certificate in Printing Machining  
7 663 Printing Machining Certificate

### 664 Binding and Finishing

**Binding and Finishing** is the study of gathering pages and assembling them into books and other publications. It includes decorating, lettering and polishing covers.

Subjects studied include:

Guillotine Operation  
Hot Foil Stamping  
Machine Folding  
Paper Handling  
Trimming  
Types of Binding

Skills learnt include:

- operating guillotines for pre- and post- press paper cutting and trimming
- using and caring for hand tools and mechanical binding equipment
- collating and preparing pages for binding
- using various techniques for finishing publications

Examples of qualifications include:

- 6 664 Apprenticeship in Binding and Finishing  
Trade Certificate in Binding and Finishing  
Trade Certificate in Bookbinding  
7 664 Bookbinding and Finishing Certificate  
Bookbinding Certificate

### 665 Screen Printing

**Screen Printing** is the study of printing images by forcing ink through a mesh screen over a stencil.

Subjects studied include:

Colour Matching  
Frames and Meshes  
Graphics and Layout  
Inks and Dyes  
Printing on Ceramics and Fabrics  
Stencil Preparation

Skills learnt include:

- preparing stencils using handcutting and photographic techniques
- selecting, mixing and matching coloured inks
- designing stencils and layout
- using stencils and meshes to print on a variety of media

Examples of qualifications include:

- 6 665 Trade Certificate in Screen Printing and Stencil Preparation  
Trade Certificate in Screen Printing  
7 665 Certificate in Screenprinting and Stencil Preparation

### 669 Printing, nec

**Printing, nec** is the study of all Printing not elsewhere classified in Narrow Field 66 Printing.

Examples of qualifications classified to this detailed include:

- 6 669 Trade Certificate in Reprographics

## Narrow Field 67

### Automotive Engineering

**Automotive Engineering** is the study of planning, designing, developing, producing and maintaining motor vehicles and their non-electrical components including earth moving equipment, motor cycles and small engines.

The focus of courses in Automotive Engineering is motor vehicles, earth moving equipment, small engines and their components.

Courses of study in Automotive Engineering aim to develop:

- an understanding of the theory and practice of the design, production and functioning of motor vehicles
- an understanding of vehicle body building, repair, painting and trimming
- an understanding of maintaining and repairing motor vehicles, earth moving plant, motor cycles and small engines
- the ability to organise, cost and complete the tasks required in the design, construction and maintenance of motor vehicles and their non-electrical components

Fields of study in this narrow field are classified into the following detailed fields:

671	Automotive Engineering Science
672	Vehicle Mechanics
673	Panel Beating
674	Vehicle Painting
675	Vehicle Building
676	Vehicle Trimming
679	Automotive Engineering, nec

#### 671 Automotive Engineering Science

**Automotive Engineering Science** is the study of designing, developing and testing motor vehicles, earth moving equipment, small engines and their components.

Subjects studied include:

Applied Engine Power  
Automotive Design  
Emission Control  
Engineering Mathematics  
Engineering Science  
Materials Science  
Technical Drawing and Communication  
Torque

Skills learnt include:

- designing and developing motor vehicles, earth moving equipment, small engines and their components
- applying the theory and practice of engineering mathematics and science in relation to automotive practice

- interpreting and applying standards to the design of motor vehicles and components
- testing and evaluating vehicle performance and safety

Examples of qualifications include:

5 671 Advanced Certificate in Automotive Engineering

#### 672 Vehicle Mechanics

**Vehicle Mechanics** is the study of maintaining, diagnosing faults in, repairing and servicing motor vehicles and their components. It includes repairing small engines in boats, motorcycles, lawnmowers, generators and related equipment.

Subjects studied include:

Braking Systems  
Clutches and Transmissions  
Cooling and Fuel Engine Fitting  
Drive Lines and Axle Assemblies

Fault Diagnosis  
 Fitting and Machining  
 Frames, Suspension and Steering  
 Fuel and Emission Control  
 Fuel Injection Systems  
 Internal Combustion Engines  
 Welding  
 Wheel Balancing and Alignment

Skills learnt include:

- using workshop manuals to dismantle faulty assemblies
- checking exhaust emissions and tuning engines to achieve better performance
- diagnosing faults in, servicing and repairing automotive systems and components
- reboring cylinders in engines

Examples of qualifications include:

- 5 672 Advanced Certificate in Automotive Mechanics  
 6 672 Trade Certificate in Automotive Fitting and Turning  
 Trade Certificate in Small Engine Mechanics  
 Trade Certificate in Brake Mechanics  
 Trade Certificate in Fuel Injection Fitting  
 7 672 Certificate in Motor Mechanics  
 Pre-vocational Certificate in Automotive Mechanics

### 673 Panel Beating

**Panel Beating** is the study of repairing damaged motor vehicle bodies and replacing panels.

Subjects studied include:

Accessory Repair  
 Aluminium and Plastic Repairs  
 Body Frame Alignment  
 Corrosion  
 Custom Panel Forming  
 Damage Assessment and Customer Relations  
 Dismantling and Reassembling  
 Electrical and Circuit Protection  
 Fibreglass Reinforced Plastics  
 Jigs Frame and Wheel Alignment  
 Metal Finishing Techniques  
 Motor Body Repair Equipment  
 Panel Repair  
 Weather Proofing  
 Welding

Skills learnt include:

- dismantling, repairing and reassembling motor body panels
- assessing damage and estimating costs
- automotive spraypainting and the forming of custom panels
- filing, grinding and sanding repaired surfaces

- straightening badly damaged vehicles using mechanical and hydraulic equipment

Examples of qualifications include:

- 5 673 Advanced Certificate in Panel Beating  
 6 673 Trade Certificate in Panel Beating  
 7 673 Pre-apprenticeship Certificate in Panel Beating

### 674 Vehicle Painting

**Vehicle Painting** is the study of preparing vehicle surfaces, mixing and matching paint colours and spray painting vehicles including aircraft.

Subjects studied include:

Acrylic Application  
 Airbrush Techniques  
 Application of Primers  
 Colour Matching and Mixing  
 Estimating and Quoting  
 Fillers and Topcoats  
 Finishing Techniques  
 Line Work  
 Spraying Enamels  
 Tinters  
 Vehicle Decoration and Signwork

Skills learnt include:

- preparing painted and unpainted surfaces, applying primers, fillers and top coats
- using spray painting technology and paint-testing equipment
- analysing, matching and mixing of both metallic and non-metallic paints
- laying out and designing decorations for vehicles
- painting murals, lines and scrolls and signwriting on vehicles

Examples of qualifications include:

- 5 674 Advanced Certificate in Motor Painting  
 6 674 Trade Certificate in Vehicle Painting  
 Trade Certificate in Spraypainting  
 7 674 Certificate in Motor Painting  
 Certificate in Vehicle Colour Matching

### 675 Vehicle Building

**Vehicle Building** is the study of building vehicle bodies, including trucks, buses, coaches, railway carriages, wagons and fire engines.

Subjects studied include:

Body Panel Shaping  
 Electrical Circuit Layout  
 Electric Welding  
 Fastening Methods

Fibreglass Reinforced Plastics and Materials  
 Motorbody Drawing  
 Oxyacetylene Welding  
 Tool Manufacture  
 Trimming  
 Vehicle Building Equipment  
 Weather Proofing and Sealing  
 Workshop Safety

Skills learnt include:

- utilising the structural properties of materials for vehicle building
- interpreting blueprints, drawings and specifications
- bolting, screwing, riveting and welding sections together to form complete frameworks
- cutting, shaping and attaching panels to frameworks

Examples of qualifications include:

5 675 Advanced Certificate in Vehicle Bodymaking  
 6 675 Trade Certificate in Carriage Building  
 Trade Certificate in Vehicle Building  
 Trade Certificate in Coach Building

## 676 Vehicle Trimming

**Vehicle Trimming** is the study of making, installing, repairing and replacing the interior trimmings and upholstery of vehicles including boats, aircraft and railway carriages.

Subjects studied include:

Attachment Methods  
 Canopies and Accessories

Carpet Fitting  
 Custom Trimming  
 Headlinings  
 Material Repairing  
 Panel Trimming  
 Proofing  
 Seating Coverings and Inserts  
 Trade Drawing and Design  
 Trim Repair  
 Trim Renovation  
 Vinyl Roof Lining

Skills learnt include:

- fitting and installing trim in vehicles
- making bodies, canopies, tonneau covers, seats and squabs
- removing old coverings and fittings and taking new measurements

Examples of qualifications include:

6 676 Trade Certificate in Vehicle Trimming  
 7 676 Pre-apprenticeship Certificate in Vehicle Trimming

## 679 Automotive Engineering, nec

**Automotive Engineering, nec** is the study of all Automotive Engineering not elsewhere classified in Narrow Field 67 Automotive engineering.

Examples of qualifications include:

6 679 Trade Certificate in Automotive Parts Interpreting  
 7 679 Certificate in Automotive Parts

## Narrow Field 68

### Textiles, Clothing and Footwear

**Textiles, Clothing and Footwear** is the study of the manufacture, care and repair of textiles, textile and leather products, clothing and related items, shoes and other forms of footwear. It includes the manufacture of soft furnishings.

The focus of courses in Textiles, Clothing and Footwear is textiles, yarns and fabrics, and the manufacture of garments, soft furnishings, footwear and leather products.

Courses of study in Textiles, Clothing and Footwear aim to develop:

- an understanding of the properties of various textiles, fabrics and yarns, and their suitability for different applications
- an understanding of the technology and techniques of textile, yarn and fabric production
- an understanding of the design, manufacture and repair of garments, upholstery and footwear
- the ability to operate equipment used for processing fibres into yarns, and the commercial production of textiles, apparel and upholstery

Fields of study in this narrow field are classified into the following fields:

681	Textile Engineering Science
682	Garment Making
683	Upholstery
684	Footwear
689	Textiles, Clothing and Footwear, nec

#### 681 Textile Engineering Science

**Textile Engineering Science** is the study of the industrial production of textiles, yarns and fabrics. It includes the study of the maintenance and operation of machines used in the textile industry.

Subjects studied include:

Dye and Colouration Techniques  
Fibre Technology  
Knitting  
Mechanical Principles  
Plant Management and Services  
Spinning  
Textile Chemistry  
Weaving  
Workshop Procedures  
Yarn Manufacturing

Skills learnt include:

- applying physical, chemical and engineering processes to the manufacture of fibres and yarn
- undertaking research and development into the properties of various textiles, fabrics and yarns

- setting up, adjusting and repairing textile spinning, weaving and tufting machines

Examples of qualifications include:

1	681	Master of Science in Textile Technology
2	681	Graduate Diploma in Textile Technology
3	681	Bachelor of Science in Textile Technology
5	681	Advanced Certificate in Textile Technology Associate Diploma of Textile Technology
6	681	Apprenticeship in Textile Mechanics
7	681	Certificate of Applied Science in Textile Technology

#### 682 Garment Making

**Garment Making** is the study of the commercial production of clothing and other apparel.

Subjects studied include:

Equipment and Machinery  
Fabric Spreading  
Fashion Sketching and Design  
Garment Assembly  
Grading

Marking and Cutting  
Pattern Construction  
Textiles

Skills learnt include:

- drafting and modifying patterns to suit style and size of garment
- planning, organising and supervising garment production
- cutting out parts of garments and hats according to patterns by hand or machine
- assembling and sewing fabric parts together to make a finished product

Examples of qualifications include:

- 6 682 Trade Certificate in Fashion Patternmaking  
Apprenticeship in Apparel Cutting
- 7 682 Certificate in Commercial Dressmaking  
Certificate in Fashion Patternmaking  
Certificate in Clothing Assembly  
Certificate in Machine Knitting  
Certificate in Apparel Machining  
Certificate in Fashion Technology

### 683 Upholstery

**Upholstery** is the study of designing, constructing and repairing the soft furnishings of chairs, beds, and bed and chairsprings.

Subjects studied include:

Cushion-making  
Decoration  
Drawing and Calculations  
Edge-forming  
Facing and Finishing Techniques  
Foundations and Springing  
Framemaking  
Repair, Recover and Reupholstery  
Sewing Machining  
Upholstery of Various Types of Chair

Skills learnt include:

- measuring and cutting covering and padding materials
- making and repairing padding and furniture coverings
- fabricating and attaching springs to furniture frames
- attaching ornamental trims, braids and buttons to covers and frames

Examples of qualifications include:

- 5 683 Advanced Certificate in Furnishing Upholstery  
6 683 Trade Certificate in Upholstering  
Apprenticeship in Upholstering

Exclusions:

Vehicle Trimming is excluded from this detailed field as it is sufficiently specialised to form a distinct and separate detailed field, Detailed Field 676 Vehicle Trimming.

### 684 Footwear

**Footwear** is the study of designing, constructing and repairing shoes, boots and other forms of footwear.

Subjects studied include:

Clicking  
Finishing Techniques  
Foot Anatomy  
Grading and Tanning  
Machine Welted Manufacturing  
Measurement and Fitting  
Pattern Design and Cutting  
Stock Fitting  
Stuff-cutting and Preparation  
Upper Closing and Preparation

Skills learnt include:

- cutting out parts using scissors, knives and clicking machines
- operating stitching machines to join, decorate and reinforce shoe parts to form uppers
- repairing footwear
- designing and making orthopaedic shoes and boots

Examples of qualifications include:

- 6 684 Trade Certificate in Footwear  
Apprenticeship in Footwear  
Trade Certificate in Shoe Repairing  
Trade Certificate in Surgical Bootmaking
- 7 684 Certificate in Footwear Machining  
Certificate in Footwear  
Certificate in Footwear Design

### 689 Textiles, Clothing and Footwear, nec

**Textiles, Clothing and Footwear, nec** is the study of all Textiles, Clothing and Footwear not elsewhere classified in Narrow Field 68 Textiles, Clothing and Footwear.

Examples of qualifications include:

- 6 689 Apprenticeship in Soft Furnishing Making  
Apprenticeship in Dry Cleaning
- 7 689 Certificate in Soft Furnishing  
Certificate in Textile Merchandising  
Certificate in Dyeing  
Certificate in Hand Weaving

## Narrow Field 69

### Other Engineering

**Other Engineering** is the study of all Engineering not included elsewhere in Broad Field 6 Engineering.

Fields of study in this narrow field are classified into the following detailed fields:

691	Chemical Engineering Science
692	Aeronautical Engineering Science
693	Industrial Engineering Science
694	Marine Engineering Science
695	Other Engineering Science
696	Marine Construction
697	Wood Machining and Turning
698	Cabinet Making
699	Other Engineering, nec

#### 691 Chemical Engineering Science

**Chemical Engineering Science** is the study of planning, designing, and developing products and processes where chemical and physical changes occur. It includes designing chemical plants and control systems.

Subjects studied include:

Chemical Reactors  
Chemistry  
Engineering Materials  
Fluid Mechanics  
Heat and Mass Transfer  
Mathematics  
Particle Mechanics  
Physics  
Plant and Equipment Design  
Process Design, Control and Analysis  
Process Engineering  
Separation Processes  
Thermodynamics

Skills learnt include:

- applying mathematical principles of modelling and optimisation to the design of chemical processes
- applying the laws of physical chemistry and physics to chemical engineering operations
- designing and developing chemical processes and plants
- preparing feasibility studies and costings of processes

Examples of qualifications include:

- 1 691 Master of Engineering in Chemical Engineering  
Master of Applied Science in Chemical Engineering
- 2 691 Graduate Diploma in Corrosion Technology  
Graduate Diploma in Biochemical Engineering
- 3 691 Bachelor of Engineering in Chemical Engineering  
Bachelor of Science in Chemical Engineering Science

#### 692 Aeronautical Engineering Science

**Aeronautical Engineering Science** is the study of planning, designing, developing and producing aircraft structures and systems.

Subjects studied include:

Aerodynamics  
Aeronautics  
Aeronautical Engineering Drawing and Design  
Aerospace Structures  
Applied Mechanics  
Dynamics  
Flight Vehicle Systems  
Mathematics  
Physics  
Propulsion  
Statics

Skills learnt include:

- designing aircraft, aircraft components and support equipment
- evaluating test flights to analyse performance and compliance to specifications and safety standards
- authorising modifications, repairs and maintenance

Examples of qualifications include:

- 1 692 Master of Engineering in Aerospace Engineering  
 3 692 Bachelor of Engineering in Aerospace Engineering  
 Bachelor of Engineering in Aeronautical Engineering

### 693 Industrial Engineering Science

**Industrial Engineering Science** is the study of planning, designing, and developing safe and efficient production systems and working environments by integrating technological, financial, human and other resources.

Subjects studied include:

Mathematics  
 Computing  
 Engineering Drawing and Design  
 Engineering Materials  
 Manufacturing Technology  
 Materials Handling  
 Metrology  
 Physics  
 Product Engineering  
 Production Control  
 Production Processes  
 Systems Engineering

Skills learnt include:

- selecting and developing manufacturing processes using new and existing machinery and equipment
- designing, developing, controlling and evaluating manufacturing systems
- operating and managing production systems and procedures

Examples of qualifications include:

- 1 693 Master of Engineering Science in Industrial Engineering  
 Master of Engineering in Computer Integrated Manufacture  
 2 693 Graduate Diploma in Robotics  
 3 693 Bachelor of Engineering in Manufacturing Engineering  
 Bachelor of Engineering in Production Engineering

- 5 693 Associate Diploma in Production Engineering  
 Associate Diploma of Business in Industrial Engineering  
 Associate Diploma in Computer Integrated Manufacturing  
 6 693 Certificate in Industrial Engineering  
 7 693 Certificate in Computer Integrated Manufacturing  
 Certificate in Materials Handling

### 694 Marine Engineering Science

**Marine Engineering Science** is the study of maintaining and operating shipboard machinery and systems.

Subjects studied include:

Applied Mechanics  
 Digital Electronic Technology  
 Engineering Drawing and Design  
 Fluid Mechanics  
 Instrumentation  
 Marine Control Systems  
 Marine Electrical Systems  
 Marine Safety  
 Marine Technology  
 Mathematics  
 Ship Operation and Maintenance  
 Thermodynamics

Skills learnt include:

- designing and developing marine engineering systems
- operating, maintaining and managing marine engineering systems
- inspecting machinery and equipment to ensure compliance with standards
- evaluating operational and maintenance procedures used for marine machinery and control equipment

Examples of qualifications include:

- 3 694 Bachelor of Engineering in Maritime Engineering  
 Bachelor of Applied Science in Marine Engineering  
 4 694 Diploma of Technology in Marine Engineering  
 5 694 Associate Diploma in Marine Engineering  
 Associate Diploma in Maritime Electronics  
 Advanced Certificate in Marine Engineering Watchkeeping  
 6 694 Marine Engineering Class 3  
 7 694 Certificate in Marine Engineering Watchkeeping

### 695 Other Engineering Science

**Other Engineering Science** is the study of all Engineering Sciences not elsewhere classified.

Examples of qualifications include:

- 1 695 Master of Engineering in Agricultural Engineering
- Master of Biomedical Engineering
- Master of Applied Science in Environmental Engineering
- 2 695 Graduate Diploma in Biomedical Engineering
- Graduate Diploma in Environmental Engineering
- Graduate Diploma in Power Engineering
- 3 695 Bachelor of Engineering in Resource Engineering
- Bachelor of Engineering in Agricultural Engineering
- Bachelor of Engineering in Naval Architecture
- Bachelor of Engineering in Biomedical Engineering
- 5 695 Certificate in Naval Architecture
- Certificate of Technology in Ship Design Drafting
- 6 695 Certificate in Hospital Engineering
- 7 695 Certificate in Fire Engineering

### 696 Marine Construction

**Marine Construction** is the study of fabricating, fitting out and repairing marine vessels and their structural components.

Subjects studied include:

- Aluminium Craft
- Docking and Launching
- Fibreglassing
- Internal Structure and Steering Gear
- Joinery
- Laminating
- Lofting, Decking and Planking
- Marine Reinforced Plastics
- Steam Bending
- Steel Ship Construction
- Timber Boat Frames
- Timber Properties

Skills learnt include:

- constructing, maintaining and repairing the internal structure, steering gear and hull support systems of marine craft
- interpreting drawings and specifications to prepare full-scale layouts
- shaping and installing masts, frames, decking and fittings
- preparing templates from full-sized detailed drawings

Examples of qualifications include:

- 6 696 Trade Certificate in Shipbuilding
- Trade Certificate in Boat and Shipbuilding
- Trade Certificate in Shipwrighting
- Apprenticeship in Boat Building
- 7 696 Certificate in Boatyard Operations

### 697 Wood Machining and Turning

**Wood Machining and Turning** is the study of shaping wood using various machines. It includes the study of wood carving.

Subjects studied include:

- Cutter Development
- Designing and Making Templates and Jigs
- Grinding and Sharpening
- Joinery Machining
- Machine and Tool Maintenance
- Mortise and Tenon Machines
- Routing
- Sawing and Planing
- Setting up Machines
- Timber Technology

Skills learnt include:

- setting up, adjusting and caring for lathes, saws, planes and routers
- designing and making templates and jigs
- machining, sawing, planing, shaping and carving wood.

Examples of qualifications include:

- 5 697 Advanced Certificate in Woodmachining
- 6 697 Trade Certificate in Woodmachining
- Trade Certificate in Woodturning
- Apprenticeship in Woodturning
- 7 697 Pre-apprenticeship in Woodmachining

### 698 Cabinet Making

**Cabinet Making** is the study of constructing and repairing furniture and interior fittings for buildings.

Subjects studied include:

- Box Construction
- Chairwork
- Costing and Estimating
- Drawer Work
- Furniture Design and Construction
- Hand and Power Tools
- Joining
- Laminating
- Polishing
- Upholstery
- Writing Furniture

## Skills learnt include:

- repairing damaged furniture and cabinets
- constructing custom-built furniture, interior fittings and fixtures
- selecting woods and preparing parts
- interpreting drawings and other specifications to determine job requirements

## Examples of qualifications include:

- 5 698 Advanced Certificate in Cabinetmaking  
 6 698 Trade Certificate in Cabinetmaking  
 Trade Certificate in Chairmaking  
 Apprenticeship in Chair and Couchmaking  
 7 698 Certificate in Cabinetmaking

**699 Other Engineering, nec**

**Other Engineering, nec** is the study of all Other Engineering not elsewhere classified in Narrow Field 69 Other Engineering.

## Examples of qualifications include:

- 1 699 Master of Design in Industrial Design  
 2 699 Graduate Diploma in Ergonomics  
 Graduate Diploma in Quality Technology  
 Graduate Diploma in Quality Management  
 3 699 Bachelor of Arts in Industrial Design  
 Bachelor of Design in Industrial Design  
 4 699 Diploma in Art in Industrial Design  
 5 699 Associate Diploma in Glass Work  
 6 699 Apprenticeship in Holloware Polishing  
 Trade Certificate in French Polishing  
 7 699 Certificate in Quality Control  
 Certificate in Plastics Technology  
 Certificate in Shotfiring  
 Certificate in Timber Technology  
 Certificate in Fibreglass Reinforced Plastics  
 Certificate in Furniture Production

