NEW SOUTH WALES
TECHNICAL AND FURTHER EDUCATION COMMISSION

NSW Course Number: 9163
NSW Version Number: 2

MEM05 Metal and Engineering Training Package

Qualification Code: MEM60105

__________________
Advanced Diploma of Engineering (Mechanical)
__________________

Endorsement Date: 08-Dec-2006
Expiry Date: 31-Jan-2009

MANUFACT ENG CONSTRUCT TRANSPRT
MECHANICAL SERVICES PROGRAM AREA
A. General information

1. Proponent

NSW TAFE Commission - Manufact Eng Construct Transprt

2. Address

NSW TAFE Commission
1 Oxford St, Darlinghurst NSW 2010

3. Contact details

Manufacturing, Engineering, Construction and Transport Curriculum Centre
Cnr Showground & Green Roads
Castle Hill NSW 2154

Phone: (02) 9204-4600
Fax: (02) 9204-4669

Website: www.lg.tafensw.edu.au/

Engineering Manufacturing Program Manager
Telephone: (02) 9204-4641

Mechanical Services Program Manager
Telephone: (02) 9204-4607

4. Type of submission

4.1 Course submission type

Training Package Qualification

5. Copyright information

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A. General information

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Fax: (02) 6123-6299
Web: www.dest.gov.au

7. Accreditation authority

Training Package - not applicable

8. Classification information

| ANZSCO Code:   | 312000 | Building and Engineering Technicians |
| ANZSIC Code:   | 0211   | Cotton Ginning                          |
|                | 2171   | Sugar Manufacturing                      |
|                | 2631   | Cement and Lime Manufacturing            |
|                | 27     | Metal Product Manufacturing              |
|                | 271    | Iron and Steel Manufacturing             |
|                | 28     | Machinery and Equipment Manufacturing    |
|                | 281    | Motor Vehicle and Part Manufacturing     |
|                | 2811   | Motor Vehicle Manufacturing              |
|                | 2823   | Railway Equipment Manufacturing          |
|                | 286    | Industrial Machinery and Equipment Manufacturing |
|                | 2861   | Agricultural Machinery Manufacturing     |
|                | 2862   | Mining and Construction Machinery Manufacturing |
|                | 2863   | Food Processing Machinery Manufacturing  |
|                | 2864   | Machine Tool and Part Manufacturing      |
|                | 2865   | Lifting and Material Handling Equipment Manufacturing |
|                | 2866   | Pump and Compressor Manufacturing        |
|                | 294    | Other Manufacturing                      |
| Field of Education: | 030701 | Mechanical Engineering                  |
| NSW Course Number: | 9163     | Advanced Diploma of Engineering (Mechanical) |
| NSW Version Number: | 2        |                                         |
1. COURSE NAME AND QUALIFICATION

1.1 Course qualification and name

Advanced Diploma of Engineering  (Mechanical)

1.2 Nominal duration:  1400 hours

The nominal duration is based on the Student Teachers Hours. The total hours required by any student may be greater than and may vary with the units of competency selected. Total hours can be calculated by adding the nominal hours for all units selected, using the unit nominal hours in the Course Structure, Section 4.1.

2. COURSE DEVELOPMENT

2.1 Industry and market needs

The various sectors of the metal and engineering industry comprise about 50% of Australia's manufacturing industry in terms of value added share. In general, 85% of these industry sectors are comprised of small to medium enterprises. Each sector is involved in the manufacture, service and repair, and maintenance of products, tooling and equipment, as well as processes.

Engineering installation, repair and maintenance is also applied across most Australian industries. This aspect of applied engineering includes significant numbers of workers. Workforce numbers counted by industry and occupational classifications alone are misleading and unreliable. The 2006 estimate of numbers of workers across Australian industries who are using engineering and manufacturing-engineering skills is approximately 650,000. The majority of these workers are not clearly identified in industry data and many are recorded as workers in other industries such as hospitals, retail etc.

There is a need within the industry for a qualification for engineering associates able to carry out engineering tasks, corresponding to level C3 in the Metal, Engineering and Associated Industries Award.

This need is met in the Metal and Engineering Training Package MEM05 by the Advanced Diploma of Engineering MEM60105. This course follows the requirements for that qualification but focuses on the area of Mechanical Engineering and is designated Advanced Diploma of Engineering (Mechanical).

2.2 Review for re-accreditation

Not Applicable.

3. COURSE OUTCOMES

3.1 Course outcomes
B. Course information

This course is designed for people who are employed, or are seeking employment in the Metal and Engineering industry as engineering associates able to carry out engineering functions.

Students will gain mandatory units of competency in:

* organising and communicating information
* interacting with computing technology
* selection of common engineering materials
* basic mathematics
* performing engineering activities
* self-management

In addition, they will gain knowledge and skills in elective units in such areas as:

* computer aided drafting (CAD)
* engineering design
* engineering management
* project management

If students complete this course with the support of their employer, it would be expected that they would be employed in positions at level C3 in the Metal, Engineering and Associated Industries Award.

The Advanced Diploma of Engineering (Mechanical) is a qualification in the Metal and Engineering Training Package MEM05.

Students who complete this course could expect to be employed as design drafters, engineering associates, project assistants and related jobs where they support professional Engineers. Associates should be able to supervise other people, solve problems and make decisions that affect others.

3.2 Competency standards

This course meets the requirements of the qualification MEM60105 Advanced Diploma of Engineering from the Metal and Engineering Training Package MEM05 and is comprised of units of competency from that training package.

3.3 General competencies

The competencies used at Advanced Diploma level predominantly require a level of competence needed to evaluate and reshape tasks. Key Competencies are required at performance level 3. At this level performance would be in accordance with protocols/policies and may be covered by procedures.

1. Collecting, analysing and organising information

The execution of the competencies required for the Advanced Diploma always requires the collection, analysis and organisation of data/information. At this level there is often the need to determine what data are needed and then to evaluate whether the data collected will yield the required information.

2. Communicating ideas and information

Many manufacturing and engineering enterprises work in teams and require high
B. Course information

levels of communication with all stakeholders. At this level there is the need to evaluate the effectiveness of communication flows and whether the information is appropriate for the decisions which need to be made and then making, or recommending changes.

3. Planning and organising activities

At the Advanced Diploma level, not only is planning and organisation of self, others and resources undertaken, but there is an expectation that the effectiveness of these plans and organising will be evaluated and where appropriate changes, or recommendations for change, made.

4. Working with others and in teams

Working in teams is fundamental to the way most competitive manufacturing organisations work. At this level the function of the teams and other interpersonal interactions should be being evaluated and improvements being made.

5. Solving problems

Problem solving is a key activity at this level with the need to evaluate the tools needed to solve problems and then to modify the tools or acquire/recommend other tools to help the problem solving process. At the Advanced Diploma level the person might be expected to have an extensive array of problem solving tools to choose from. They might also be expected to generate novel solutions to problems which do not respond to standard solutions, possibly working with relevant technical experts.

6. Using mathematical ideas and techniques

While some units require specific mathematical competence most, require a level of numeracy sufficient to understand numerical data/charts, interpret what they mean and communicate with technical experts about quantitative data.

7. Using technology

At this level hands on competency with the technology of the process may not be required, however an understanding of the principles underpinning manufacturing processes will be required sufficient to evaluate its operation and to evaluate different courses of action while working with a technical expert. Computer usage would be expected.

3.4 Recognition given to course

Not applicable.

3.5 Licensing and regulatory requirements

Advanced Diploma of Engineering – Technical (Mechanical), or NSW course number 9163, will be aligned to NSW Vocational Training Order (VTO) 3548.

4. COURSE STRUCTURE

4.1 Outline of course structure
To be awarded an Advanced Diploma of Engineering - Technical (Mechanical), competency must be achieved in thirty units as specified below:

Group 1 contains the mandatory units of competency. You must achieve all six of them.

Group 2 contains the basic elective units. You may select from zero to eight of these units.

Group 3 contains the advanced elective units. You must achieve at least sixteen of these units.

Group 4 contains units imported from other training packages. You may select zero to four of these units.

Imported units in Group 4 must be:
* relevant to this course
* available for inclusion in an Advanced Diploma qualification

If you:
* already hold units of competency
or
* want to complete units from another training package
and, with the support of your employer/industry, you want to count up to four units towards this qualification, contact the head teacher at your college. A request will then be made to the Manufacturing, Engineering, Construction and Transport Curriculum Centre to include the required units in the course.

You must achieve at least twenty four units in total from Groups 2, 3 and 4.

Group 5 contains prerequisite units for units in other groups. It also contains a course enrichment unit. Units in group 5 have no value in the count of units for this qualification.

The table below indicates the units that require the prerequisites.

<table>
<thead>
<tr>
<th>Prerequisite Unit</th>
<th>Units in this course requiring the prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEM09002B</td>
<td>MEM09003B Prepare basic engineering drawing</td>
</tr>
<tr>
<td></td>
<td>MEM09005B Perform basic engineering detail drafting</td>
</tr>
<tr>
<td></td>
<td>MEM18016B Analyse plant and equipment condition monitoring results</td>
</tr>
<tr>
<td>MEM09003B</td>
<td>MEM09005B Perform basic engineering detail drafting</td>
</tr>
<tr>
<td>MEM13002B</td>
<td>MEM13010A Supervise occupational health and safety in an industrial work environment</td>
</tr>
<tr>
<td>MEM12003B</td>
<td>MEM18016B Analyse plant and equipment condition monitoring results</td>
</tr>
<tr>
<td>MEM12023A</td>
<td></td>
</tr>
<tr>
<td>MEM12024A</td>
<td></td>
</tr>
<tr>
<td>MEM18002B</td>
<td></td>
</tr>
<tr>
<td>MEM18003B</td>
<td></td>
</tr>
<tr>
<td>MEM18006B</td>
<td></td>
</tr>
<tr>
<td>MEM18010C</td>
<td></td>
</tr>
<tr>
<td>MEM18055B</td>
<td></td>
</tr>
</tbody>
</table>
B. Course information

Group 99 contains a tutorial module. You do not have to undertake it. It is provided so you can get extra help if you need it.

Learner Support - Students requiring support to meet their learning goals will need to co-enrol in the Learner Support Course (9999)

Note:
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The column headed "Seq" in the course structure below is used to ensure the units are displayed in the correct numerical sequence. This column has no relevance with regard to either order of delivery, or assessment.

Course Elective Completion:
At least 24 elective module/units must be completed. These may be chosen from groups 2, 3, 4

Group 1 MANDATORY UNITS
All module/units must be completed

<table>
<thead>
<tr>
<th>Module/Unit Code</th>
<th>Seq No</th>
<th>National Module Code</th>
<th>Module/Unit Name</th>
<th>Nom Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEM16006A</td>
<td>0</td>
<td></td>
<td>Organise and communicate information</td>
<td>18</td>
</tr>
<tr>
<td>MEM16008A</td>
<td>0</td>
<td></td>
<td>Interact with computing technology</td>
<td>18</td>
</tr>
<tr>
<td>MEM22001A</td>
<td>0</td>
<td></td>
<td>Perform engineering activities</td>
<td>36</td>
</tr>
<tr>
<td>MEM22002A</td>
<td>0</td>
<td></td>
<td>Manage self in the engineering environment</td>
<td>36</td>
</tr>
<tr>
<td>MEM30007A</td>
<td>0</td>
<td></td>
<td>Select common engineering materials</td>
<td>36</td>
</tr>
<tr>
<td>MEM30012A</td>
<td>1</td>
<td></td>
<td>Apply mathematical techniques in a manufacturing engineering or related environment</td>
<td>36</td>
</tr>
</tbody>
</table>

Group 2 BASIC ELECTIVE UNITS
No more than 8 module/units may be completed

<table>
<thead>
<tr>
<th>Module/Unit Code</th>
<th>Seq No</th>
<th>National Module Code</th>
<th>Module/Unit Name</th>
<th>Nom Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEM12024A</td>
<td>0</td>
<td></td>
<td>Perform computations</td>
<td>27</td>
</tr>
<tr>
<td>MEM15001B</td>
<td>0</td>
<td></td>
<td>Perform basic statistical quality control</td>
<td>18</td>
</tr>
<tr>
<td>MEM18001C</td>
<td>0</td>
<td></td>
<td>Use hand tools</td>
<td>18</td>
</tr>
<tr>
<td>MEM30001A</td>
<td>0</td>
<td></td>
<td>Use computer aided drafting systems to produce basic engineering drawings</td>
<td>36</td>
</tr>
<tr>
<td>MEM30002A</td>
<td>0</td>
<td></td>
<td>Produce basic engineering graphics</td>
<td>36</td>
</tr>
<tr>
<td>MEM30003A</td>
<td>0</td>
<td></td>
<td>Produce detailed engineering drawings</td>
<td>36</td>
</tr>
<tr>
<td>MEM30004A</td>
<td>0</td>
<td></td>
<td>Use CAD to create and display 3D models</td>
<td>36</td>
</tr>
<tr>
<td>MEM30005A</td>
<td>0</td>
<td></td>
<td>Calculate force systems within simple beam structures</td>
<td>72</td>
</tr>
<tr>
<td>MEM30006A</td>
<td>0</td>
<td></td>
<td>Calculate stresses in simple structures</td>
<td>36</td>
</tr>
<tr>
<td>MEM30008A</td>
<td>0</td>
<td></td>
<td>Apply basic economic and ergonomic concepts to evaluate engineering applications</td>
<td>36</td>
</tr>
<tr>
<td>MEM30009A</td>
<td>0</td>
<td></td>
<td>Contribute to the design of basic mechanical systems</td>
<td>36</td>
</tr>
<tr>
<td>MEM30010A</td>
<td>1</td>
<td></td>
<td>Set up basic hydraulic circuits</td>
<td>36</td>
</tr>
<tr>
<td>MEM30011A</td>
<td>1</td>
<td></td>
<td>Set up basic pneumatic circuits</td>
<td>36</td>
</tr>
<tr>
<td>MEM30025A</td>
<td>1</td>
<td></td>
<td>Analyse a simple electrical system circuit</td>
<td>36</td>
</tr>
<tr>
<td>MEM30026A</td>
<td>1</td>
<td></td>
<td>Select and test components for simple electronic switching and timing circuits</td>
<td>36</td>
</tr>
<tr>
<td>MEM30027A</td>
<td>1</td>
<td></td>
<td>Prepare basic programs for programmable logic controllers</td>
<td>36</td>
</tr>
</tbody>
</table>

Group 3 ADVANCED ELECTIVE UNITS
### Module/Unit Names and Credits

<table>
<thead>
<tr>
<th>Module/Unit Code</th>
<th>Seq No</th>
<th>National Module Code</th>
<th>Module/Unit Name</th>
<th>Nom Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCMT261A</td>
<td>0</td>
<td></td>
<td>Use SCADA systems in manufacturing</td>
<td>50</td>
</tr>
<tr>
<td>MEM09005B</td>
<td>0</td>
<td></td>
<td>Perform basic engineering detail drafting</td>
<td>72</td>
</tr>
<tr>
<td>MEM23093A</td>
<td>0</td>
<td></td>
<td>Apply plant and process design principles and techniques in engineering situations</td>
<td>72</td>
</tr>
<tr>
<td>MEM09141A</td>
<td>1</td>
<td></td>
<td>Represent mechanical engineering designs</td>
<td>54</td>
</tr>
<tr>
<td>MEM09151A</td>
<td>1</td>
<td></td>
<td>Apply computer aided modelling and data management techniques to mechanical engineering designs</td>
<td>54</td>
</tr>
<tr>
<td>MEM12025A</td>
<td>2</td>
<td></td>
<td>Use graphical techniques and perform simple statistical computations</td>
<td>18</td>
</tr>
<tr>
<td>MEM13010A</td>
<td>2</td>
<td></td>
<td>Supervise occupational health and safety in an industrial work environment</td>
<td>36</td>
</tr>
<tr>
<td>MEM14002B</td>
<td>2</td>
<td></td>
<td>Undertake basic process planning</td>
<td>72</td>
</tr>
<tr>
<td>MEM14061A</td>
<td>2</td>
<td></td>
<td>Plan and design mechanical engineering projects</td>
<td>72</td>
</tr>
<tr>
<td>MEM14062A</td>
<td>2</td>
<td></td>
<td>Plan and design mechatronic engineering projects</td>
<td>72</td>
</tr>
<tr>
<td>MEM14081A</td>
<td>2</td>
<td></td>
<td>Apply mechanical engineering fundamentals to support design and development of projects</td>
<td>36</td>
</tr>
<tr>
<td>MEM14082A</td>
<td>2</td>
<td></td>
<td>Apply mechatronics fundamentals to support design and development of engineering projects</td>
<td>36</td>
</tr>
<tr>
<td>MEM15012B</td>
<td>2</td>
<td></td>
<td>Maintain/supervise the application of quality procedures</td>
<td>36</td>
</tr>
<tr>
<td>MEM18016B</td>
<td>2</td>
<td></td>
<td>Analyse plant and equipment condition monitoring results</td>
<td>36</td>
</tr>
<tr>
<td>MEM22003A</td>
<td>3</td>
<td></td>
<td>Manage engineering resources</td>
<td>54</td>
</tr>
<tr>
<td>MEM22004A</td>
<td>3</td>
<td></td>
<td>Manage engineering projects</td>
<td>54</td>
</tr>
<tr>
<td>MEM22005A</td>
<td>3</td>
<td></td>
<td>Manage engineering operations</td>
<td>36</td>
</tr>
<tr>
<td>MEM22006A</td>
<td>3</td>
<td></td>
<td>Source and estimate materials</td>
<td>36</td>
</tr>
<tr>
<td>MEM22007A</td>
<td>3</td>
<td></td>
<td>Manage environmental effects of engineering activities</td>
<td>54</td>
</tr>
<tr>
<td>MEM22008A</td>
<td>3</td>
<td></td>
<td>Manage change and technical development</td>
<td>36</td>
</tr>
<tr>
<td>MEM22009A</td>
<td>3</td>
<td></td>
<td>Manage technical sales and promotion</td>
<td>36</td>
</tr>
<tr>
<td>MEM23001A</td>
<td>3</td>
<td></td>
<td>Apply advanced mathematical techniques in a manufacturing engineering or related environment</td>
<td>36</td>
</tr>
<tr>
<td>MEM23002A</td>
<td>3</td>
<td></td>
<td>Apply calculus in engineering situations</td>
<td>36</td>
</tr>
<tr>
<td>MEM23003A</td>
<td>3</td>
<td></td>
<td>Operate and program computers and/or controllers in engineering situations</td>
<td>54</td>
</tr>
<tr>
<td>MEM23041A</td>
<td>3</td>
<td></td>
<td>Apply basic scientific principles and techniques in mechanical engineering situations</td>
<td>108</td>
</tr>
<tr>
<td>MEM23051A</td>
<td>3</td>
<td></td>
<td>Apply basic electro and control scientific principles and techniques in mechanical and manufacturing</td>
<td>36</td>
</tr>
<tr>
<td>MEM23061A</td>
<td>3</td>
<td></td>
<td>Select and test mechanical engineering materials</td>
<td>18</td>
</tr>
<tr>
<td>MEM23062A</td>
<td>3</td>
<td></td>
<td>Select and test mechatronic engineering materials</td>
<td>18</td>
</tr>
<tr>
<td>MEM23071A</td>
<td>3</td>
<td></td>
<td>Select and apply mechanical engineering methods, processes and construction techniques</td>
<td>72</td>
</tr>
<tr>
<td>MEM23072A</td>
<td>3</td>
<td></td>
<td>Select and apply mechatronic engineering methods, processes and construction techniques</td>
<td>72</td>
</tr>
<tr>
<td>MEM23081A</td>
<td>3</td>
<td></td>
<td>Apply scientific principles and techniques in mechanical engineering situations</td>
<td>144</td>
</tr>
<tr>
<td>MEM23082A</td>
<td>3</td>
<td></td>
<td>Apply scientific principles and techniques in mechatronic engineering situations</td>
<td>144</td>
</tr>
<tr>
<td>MEM23091A</td>
<td>3</td>
<td></td>
<td>Apply mechanical system design principles and techniques in mechanical engineering situations</td>
<td>54</td>
</tr>
<tr>
<td>MEM23092A</td>
<td>3</td>
<td></td>
<td>Apply automated systems principles and techniques in engineering situations</td>
<td>72</td>
</tr>
<tr>
<td>MEM23094A</td>
<td>3</td>
<td></td>
<td>Apply maintenance systems principles and techniques in engineering situations</td>
<td>72</td>
</tr>
<tr>
<td>MCMC612A</td>
<td>5</td>
<td></td>
<td>Manage workplace learning</td>
<td>50</td>
</tr>
<tr>
<td>MCMT260A</td>
<td>5</td>
<td></td>
<td>Use planning software systems in manufacturing</td>
<td>50</td>
</tr>
</tbody>
</table>

**Group 4 IMPORTED UNITS**  
No more than 4 module/units may be completed
B. Course information

<table>
<thead>
<tr>
<th>Module/Unit Code</th>
<th>National Module Code</th>
<th>Module/Unit Name</th>
<th>Nom Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCMC410A</td>
<td></td>
<td>Lead change in a manufacturing environment</td>
<td>50</td>
</tr>
<tr>
<td>MCM5600A</td>
<td></td>
<td>Develop a competitive manufacturing system</td>
<td>50</td>
</tr>
<tr>
<td>MCMT621A</td>
<td></td>
<td>Develop a Just in Time (JIT) system</td>
<td>50</td>
</tr>
</tbody>
</table>

Group 5 PREREQUISITE UNITS AND OTHER COURSE ENRICHMENT UNITS
These are enrichment modules/units and do not count towards course completion.

<table>
<thead>
<tr>
<th>Module/Unit Code</th>
<th>Seq No</th>
<th>National Module Code</th>
<th>Module/Unit Name</th>
<th>Nom Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEM05004C</td>
<td>0</td>
<td></td>
<td>Perform routine oxy acetylene welding</td>
<td>18</td>
</tr>
<tr>
<td>MEM05007C</td>
<td>0</td>
<td></td>
<td>Perform manual heating and thermal cutting</td>
<td>18</td>
</tr>
<tr>
<td>MEM05012C</td>
<td>1</td>
<td></td>
<td>Perform routine manual metal arc welding</td>
<td>18</td>
</tr>
<tr>
<td>MEM05050B</td>
<td>1</td>
<td></td>
<td>Perform routine gas metal arc welding</td>
<td>18</td>
</tr>
<tr>
<td>MEM07032B</td>
<td>1</td>
<td></td>
<td>Use workshop machines for basic operations</td>
<td>18</td>
</tr>
<tr>
<td>MEM09002B</td>
<td>1</td>
<td></td>
<td>Interpret technical drawing</td>
<td>36</td>
</tr>
<tr>
<td>MEM12003B</td>
<td>1</td>
<td></td>
<td>Prepare basic engineering drawing</td>
<td>27</td>
</tr>
<tr>
<td>MEM12023A</td>
<td>2</td>
<td></td>
<td>Perform precision mechanical measurement</td>
<td>18</td>
</tr>
<tr>
<td>MEM12024A</td>
<td>3</td>
<td></td>
<td>Perform engineering measurements</td>
<td>45</td>
</tr>
<tr>
<td>MEM13002B</td>
<td>3</td>
<td></td>
<td>Perform computations</td>
<td>27</td>
</tr>
<tr>
<td>MEM18002B</td>
<td>3</td>
<td></td>
<td>Undertake occupational health and safety activities in the workplace</td>
<td>27</td>
</tr>
<tr>
<td>MEM18003C</td>
<td>3</td>
<td></td>
<td>Use workshop machines for basic operations</td>
<td>18</td>
</tr>
<tr>
<td>MEM18006B</td>
<td>3</td>
<td></td>
<td>Use tools for precision work</td>
<td>36</td>
</tr>
<tr>
<td>MEM18010C</td>
<td>4</td>
<td></td>
<td>Repair and fit engineering components</td>
<td>54</td>
</tr>
<tr>
<td>MEM18055B</td>
<td>4</td>
<td></td>
<td>Perform equipment condition monitoring and recording</td>
<td>36</td>
</tr>
</tbody>
</table>

Group 99 TUTORIAL MODULES
These are tutorial modules and do not count towards completion.

<table>
<thead>
<tr>
<th>Module/Unit Code</th>
<th>National Module Code</th>
<th>Module/Unit Name</th>
<th>Nom Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>4208C</td>
<td></td>
<td>Manuf. &amp; eng. technical tutorial support</td>
<td>54</td>
</tr>
</tbody>
</table>

4.2 Requirements to receive the qualification

To gain the award of Advanced Diploma of Engineering (Mechanical) you must achieve:

* All six mandatory units from Group 1
* At least sixteen elective units from Group 3
* At least twenty four units in total from Groups 2, 3 and 4.

You are restricted to a maximum of eight units from Group 2 and/or a maximum of four units from Group 4 (the imported units).

4.3 Exit points

Depending on your choice of electives, you may be able to achieve the following:
MEM30505 Certificate III in Engineering - Technical
MEM50205 Diploma of Engineering - Technical or
MEM50205 Diploma of Engineering - Technical (Mechanical)

4.4 On-job requirements

There are no compulsory requirements for on-the-job training in this course. However, depending on the units selected, on-the-job assessment may be conducted.

4.5 Customisation

This program is designed to meet the needs of different industry specific groups. Customisation of the supporting curriculum units for the purpose of accommodating a specific organisation's needs is permissible within the MEM05 National Training Package customisation guidelines.

The units of competency are designed to provide flexibility with scope for enterprises to apply local procedures, processes, and in particular operating requirements to achieve the overall unit outcome.

4.6 Entry requirements

There are no formal entry requirements for this course, but because of the analytical nature of some of the units it is recommended that applicants have MEM50205 Diploma in Engineering - Technical (Mechanical) or a NSW Higher School Certificate (or equivalent). It is also recommended that applicants are already employed, or seeking employment, in the Metals and Engineering industry.

PLEASE NOTE

Entry requirements are the minimum qualifications, attributes, skills and/or experience that students must have to enter a course.

Selection criteria should be applied if demand exceeds the supply of places.

4.7 Recognition of prior learning

Students undertaking the Advanced Diploma of Engineering (Mechanical) are entitled to have their current competencies assessed against the units of competency in this course, and will be recognised regardless of how or where they were achieved.

For recognition to be granted, the applicant making the claim must provide current, quality evidence of their competency against the relevant unit of competency.

The evidence presented may take a variety of forms such as through observation of workplace performance and skills application, and oral and/or written assessment.

In judging evidence, the assessor must ensure that the evidence of prior learning presented is:
B. Course information

- authentic (the candidate's own work)
- valid (directly relevant to the current version of the relevant endorsed unit of competency)
- reliable (shows that the candidate consistently meets the endorsed unit of competency)
- current (reflects the candidate's current capacity to perform the aspect of the work covered by the endorsed unit of competency), and
- sufficient (covers the full range of elements in the relevant unit of competency and addresses the four dimensions of competency, namely task skills, task management skills, contingency management skills and job/role environment skills).

Recognition of Prior Learning (RPL) requirements of Standard 8.2 of the Standards for Registered Training Organisations (RTOs) must be met.

5. ASSESSMENT

5.1 Assessment strategy

The Assessment Guidelines in the Metal and Engineering Training Package MEM05 provide the endorsed framework for assessment of units of competency in this training package. They are designed to ensure that the assessment is consistent with the Australian Quality Training Framework (AQTF) Standards for Registered Training Organisations. Assessment against the units of competency in this training package must be carried out in accordance with these Assessment Guidelines.

Assessment in this course is the process of collecting evidence and making judgements about whether competency has been achieved to confirm whether an individual can perform to the standards expected in the workplace, as expressed in the relevant unit of competency.

In the areas of work covered by this course, the units of competency are the benchmarks for assessment. As such, they provide the basis for qualifications recognised nationally by the Australian Qualifications Framework (AQF) and Statements of Attainment issued by Registered Training Organisations (RTOs).

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AQTF ASSESSMENT REQUIREMENTS
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Assessment leading to nationally recognised AQF qualifications and Statements of Attainment in the vocational education and training sector must meet the requirements of the AQTF as expressed in the Standards for Registered Training Organisations.

The Standards for Registered Training Organisations can be downloaded from the Department of Education, Science and Training website at www.dest.gov.au

Follow the links: Home > Training & skills > Policy, issues & reviews > Key issues > National Training System > Australian Quality Training Framework > 2005 AQTF Standards

Assessment Requirements
-----------------------------
The RTOs assessments must meet the requirements of the endorsed components of Training Packages within its scope of registration. See Standard 8 of the Standards for RTOs.
B. Course information

Assessment Strategies
---------------------
Each RTO must identify, negotiate, plan and implement appropriate learning and assessment strategies to meet the needs of each of its clients. See Standard 9 of the Standards for RTOs.

Mutual Recognition
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Each RTO must recognise the AQF qualifications and Statements of Attainment issued by any other RTO. See Standard 5 of the Standards for RTOs.

Access and Equity and Client Services
-------------------------------------
Each RTO must apply access and equity principles, provide timely and appropriate information, advice and support services that assist clients to identify and achieve desired outcomes. This may include reasonable adjustment in assessment. See Standard 6 of the Standards for RTOs.

Partnership Arrangements
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RTOs must have, and comply with, written agreements with each organisation providing training and/or assessment on its behalf. See Standard 1.6 of Standards for RTOs.

PATHWAYS
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The competencies in this Training Package may be attained in a number of ways including through:

· formal or informal education and training
· experiences in the workplace
· general life experience, and/or
· any combination of the above

Assessment under this Training Package leading to an AQF qualification or Statement of Attainment may follow a learning and assessment pathway, an assessment-only or recognition pathway, or a combination of the two.

Each of these assessment pathways leads to full recognition of competencies held - the critical issue is that the candidate is competent, rather than how the competency was acquired.

Assessment, by any pathway, must comply with the assessment requirements set out in the Standards for Registered Training Organisations.

Learning and Assessment Pathways
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Usually, learning and assessment are integrated, with assessment evidence being collected and feedback provided to the candidate at anytime throughout the learning and assessment process.

Learning and assessment pathways may include structured programs in a variety of contexts using a range of strategies to meet different learner needs. Structured learning and assessment programs could be: group-based, work-based, project-based, self-paced, action learning-based, conducted by distance or e-learning; and/or involve practice and experience in the workplace.
B. Course information

Assessment-Only or Recognition of Prior Learning Pathway

Competencies already held by individuals can be formally assessed against the units of competency in this course, and should be recognised regardless of how or where they were achieved.

In an assessment-only or Recognition of Prior Learning (RPL) pathway, the candidate provides current, quality evidence of their competency against the relevant unit of competency. This process may be directed by the candidate and verified by the assessor, such as in the compilation of portfolios; or directed by the assessor, such as through observation of workplace performance and skills application, and oral and/or written assessment. Where the outcomes of this process indicate that the candidate is competent, structured training is unnecessary. The RPL requirements of Standard 8.2 of the Standards for Registered Training Organisations must be met.

As with all assessment, the assessor must be confident that the evidence indicates that the candidate is currently competent against the endorsed unit of competency. This evidence may take a variety of forms and might include certification, references from past employers, testimonials from clients, and work samples. The onus is on candidates to provide sufficient evidence to satisfy assessors that they currently hold the relevant competencies. In judging evidence, the assessor must ensure that the evidence of prior learning is:

1. authentic (the candidate's own work)
2. valid (directly related to the current version of the relevant endorsed unit of competency)
3. reliable (shows that the candidate consistently meets the endorsed unit of competency)
4. current (reflects the candidate's current capacity to perform the aspect of the work covered by the endorsed unit of competency), and
5. sufficient (covers the full range of elements in the relevant unit of competency and addresses the four dimensions of competency, namely task skills, task management skills, contingency management skills, and job/role environment skills).

The assessment only or Recognition of Prior Learning (RPL) pathway is likely to be most appropriate in the following scenarios:

1. candidates enrolling in qualifications who want recognition for prior learning or current competencies
2. existing workers
3. individuals with overseas qualifications
4. recent migrants with established work histories
5. people returning to the workplace
6. people with disabilities or injuries requiring a change in career.

Combination of Pathways

Where candidates for assessment have gained competencies through work and life experience and gaps in their competence are identified, or where they require training in new areas, a combination of pathways may be appropriate.

In such situations, the candidate may undertake an initial assessment to determine their current competency. Once current competency is identified, a structured learning and assessment program ensures that the candidate acquires the required additional competencies identified as gaps.

DESIGNING ASSESSMENT TOOLS

This section provides an overview on the use and development of assessment tools.
Use of Assessment Tools

Assessment tools provide a means of collecting the evidence that assessors use in making judgements about whether candidates have achieved competency.

There is no set format or process for the design, production or development of assessment tools. Assessors may use prepared assessment tools, such as those specifically developed to support this Training Package, or they may develop their own.

Using Prepared Assessment Tools

If using prepared assessment tools, assessors should ensure they are benchmarked, or mapped, against the current version of the relevant unit of competency. This can be done by checking that the materials are listed on the National Training Information Service (http://www.ntis.gov.au). Materials on the list have been noted by the National Training Quality Council as meeting their quality criteria for Training Package support materials.

Developing Assessment Tools

When developing their own assessment tools, assessors must ensure that the tools:

- are benchmarked against the relevant unit or units of competency
- are reviewed as part of the validation of assessment strategies as required under 9.2i of the Standards for Registered Training Organisations, and
- meet the assessment requirements expressed in the Standards for Registered Training Organisations, particularly Standards 8 and 9.

Assessment Validation

The Australian Quality Training Framework (AQTF) requires an RTO to validate its assessment strategies at least on an annual basis.

This can be achieved by bringing together assessors from within TAFE NSW and the workplace to evaluate assessment tools, processes and the evidence collected. Such meetings should involve assessors exchanging and discussing evidence collected and judgements made on the achievement of units of competency. The discussion should be supported by comments from industry on the performance of students (i.e. students who are deemed to have achieved units of competency are able to perform in the workplace to the standards detailed in the units of competency).

Minutes should be kept along with any recommendations for improving the assessment process. Measures to improve assessment need to be documented.

NOTE:

ALL DOCUMENTATION RELATING TO THE PROCESS OF VALIDATION AND IMPROVEMENT (INCLUDING MINUTES) SHOULD BE HELD IN A LOCATION AT EACH CENTRE THAT IS EASILY ACCESSIBLE FOR AUDITING PURPOSES.

CONDUCTING ASSESSMENT

This section details the mandatory assessment requirements and provides
B. Course information

information on equity in assessment including reasonable adjustment.

Mandatory Assessment Requirements

Assessments must meet the criteria set out in Standard 8 from the Standards for Registered Training Organisations. For information, Standard 8 from the Standards for Registered Training Organisations is reproduced below.

8 RTO Assessments

The RTO's assessments must meet the requirements of the endorsed components of Training Packages and the outcomes specified in accredited courses within the scope of its registration.

8.1 The RTO must ensure that assessments, regardless of whether through a training and assessment pathway or an assessment-only pathway:
   i  comply with the Assessment Guidelines included in the applicable nationally endorsed Training Packages or the assessment requirements specified in accredited courses;
   ii lead to the issuing of a Statement of Attainment or qualification under the AQF when a person is assessed as competent against nationally endorsed unit(s) of competency in the applicable Training Package or modules specified in the applicable accredited course;
   iii comply with the principles of validity, reliability, fairness and flexibility;
   iv provide for applicants to be informed of the context and purpose of the assessment and the assessment process;
   v  where relevant, focus on the application of knowledge and skill to the standard of performance required in the workplace and cover all aspects of workplace performance;
   vi involve the evaluation of sufficient evidence to enable judgements to be made about whether competency has been attained;
   vii provide for feedback to the applicant about the outcomes of the assessment process and guidance on future options;
   viii are equitable for all persons, taking account of cultural and linguistic needs; and
   ix provide for reassessment on appeal.

8.2 a THE RTO MUST ENSURE THAT RPL IS OFFERED TO ALL APPLICANTS ON ENROLMENT.
   b The RTO must have an RPL process that:
      i  is structured to minimise the time and cost to applicants; and
      ii provides adequate information and support to enable applicants to gather reliable evidence to support their claim for recognition of competencies currently held, regardless of how or where the learning occurred.

Advice on using simulation

Simulations may be used for assessment where it is impossible to assess a candidate whilst they are in productive work. The scope of the assessment may be for the entire unit of competency or some aspects of competence.

It is most important that the simulated environment reflects realistic workplace situations. This means that the simulation must be capable of covering a range of variability and different contexts to ensure that sufficient valid and reliable evidence of performance can be gathered. Using simulation should be viewed as equal to assessment in the workplace. Careful thought and preparation must be made so that the simulation complies with all of the requirements for gathering evidence and making assessment judgements.

Advice on integrated assessment
B. Course information

The Metal and Engineering Training Package is comprised of units of competency that will rarely be used in isolation. All units will form part of a person's job role. No single unit of competency can be acquired in isolation and therefore opportunities for integrated learning and assessment activities should always be explored. Careful consideration of the profile of competencies will identify groups of units where integrated assessment (or co-assessment) can be applied.

Adoption of integrated assessment can provide significant savings in time, cost and effort of assessors and candidates. Assessment tools should be designed so that assessment evidence can be gathered for a group of units and the outcomes identified with those units. This approach can be quite adequately used to also deal with prerequisites.

Advice on graded assessment

The minimum level of reporting assessment outcomes is at the unit level.

ASSESSMENT OUTCOMES MUST BE REPORTED WITHOUT GRADING ON THE BASIS OF THE CANDIDATE BEING EITHER COMPETENT OR NOT YET COMPETENT.

Discrimination in Assessment

The Commonwealth Disability Discrimination Act (1992) makes it unlawful to treat people with a disability less fairly than people without a disability. In the context of this course, the principle of Reasonable Accommodation (Adjustment) is applied to ensure that participants with a disability have equitable access to all aspects of the learning situation. For assessment, this means that artificial barriers to their demonstrating competence are removed.

Examples of reasonable accommodation (adjustment) in assessment include:

. substitution of an oral assessment task for a written one
. provision of extra time
. use of an interpreter
. use of adaptive technology

Although assessment will vary from unit to unit, generally the assessment methods most appropriate for this course are:

. learner performance in practical exercises or on job work experiences

and/or

. practical assignments that focus not only on the individual's performance of the process but also on the final product.

And

. oral and written assignments that focus on judging the student's ability to make decisions in a range of manufacturing contexts.

6. DELIVERY OF COURSE

6.1 Delivery modes

The following methods of delivery are suitable for this course:
B. Course information

- workplace delivery
- institution based practical and theory delivery
- blended delivery

Each delivery mode should include a range of guided and supervised opportunities for the learner to:

- acquire and practise technical skills
- assimilate underpinning knowledge
- practise decision making and problem solving
- communicate effectively

The following advice is offered for each of the above identified delivery modes.

Workplace delivery

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At least 3 workplace delivery scenarios are anticipated -

- Assessment only where evidence must be gathered sufficient to satisfy the requirements of all elements of each unit selected. This is common where organisations want to rate personnel against award classifications.

- Skills and knowledge development for a single organisation. There is an expectation, expressed in the training package, that units will be integrated for learning and assessment purposes in such a way that the learning and assessment reflects that organisation's process, product and service functions.

- Skills and knowledge development for a learner cohort from several organisations. There is an expectation, expressed in the training package, that units will be integrated for learning and assessment purposes in such a way that the learning and assessment reflects the functions of at least one of the group of organisations.

Institution based practical and theory delivery

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It is expected by training package developers, that selected units will be integrated for learning and assessment purposes and that the learning and assessment reflects current process, product and service functions of actual organisations.

From an educational perspective, it is highly recommended that the units delivered be integrated in such a manner that they complement the overall outcomes of this Advanced Diploma qualification.

Blended delivery

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Learning and assessment processes will be as flexible as possible to allow for limited candidate numbers, disparate work and domestic circumstances. Remote access, web access, networking, group working and appropriate institutional support sessions are encouraged. Continual development and regular validation of resources and techniques is an AQTF requirement designed to ensure effectiveness of delivery.

Reasonable Adjustment

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This course should be adjusted to incorporate the principles of reasonable
B. Course information

adjustment in accordance with the requirements of the Commonwealth Disability Discrimination Act (1992).

Reasonable adjustment may need to be made to delivery methods for students with disabilities. Adjustments to delivery may include:

- assistance with reading (eg, explicit teaching procedures)
- adjusting content for the target group
- adjusting teaching sequence
- providing extra practice/time to acquire skills
- providing extra demonstrations and explanations of skills and tasks
- using adaptive technology
- providing customised learning materials (eg with pictorial cues)
- providing specialist tutorial assistance
- professional development for teacher

6.2 Resources

AQTF 2007, Standard 1 requires the RTO to provide quality training and assessment across all of its operations.


In particular:
Element 1.3 requires that staff are consistent with the requirements of the Training Package or accredited course and the RTO's own training and assessment strategies (page 13, Users' Guide to the Essential Standards for Registration);

Element 1.4 requires that training and assessment are conducted by trainers and assessors who:
  a) have the necessary training and assessment competencies as determined by the National Quality Council or its successors
  b) have the relevant vocational competencies at least to the level being delivered or assessed. (Appendix 2, page 61, Users' Guide to the Essential Standards for Registration).

Essential teacher qualifications

To deliver and conduct assessments in the units in this course, teachers must satisfy AQTF and TAFE NSW requirements. (See note at the end of this section for the TAFE NSW requirements).

Teachers must have a combination of:
- Vocational qualifications, to ensure knowledge of the occupation or vocation in which the vocational education is provided
- Industry or related experience, to ensure the currency and relevance of the vocational program to the learner and the industry or community
- Educational qualifications, to ensure competence in educational delivery and in competency based assessment

Vocational Qualifications

Teachers must be able to demonstrate current vocational competence. Usually this requires completion of a relevant degree, diploma or other vocational qualifications.

The vocational qualifications must be at least at the AQF level of the units of
B. Course information

competency being delivered and/or assessed, or an equivalent qualification that will provide the knowledge and skills to deliver and assess the unit.

Note - A person with a qualification in a vocational area that is different from the course in which the unit is delivered may meet the requirements to deliver the unit.

As a guide, appropriate vocational qualifications include:
* Degree in Mechanical Engineering
* Other relevant qualification that will provide a teacher with skills and knowledge to deliver and conduct assessment in this course.

Relevant Experience

Teachers must be able to demonstrate a broad perspective and depth of understanding of the vocational area based on current and relevant experience in the industry. Usually this will be a minimum of three years experience gained no longer than five years previously. It may have been gained through employment, professional development, industry or community liaison, return to industry programs, community service or a combination of these and other relevant methods,

Educational Qualifications

As a minimum all TAFE NSW teachers must meet the qualification requirements detailed in the AQTF Standard 1, 2007 or equivalent.

TAFE NSW Requirements

RTOs may require qualifications in addition to those specified in the AQTF, to enhance the quality of their delivery and assessment practice, for example, TAFE NSW may specify a degree or diploma in educational or vocational areas.

Teachers who are involved in on-line delivery and assessment should be competent on-line facilitators.

Teachers should have current knowledge and awareness of access and equity issues relevant to learners needs arising from a variety of factors including socio-economic status, disability status, ethnic background, race, family differences, sexual preferences and gender specific differences.

The qualifications and experience required by teachers to deliver and conduct assessments in this course may vary. Refer to the individual documents for details specified in each. The requirements comprise vocational qualifications, educational qualifications and relevant experience.

For specific qualifications and other requirements for appointment of full-time and part-time teaching staff, consult your Staff Services Unit for the relevant Teacher Designation requirements.

Specialised Facilities and Equipment

In general students may require access to a suitably equipped engineering workshop which conforms with all relevant Occupational Health and Safety regulations. The equipment required will depend on the units of competency being undertaken. For specific information, please consult the unit guides which can be downloaded from CIDO.

7. ARTICULATION AND CREDIT TRANSFER
B. Course information

7.1 Articulation and credit transfer

This course is at the highest level in this training package. Those who complete 9163 Advanced Diploma of Engineering (Mechanical) would have to negotiate any credits for higher level courses on an individual basis.

7.2 Training, education and career pathways

Students may enter this course directly. They would normally be expected to be in relevant employment.

If students have undertaken this qualification with the support of their employer it would be expected that they would be employed in positions at AQF VI (level C3 in the federal Metal, Engineering and Associated Industries Award) in the workplace.

8. ONGOING MONITORING AND EVALUATION

Curriculum maintenance involves the review, monitoring and evaluation of a course, to evaluate its effectiveness and to advise on the continuing needs and requirements of industry and the community with specific consideration of changing technologies.

It will be the role of the relevant Industry Skills Council to evaluate the effectiveness and continuing need and demand for the qualifications and units of competency under the training package and to make such changes to the training package as are seen to be necessary.

The Manufacturing, Engineering, Construction and Transport Curriculum Centre (MEC&T) will monitor and evaluate the implementation of the training package, and the qualifications included in it, within TAFE NSW.

MEC&T will collect information from a range of stakeholders including Institute management, teachers, students, graduates, employers, industry and community agencies, relevant industry skills councils and industry support organisations on:

- general relevance of the program to the intended vocational outcomes
- specific strengths of the course
- sections of the course that need to be reviewed or strengthened
- suggestions for improvement
- appropriateness of entry requirements and selection criteria
- appropriateness of assessment strategies
- need to address current industry developments and new technologies
- monitoring changes to the training package where relevant.
Advanced Diploma of Engineering (Mechanical)

C. TAFE NSW implementation requirements

1. TAFE NSW course(s) replaced by this course

Course qualification and name: Advanced Diploma of Mechanical and Manufacturing Engineering
Course number: 9887
Duration: 1080 hours
Approval Date: 16-Oct-2002
Expiry Date: 31-Dec-2005

2. Handbook description

This course is for people aiming at employment in the metal and engineering industry in occupations at engineering associate level carrying out tasks such as mechanical engineering design and/or management.

You will gain compulsory competencies in organising and analysing information, interacting with computing technology and selecting engineering materials. You will also gain a range of elective competencies in areas relevant to your current or intended employment, such as CAD, drafting, engineering design, engineering management, and project management.

The course duration will vary depending on the training pathway agreed to between you, your employer and the TAFE college.

CAREER OPPORTUNITY:
Engineering Associate at level C3 under the Metal, Engineering and Associated Industries Award.

ARTICULATION:
When you finish this course you may be eligible to apply to enrol in engineering courses at university and gain advanced standing.

ENTRY REQUIREMENTS
There are no formal entry requirements for this course, but because of the analytical nature of some of the units it is recommended that applicants have MEM50205 Diploma in Engineering - Technical (Mechanical) or a NSW Higher School Certificate (or equivalent). It is also recommended that applicants are already employed, or seeking employment, in the Metals and Engineering industry.

3. Student selection

SELECTION CRITERIA: Your application will be assessed using the following selection criteria (in priority order):

Applicants who:

1. have just completed their Diploma of Engineering - Technical (Mechanical) and wish to continue their studies in this Advanced Diploma
2. are employed as mechanical engineering associates.
3. have written evidence of appropriate employment as mechanical engineering associates in the immediate future.
4. are employed, or soon to be employed, as engineering associates.

then other applicants

SELECTION METHOD: Your selection into this course will be based on the
C. TAFE NSW implementation requirements

Information provided on the TAFE NSW Application Form.

PLEASE NOTE

Selection criteria are considerations which are applied where demand for a course exceeds available places. All students must meet entry requirements to be eligible for entry in a course BEFORE selection criteria are applied (see Section B, Course information, 4.6 Entry requirements).

Selection methods are the tools used to evaluate students against the selection criteria.

4. Procedures for student selection
5. Course grading

This qualification is ungraded

6. NSW recognition of prior learning

Please refer to Part B section 4.7.

TAFE Advanced Standing Arrangements and/or Standard Exemptions which have been created in respect of units/ modules in this course are shown in Part B of the syllabus of each unit/ module. The unit/ module syllabus also provides information about appropriate evidence for assessing recognition applications.

7. Employer report

Not applicable

8. Minimum essential course resources

For details of teaching and learning resources and major texts and references refer to each unit/module.

8.1. Physical resources comments

Equipment costs in delivering this course will depend on the units selected. Refer to the appropriate Unit Guides.

8.2. Human resources comments

The teacher qualifications stated in Part B: 6.2.1 Human Resources are a guide to the minimum qualifications required by all teachers to deliver and conduct assessments in this course.

For qualifications required to deliver and conduct assessments in individual unit/ modules in this course, consult individual unit/ module syllabuses.

For specific qualifications and other requirements for appointment of full-time teaching staff, consult the relevant Teacher Designation requirements on LATITE, through your Staff Services Unit.

Human resource requirements will depend on the competency units selected by the employer, employee and RTO.

9. Additional information

Tutorial hours in basic literacy, numeracy or other areas of general educational difficulty are available. Tutorial hours are also available for course-specific technical tutorial assistance.