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| <b>MODULE TITLE</b>                         | <b>ELECTRONIC CONCEPTS AND DEVICES</b>   |
| <b>Nominal Duration</b>                     | One module   |
| <b>Module Code or Number</b>                | EA707  |
| <b>Module Purpose</b>                       | This module will provide non electronic engineering students with the conceptual knowledge and skills needed to perform basic electronic calculations and experimental investigations, and the ability to discuss the selection of common electronic components with electronic engineers and/or technicians.  |
| <b>Relationship to Competency Standards</b> | <p>This module will be modified in line with the requirements of the National Metals and Engineering Standards when they become available.</p> <p>The module contains the knowledge and skills identified and agreed by all states/territories. It has been developed on the assumption that these will be reflected in the Standards.</p>   |
| <b>Prerequisites</b>                        | EA003 Engineering Maths B  |
| <b>Summary of Content</b>                   | <ol style="list-style-type: none"><li><b>1. Electronic Concepts and Units</b><br/>Voltage<br/>Current<br/>Resistance and Capacitance<br/>Power<br/>Frequency and Period</li><li><b>2. Common Electronic Instruments</b><br/>Multi-meters<br/>Power Supplies<br/>Signal Generators<br/>Oscilloscopes</li><li><b>3. Timing Circuits and Oscillators</b></li><li><b>4. Semiconductor devices</b><br/>Diodes (Power, Zener, LED's)<br/>Transistors<br/>Linear Integrated Circuits<br/>Power Control Devices (Triacs, SCR's)</li><li><b>5. Power Supplies</b></li></ol> |

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| <b>Delivery</b>           | <p>This module contains learning outcomes that will require both theory and practical instruction.</p> <p>Resources will be needed to deliver the module in an off-the-job environment. Access to appropriate electronic components and test equipment will need to be provided as the module contains a significant practical content.</p> <p>Wherever possible, parallels should be drawn between the electronic concepts and their mechanical equivalents.</p> |
| <b>Learning outcomes</b>  | On completion of this module the learner will be able to:   |
| <b>Learning Outcome 1</b> | <b>Perform basic electronic calculations and identify common electronic waveforms.</b>  |
| Assessment criteria       | <p>Perform calculations involving voltage, current, resistance and DC power.</p> <p>Perform calculations involving the period and frequency and the RMS, peak and peak to peak voltages of a repetitive waveform.</p> <p>Identify sine waves, cosine waves, square waves, triangular waves and sawtooth waves.</p>  |
| Conditions                | <p>Normal learning will take place in the classroom or other suitable study environments.</p> <p>Emphasis should be placed on understanding the concepts involved.</p> <p>differences between voltage and current.</p> <p>differences between frequency and period.</p> <p>differences between peak and RMS voltages.</p>   |
| Assessment method         | Short answer tests  |
| <b>Learning Outcome 2</b> | <b>Set up and use basic electronic test equipment.</b>  |
| Assessment criteria       | <p>Use a multimeter to measure AC and DC voltages, resistance and capacitance.</p> <p>Set an oscillator/signal generator to a specified frequency and amplitude.</p> <p>Use an oscilloscope to record wave shapes and to measure the peak to peak voltage and the period of any repetitive waveform.</p>  |
| Conditions                | <p>Emphasis in this learning outcome is to be given to a "hands on" approach to learning.</p> <p>Access to suitable components and test equipment is required.</p>  |
| Assessment method         | Practical tests.  |

**Learning Outcome 3****Identify, test and use simple transistor switches and linear integrated circuits.**

Assessment criteria

Identify transistors required for simple switching applications.

Wire up and test simple circuits using switching transistors.

Wire up and test simple circuits using simple linear integrated circuits.

Conditions

This learning outcome will require an integration of theory and practical skills.

Access to suitable prototyping equipment (eg. "breadboards") as well as necessary components and equipment is required.

Assessment method

Theory test (Circuit Design) and practical tests.

**Learning Outcome 4****Set up and test simple electronic timing circuits.**

Assessment criteria

Calculate and test the time constant of a simple RC timing circuit.

Design and test a timing circuit using a type 555 integrated circuit.

Conditions

This learning outcome will require an integration of theory and practical skills.

Access to suitable prototyping equipment (eg. "breadboards") as well as necessary components and equipment is required.

Assessment method

Theory test (Circuit Design) and practical tests.

**Learning Outcome 5**

**Describe and specify common power supplies and power control devices**

Assessment criteria

Differentiate between full and half wave rectification and state the advantages of both.

Draw a circuit and specify all components needed for a common power supply.

Design and draw simple circuits using zener diodes and LED's.

Describe the operation and specify the characteristics of SCR's and triacs in simple circuits.

Conditions

This learning outcome concentrates on the application of devices associated with power supplies and power control.

Normal learning will take place in the classroom or other suitable study environments.

Experiments should be used to demonstrate the applications of the devices concerned.

Assessment method

Written tests including circuit design and short answer questions.

**Suggested Learning Resources**

Texts/References

Edwards, Rodney. & Meyer, Douglas.  
Electronics - A Basic Course.  
Second Edition.  
McGraw Hill, Sydney, 1993.

Lowe, James.  
Electronics for Electrical Trades.  
Fourth Edition.  
McGraw Hill, Sydney, 1990.