

APPLY BASIC ENGINEERING SCIENCE

UNIT CODE: ENG/OS/RAC/CC/03/4/A

UNIT DESCRIPTION

This unit describes the competencies required to apply basic engineering science. It involves applying concepts of fluid mechanics and thermodynamics.

ELEMENTS AND PERFORMANCE CRITERIA

| ELEMENT | PERFORMANCE CRITERIA <i>(Bold and italicised terms are elaborated in the Range)</i> |
|--------------------------------------|---|
| 1. Apply concepts of fluid mechanics | 1.1 Defined fluid mechanics as applied in the concept 1.2 Identified <i>properties of fluids</i> as applied in fluid mechanics 1.3 Calculated density of fluids 1.4 Applied viscosity of fluids 1.5 Pressure of fluids is defined 1.6 Pascal's law is defined 1.7 <i>Flow rate</i> in pipes is measured |
| 2. Apply concept of thermodynamics | 2.1 Thermodynamics defined as it applied in refrigeration and air conditioning 2.2 Defined various <i>modes of heat transfer</i> : 2.3 Applied various modes of heat transfer in 2.4 refrigeration and air conditioning 2.5 Defined thermodynamic systems 2.6 Defined the 1st law of thermodynamics and its application in refrigeration and air conditioning 2.7 Defined the 2nd law of thermodynamics and its application in refrigeration and air conditioning 2.8 Applied heat transfer as per the concept 2.9 Simple vapor compression cycle is applied in thermodynamics |

RANGE

| Variable | Range |
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| 1. Properties of fluids may include but is not limited to: | <ul style="list-style-type: none"> • Density • Viscosity • Temperature • Pressure • Specific volume • Specific weight |
| 2. Flow rate may include | <ul style="list-style-type: none"> • Viscous flow • Turbulent flow |

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| but is not limited to: | <ul style="list-style-type: none"> • Lamina flow |
| 3. Modes of heat transfer may include but is not limited to: | <ul style="list-style-type: none"> • Radiation • Convection • Conduction |

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required skills

The individual needs to demonstrate the following skills:

- Interpretation of diagrams, drawings and charts
- Proper handling of materials, tools, equipment and instruments
- Carrying out calculations

Required knowledge

The individual needs to demonstrate knowledge of:

- Reading pressure gauges
- Calculating pressures
- Interpreting readings from pressure gauges
- Performing calculations on Pascal's law
- Properties of fluids
- Calculation of density of fluids
- Application of viscosity of fluids
- Flow rate in pipes
- Application of simple refrigeration cycles
- Modes of heat transfer

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and understanding and range.

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| 1. Critical aspects of competency | <p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Applied concepts of fluid mechanics 1.2 Performed Pressure measurement 1.3 Was able to measure flow rate in pipes 1.4 Applied concepts of thermodynamics 1.5 Applied principles of heat transfer 1.6 Applied simple refrigeration cycles |
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| 2. Resource Implications | <p>The following resources should be provided:</p> <p>2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place</p> <p>2.2 Measuring equipment and instruments</p> <p>2.3 Materials relevant to the tasks</p> <p>2.4 Refrigeration and air conditioning equipment</p> |
| 3. Methods of Assessment | <p>Competency may be assessed through:</p> <p>3.1 Practical tests</p> <p>3.2 Observation</p> |
| 4. Context of assessment | <p>Competency may be assessed individually in the actual workplace or a simulated work place setting or during industrial attachment</p> |
| 5. Guidance information for assessment | <p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p> |

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