

1. Module details

Module name

Rail Signalling Systems Concepts

Module duration

It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 54 - 60 hours.

Module code

NUE 604.1

Discipline code

0703110

2. Module purpose

This module provides students with the fundamental principles and overview of rail signalling systems. It focuses on signalling, track circuit and point principles.

3. Prerequisites

Nil

4. Relationship to competency standards

This module provides part of the underpinning knowledge and skills in the 'Evidence Guide' of specific units of competency in the National Electrotechnology Training Package and provides similar support, where mapped, to equivalent units in the National Metals and Engineering Competency Standards. For details refer to the module to unit maps, available from ElectroComms & Energy Utilities Qualifications Standards Body of Australia Ltd.(EESQBA)

5. Content

Signalling system overview

- Control and indication panels.
- Interlocking layouts.
- Permissive signalling layouts.
- Train protection system.
- Point machine.
- Track circuit.
- Level crossing protection.
- Signal types.
- Power supplies.

Track circuit principles

- Standard symbols.
- Basic components.
- Operation.

Permissive signalling principles

- Standard symbols.
- Recognition.
- Signalling positions/aspects.
- Signal locations.

Point principles

- Standard symbols
- Operation

	<ul style="list-style-type: none">- Configuration- Components- Derails
6. Assessment strategy	
Assessment methods	Assessment should be progressive reflecting a holistic approach to ensure the module purpose is met. To assist in ensuring validity, reliability and fairness assessment instruments should include practical exercises, assignments and written tests consisting of a number of item types, such as multiple choice, short answer and problem solving.
Conditions of assessment	Learning and assessment will take place in an environment that is conducive to a learner's development.
7. Learning outcome details	
Learning outcome 1	Describe the purpose and concepts of a rail signalling system.
Assessment criteria	<ol style="list-style-type: none">1.1 List the essential components of a rail signalling system.1.2 State the indication and colours shown on a control and indication panel.1.3 Describe the interlocking layouts of rail signalling system.1.4 Describe the permissive signal layouts of rail signalling system(s).1.5 State the essential operating characteristics of train protection systems, point machines, signals, power supplies and track circuits.1.6 State the essential operating characteristics of level crossing protection.1.7 Identify how the signalling hardware satisfies operating requirements
Learning outcome 2	Explain the purpose, components and operation of track circuits.
Assessment criteria	<ol style="list-style-type: none">2.1 Identify common track circuit symbols and drawings.2.2 Draw and label a standard DC and AC track circuit.

	<p>2.3 State the purpose of all the components and describe the operation of DC and AC track circuit(s).</p> <p>2.4 Describe how broken rail protection is provided.</p> <p>2.5 Explain the effect of changing ballast resistance on the operation of track circuits.</p>
Learning outcome 3	Describe the major features of a permissive signalling system.
Assessment criteria	<p>3.1 Identify common signal symbols and drawings.</p> <p>3.2 Recognise permissive signals.</p> <p>3.3 State all the signalling positions/aspects and their meaning</p> <p>3.4 Identify, using diagrams, signal aspects in relation to train positions within block sections.</p> <p>3.5 Describe the criteria required to calculate the correct positioning of a signal.</p>
Learning outcome 4	Explain the purpose, components and operation of point systems.
Assessment criteria	<p>4.1 Identify common point mechanism symbols and drawings.</p> <p>4.2 Describe the components and basic operation of point operating mechanisms</p> <p>4.3 State the method to determine the hand and location of a point mechanism.</p> <p>4.4 Identify point layout components.</p> <p>4.5 Describe the operation of slips and derail mechanisms.</p>
8. Delivery of the module	
Delivery strategy	<p>Delivery strategies must be suitable for learning both theoretical and practical aspects described in the module purpose. It is considered that the most effective method to achieve this is by integration of theory and practice where students learn by experimentation, research and reports. It is recommended that learning and assessment be facilitated in a holistic manner that may require learning outcome sequence other than that indicated in the module.</p>

Resource requirements

Resources should be sufficient for students to carry out learning activities on an individual basis.

Suggested Learning Resource:

- Include relevant equipment
- Include manuals or other relevant materials
- Relevant codes, standards and/or regulations

Where this module is used in an approved Traineeship or Apprenticeship program learners should be advised to obtain, where available, respective EEQSBA1 **User Guides** (*these outline in detail what training and work performance the Learner is required to undertake for the program*).

Occupational health and safety requirements

A safe and healthy environment will be provided for students and teachers as well as the particular safety procedures followed as part of the learning / teaching activity and content.