



Australian Government

UEENEEE082A Apply physics to solving electrotechnology engineering problems

Release: 3

UEENEEE082A Apply physics to solving electrotechnology engineering problems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

1)

1.1) Descriptor

This unit covers the law of physics and how they apply to solving electrotechnology related problems. It encompasses working safely, knowledge of measurements of physical phenomena, linear and angular motion, harmonic motion, wave theory, optics, acoustics and heat capacity and transfer, use of measurement techniques, solving physics related problems and documenting justification for such solutions.

Application of the Unit

Application of the Unit

4)

This unit is intended for competency development in entry-level employment based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit may require a license to practice in the workplace subject to regulations for undertaking of electrical work. Practice in workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training. Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

Employability Skills Information

Employability Skills

3)

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT

PERFORMANCE CRITERIA

1 Prepare to apply physics to developing solutions to electrotechnology related problems.	1.1	OHS procedures for a given work area are identified, obtained and understood.
	1.2	OHS risk control work preparation measures and procedures are followed.
	1.3	The nature of the problem is obtained and understood from documentation or from work supervisor.
	1.4	Problems are clearly stated in writing and/or diagrammatic form to ensure they are understood and appropriate methods used to resolve them.
	1.5	Equipment and testing devices needed to develop solutions to problems are obtained and checked for correct operation and safety

ELEMENT	PERFORMANCE CRITERIA
2 Apply the laws of physics to developing solutions to electrotechnology problems.	2.1 OHS risk control work measures and procedures are followed.
	2.2 Tests and measurements are undertaken in strict accordance with OHS requirements and within established safety procedures.
	2.3 Knowledge of laws of physics are drawn to develop resolutions problems in static and dynamics including tests and measurements and interpreting their results.
	2.4 Theoretical and measured values are applied to developing solutions to problems in static and dynamics
	2.5 Consideration is given to adverse effects in the developed solutions of problems
	2.6 Unexpected situations are dealt with safely and with the approval of an authorised person.
3 Report solutions of problems in static and dynamics	3.1 Proposed solutions to electrotechnology problems are documented with science based justification for the solutions..
	3.2 Known adverse effects and outcome of developed solution are included in the report
	3.3 Solution report is forwarded to the and appropriate person notified in accordance with established procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of physics and how they apply to solving electrotechnology related problems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EE082A

Electrotechnology engineering physics

Evidence shall show an understanding of electro engineering physics to an extent indicated by the following aspects:

T1 Measurement encompassing

- SI units in measurement of physical phenomena
- Uncertainty and tolerance

T2 Linear motion

T3 Angular motion

T4 Simple harmonic motion and vibration

T5 Wave theory

- Interference
- Diffraction

T6 Electromagnetic waves and propagation

T7 Optics

- Mirrors and lenses
- Optical fibre

T8 Acoustics and ultrasonics

T9 Heat capacity and heat transfer

- Fluid power

Evidence Guide

EVIDENCE GUIDE

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

EVIDENCE GUIDE

competency in this unit

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of performance criteria demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
 - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
 - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
 - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
 - Demonstrate an appropriate level of skills enabling employment
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
 - Develop solution to problems in statics and dynamics as described in 8) and including:
 - A Understanding and clearly stating the nature of the problem
 - B Obtaining the appropriate equipment and testing devices needed to develop solutions to problems
 - C Using knowledge of laws of physics are drawn to develop resolutions problems in static and dynamics
 - D Applying theoretical and measured values to developing solutions to problems in static and dynamics
 - E Consideration is given to adverse effects in the developed solutions

EVIDENCE GUIDE

F Reporting accurately the developed solutions, recommendations and justification

G Dealing with unplanned events

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to physics and how they apply to solving electrotechnology related problems.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to developing solution to problems involving linear and angular motion, harmonics, wave propagation, interference and diffraction, electromagnetic wave propagation, optics acoustics and heat capacity and transfer.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

Competency Field

2.3) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	5	Writing	5	Numeracy	5
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2.3) Literacy and numeracy skills

Competency Field 5)

Electrotechnology