

1. Module details**Module name****Mathematical Skills for Electrotechnology Trades****Module duration**

It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 36 – 40 hours.

Module code

NUE053

Discipline code

1703101

2. Module purpose

This module is intended to prepare students with mathematical skills necessary for installation planning, modification, fault diagnosis and repair work in the electrical industry. The module ensures a sound foundation for further education and training.

3. Prerequisites

Nil.

4. Relationship to competency standards

This module partly supports the achievement competency in units in the National Electrotechnology Competency Standards. Full competence is achieved through additional off-job and on-job training prescribed by the industry in Contract of Training

5. Content**Basic operations****Estimating the results of a calculation****Scientific and engineering notation****Graphs****Fundamental and derived units**

multiple

sub-multiples

Transposition**Vectors/phasors**

6. Assessment strategy**Assessment methods**

Assessment should be progressive reflecting a holistic approach to ensure the module purpose is met and students are well prepares for work placement. To assist in ensuring validity, reliability and fairness assessment instruments should include practical exercises, assignments and written tests. Written tests should include, multiple choice, short answer and problem type items.

Conditions of assessment

Normally learning and assessment will take place in a classroom/laboratory environment

7. Learning outcome details**Learning outcome 1**

Perform addition, subtraction, multiplication and division operations with fractions, decimals and scientific and engineering notation.

Assessment criteria

- 1.1 Solve problems involving addition, subtracting, multiplication and division operations.
- 1.2 Solve problems involving the order of fractions.
- 1.3 Notate numbers above and below unity.
- 1.4 Express numbers as multiples and sub-multiples.

Learning outcome 2

Estimate the result of calculations involving addition, subtraction, multiplication and division operations with fractions, decimals and scientific and engineering notation

Assessment criteria

- 2.1 Without the aid of a calculator estimate the result calculation involving addition, subtraction, multiplication, and division operations and then verify answers with a calculator.
- 2.2 Estimate the result of a problem involving fractions.
- 2.3 Convert fractions to decimal numbers.
- 2.4 Convert a fraction into a scientific notation.

Learning outcome 3

Express a decimal number in scientific notation.

Assessment criteria

- 3.1 Convert decimal numbers into a notated number.
- 3.2 Convert a notated number into a decimal.

Learning outcome 4

Use a graph to show the relationship between two variables.

Assessment criteria

- 4.1 Describe the use of different types of graphs.
- 4.2 Identify dependent and independent variables.
- 4.3 Draw a graph involving two variables.
- 4.4 Plot and record values from the graph drawn in 4.3.

Learning outcome 5

Use fundamental and derived units in the calculation of electrical and mechanical quantities.

Assessment criteria

- 5.1 Define the basic units of
- 5.2 Define the SI derived units of
- 5.3 Convert units to multiple and sub-multiple units.

Learning outcome 6

Transpose a given equation for any variable in equation.

Assessment criteria

- 6.1 Transpose a formula in order to calculate an unknown value (e.g $V=IR$).
- 6.2 Transpose a formula involving several variables (eg series / parallel resistors).
- 6.3 Transpose a formula involving brackets (e.g $V=Lx$).

Learning outcome 7

Resolve vectors/phasors given any combination of quantity / direction, sine, cosine and tan ratios.

Assessment criteria

- 7.1 Define vector quantities.
- 7.2 Draw a phasor diagram.
- 7.3 Calculate a resultant using a vector polygon.
- 7.4 Solve problems involving sine, cosine and tan ratios.

8. Delivery of the module

Delivery strategy

Delivery strategies must be suitable for both theoretical and practical learning and address the module purpose. It is recommended that learning and assessment be facilitated in a holistic manner which may require a learning outcome sequence other than that indicated in the body of the module. Also an integrated theory/practice approach should be used where students learn by experimentation and through practical application.

Resource requirements

Resources should be sufficient for students to carry out exercises on an individual basis. Trainers/teachers/facilitators must have qualifications in the relevant subject area they are engaged to deliver, recognised trainer and assessment training and at least five years relevant work experience. Useful references include:
Class notes
Bridging the Gap.

Occupational health and safety requirements

A safe and healthy environment will be provided for students and teachers as well as safety procedure with regard to learning/teaching activity.