

## APPLY ENGINEERING TECHNICIAN MATHEMATICS I

**UNIT CODE:** 0541441 05 A

**TVET CDACC UNIT CODE:** ENG/OS/MDE/CC/01/5/MA

### UNIT DESCRIPTION:

This unit describes the competencies required by a technician in order to apply engineering technician mathematics. It enables the learner to; apply algebra, carry out mensuration, apply number systems, trigonometry and hyperbolic functions.

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each of the elements. <i>(Bold and italicized terms are elaborated in the Range)</i>
1. Apply algebra	1.1 Indices calculations are performed as per laws of indices 1.2 Logarithms calculations are performed as per laws of logarithms 1.3 Simultaneous equations are performed as per Mathematical methods. 1.4 Quadratic equations are solved as per mathematical methods
2. Carry out mensuration	2.1 Perimeter and areas of regular figures are obtained as per mathematical methods. 2.2 Volume and surface area of solids are obtained as per mathematical methods. 2.3 Area of irregular figures is obtained as per mathematical methods as per mathematical methods.
3. Apply number systems	3.1 Calculations involving various <b><i>types of numbers</i></b> are performed as per the concept. 3.2 <b><i>Arithmetic operations</i></b> on integers are carried out as per the concept. 3.3 Mathematical problems are solved as per concepts.
4. Apply trigonometry functions	4.1 Calculations are performed as per trigonometric rules 4.2 Trigonometric Ratios and Functions are performed as per trigonometric rules 4.3 Trigonometric Equations are applied according to Mathematical methods. 4.4 Trigonometric identities are applied according to Mathematical methods.

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5. Apply hyperbolic functions	5.1 Calculations are performed according to <b><i>hyperbolic functions</i></b> rules. 5.2 Hyperbolic Identities are applied according to Mathematical methods. 5.3 Hyperbolic Equations are solved according to Mathematical methods. 5.4 Hyperbolic Functions are applied according to Mathematical methods.

### **RANGE##**

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

<b>Variable</b>	<b>Range</b>
Types of numbers may include but not limited to:	<ul style="list-style-type: none"> <li>• Integers</li> <li>• Decimals</li> <li>• Fractions</li> </ul>
Arithmetic operations may include but not limited to:	<ul style="list-style-type: none"> <li>• Addition</li> <li>• Subtraction</li> <li>• Multiplication</li> <li>• Division</li> </ul>
Hyperbolic functions may include but not limited to:	<ul style="list-style-type: none"> <li>• Sinh x</li> <li>• Cosh x</li> <li>• Cosec x</li> <li>• Tanh x</li> <li>• Sech x</li> </ul>

### **REQUIRED KNOWLEDGE AND UNDERSTANDING**

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

#### **Required Skills**

The individual needs to demonstrate the following skills:

- Applying fundamental operations (addition, subtraction, division, multiplication)
- Using and applying mathematical formulas
- Logical thinking
- Problem solving
- Applying statistics
- Drawing graphs
- Using different measuring tools

### Required Knowledge

The individual needs to demonstrate knowledge and understanding of:

- Algebra
- Linear algebra
- Fundamental operations (addition, subtraction, division, multiplication)
- Types and purpose of measuring instruments
- Units of measurement and abbreviations
- Rounding techniques
- Types of fractions

### EVIDENCE GUIDE

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

1.Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Applied algebra as per mathematical methods 1.2 Applied number systems as per mathematical methods 1.3 Carried out mensuration as per mathematical methods 1.4 Applied trigonometric functions as per mathematical methods 1.5 Applied hyperbolic functions as per mathematical methods
2. Resource implications	The following resources should be provided: 2.1 Mathematical tables 2.2 Whiteboards 2.3 Marker 2.4 Scientific calculator 2.5 Measuring equipment
3. Methods of assessment	Competency in this unit may be assessed through: 3.1 Observation

	3.2 Oral assessment 3.3 Portfolio of evidence 3.4 Interviews 3.5 Third party report 3.6 Written assessment 3.7 Practical assessment 3.8 Projects
4. Context of assessment	Competency may be assessed: 4.1 Workplace or simulated workplace.
5. Guidance information for assessment	5.1 Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended

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