APPLY ENGINEERING TECHNICIAN MATHEMATICS I

UNIT CODE: 0541 441 05A
TVETCDACC UNIT CODE: ENG/OS/SPV/CC/01/5/MA

UNIT DESCRIPTION

This unit describes the competencies required to apply a wide range of engineering technician mathematics. Competencies include: applying number systems, applying algebra, applying trigonometry and hyperbolic functions, performing coordinates geometry and carrying out binomial expansions.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range.***
1. Apply number systems	1.1 Calculations involving various ***types of numbers*** are performed as per the concept. 1.2 ***Arithmetic operations*** on integers are carried out as per the concept. 1.3 Mathematical problems are solved as per concepts.
2. Apply algebra	2.1 Indices calculations are performed as per the concept. 2.2 Simultaneous equations are performed as per the rules. 2.3 mathematical problems are solved as per concepts. 2.4 Quadratic equations are calculated as per the concept
3. Apply trigonometry and hyperbolic functions	3.1 Calculations are performed as per trigonometric rules 3.2 Calculations are performed according to ***hyperbolic functions*** rules. 3.3 Trigonometric identities are applied according to Mathematical methods.
4. Perform coordinates geometry	1.1 Polar equations are solved as per mathematical methods. 1.2 Polar equations graphs are drawn as per mathematical methods. 1.3 Normal and tangents are determined as per mathematical methods
5. Carry out binomial expansion	1.1 Binomial series is determined as per mathematical methods. 1.2 Roots of numbers are determined as per mathematical methods. 1.3 Errors of small changes are determined as per mathematical methods.

RANGE

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

Variable	Range
1. Arithmetic operations include but not limited to:	• Addition • Subtraction • Multiplication • Division
2. Trigonometry ratios include but not limited to:	• Sine • Cosine • Tangent • Sec • Cosec • Cotagent
3. Trigonometric rules	• sine rules • cosine rule
4. Inverse trigonometric ratios	• Inverse of sine • Inverse of cosine • Inverse of tangent
5. Trigonometric functions Integrals	• Sine • Cosine • Tangent
6. Hyperbolic functions may include but not limited to:	• Sinh x • Cosh x • Cosec x • Tanh x • Sech x

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:

- 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 of:

- Fundamental operations (addition, subtraction, division, multiplication)
- Types of fractions
- Trigometric Ratios
- Types of tables and graphs
- Presentation of data in tables and graphs

EVIDENCE GUIDE

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

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Carried out arithmetic operations on integers as per concept. 1.2 Performed Indices calculations as per concept. 1.3 Performed simultaneous equations as per rules. 1.4 Performed quadratic equations as per concept. 1.5 Applied algebra as per mathematical methods 1.6 Applied trigonometry and hyperbolic functions as per mathematical methods 1.7 Applied coordinates geometry as per mathematical methods 1.8 Carried out binomial expansion as per mathematical methods 1.9 Carried out mensuration as per mathematical methods
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	**Competency may be assessed through:** 3.1 Practical demonstration 3.2 Projects 3.3 Written tests 3.4 Oral test
4. Context of Assessment	4.1 Competency may be assessed in a workplace or a 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.