APPLY ENGINEERING TECHNICIAN MATHEMATICS II

UNIT CODE: 0541441 06A
TVET CDACC UNIT CODE: ENG/OS/MDE/CC/05/5/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 statistics and probability, matrices, and vector theorem, and carry out binomial expansion.

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 statistics and probability	1.1. ***Measures of central tendency*** are obtained as per mathematical methods. 1.2. ***Measures of dispersion*** are obtained as per mathematical methods. 1.3. Laws of probability are applied as per mathematical methods. 1.4. ***Probability distribution methods*** are applied as per mathematical methods. 1.5. Sampling distribution methods are applied as per mathematical methods.
2. Apply matrices	2.1. Matrices operations are performed as per mathematical methods 2.2. Inverse of matrices are obtained as per mathematical methods 2.3. Simultaneous equations are solved using matrices as per mathematical methods.
3. Apply vector theorem	3.1. Vectors and scalar quantities are defined as per mathematical methods 3.2. ***Operations*** on vectors are performed as per mathematical methods 3.3. Position vectors are determined as per mathematical methods 3.4. Resolution of vectors is performed as per mathematical methods

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	3.5. Vector and scalar products are obtained as per mathematical methods
4. Carry out binomial expansion	4.1 Binomial series is determined as per mathematical methods. 4.2 Roots of numbers are determined as per mathematical methods. 4.3 Errors of small changes are determined as per 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.

Variable	Range
Measures of central tendency may include but not limited to:	• Mean • Mode • Median
Measures of dispersion may include but not limited to:	• Standard deviation • Variance
Probability distribution methods may include but not limited to:	• Normal distribution • Poisson distribution • Chi distribution
Operations may include but not limited to:	• Addition • Subtraction • Multiplication • Division

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
- Geometry
- Fundamental operations (addition, subtraction, division, multiplication)
- Calculating area and volume
- Types and purpose of measuring instruments
- Units of measurement and abbreviations
- Rounding techniques
- Types of fractions
- 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 and understanding and range.

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1.Applied statistics and probability as per mathematical methods 1.2.Applied matrices as per mathematical methods. 1.3.Applied vector theorem as per mathematical methods. 1.4.Applied binomial expansion 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