

APPLY ENGINEERING MATHEMATICS

UNIT CODE:CON/OS/PL/CC/01/4/A

UNIT DESCRIPTION:

This unit describes the competencies required to apply Engineering Mathematics. It involves applying algebra and co-ordinate geometry, carrying out mensuration, applying matrices and statistics and plotting simple graphs.

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. <i>Bold and italicized terms are elaborated in the Range.</i>
1. Apply Algebra	1.1 Calculations involving indices and logarithms are carried out as per the concept 1.2 Linear algebraic expressions and equations are formed and solved based on the concept 1.3 Scientific calculator is used in solving mathematical problems in line with manufacturer's manual 1.4 Simultaneous equations are performed as per the concept 1.5 Quadratic equations are solved as per the concept
2. Apply co-ordinate Geometry	2.1 Polar equations are calculated using coordinate geometry 2.2 Graphs of given polar equations are drawn using the Cartesian plane 2.3 Normal and tangents are determined using coordinate geometry
3. Carry out Mensuration	3.1 Perimeter and areas of regular <i>figures</i> are obtained 3.2 Volume and surface area of solids are obtained 3.3 Area of irregular figures are obtained 3.4 Areas and volumes are obtained using Pappus theorem
4. Apply Matrices	4.1 Determinant and inverse of 2x2 matrix are obtained

ELEMENT	PERFORMANCE CRITERIA
These describe the key outcomes which make up workplace function.	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>
	4.2 Solutions of simultaneous equations are obtained
5. Apply basic statistics	5.1 Grouped and ungrouped data is identified and interpreted based on given sample 5.2 Ungrouped data is organized based on the concept 5.3 Data is represented in frequency tables based on the concept 5.4 The median, mode and mean of grouped and ungrouped data is calculated based on the concept 5.5 Data is presented in a chart form based on the concept
6. Plot simple graphs	6.1 <i>Graphs</i> are plotted for given set of data based on data 6.2 Information from a given graph is interpreted based on data

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. Figures may include but not limited to:	<ul style="list-style-type: none"> • Square • rectangle • triangle • polygons • circles
2. Graphs limited to:	<ul style="list-style-type: none"> • linear graphs • bar graphs

	<ul style="list-style-type: none">• pie chart• pictograph
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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:

- Communication
- Logical thinking
- Problem solving
- Interpersonal
- Drawing
- Interpretation
- Sketching
- Measuring skills

Required knowledge

The individual needs to demonstrate knowledge of:

- 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 angles
- Types of tables and graphs
- Presentation

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	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Carried out mensuration correctly 1.2 Applied basic algebra appropriately 1.3 Performed geometrical calculations correctly 1.4 Demonstrated knowledge of applied basic statistics appropriately 1.5 Plotted simple graphs correctly
2. Resource Implications	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1 Access to relevant or appropriately simulated environment where assessment can take place 2.2 Measuring equipment 2.3 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Written tests 3.2 Practical Tests 3.3 Oral Questioning 3.4 Interviewing 3.5 Portfolio 3.6 Third party report
4. Context of Assessment	<p>Competency may be assessed individually:</p> <ul style="list-style-type: none"> 4.1 On-the-job 4.2 Off-the-job 4.3 During industrial attachment
5. Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>