

AEN 1104 ENGINEERING MATHEMATICS I

Lecturer

Course Type: CORE (B.Sc. Agric. Engineering)

1. COURSE DESCRIPTION

Course Credits (CU): 4 CU i.e. 60 Contact Hours per semester

Course Duration: 15 weeks (45 hours) i.e. 60 LH

COURSE DESCRIPTION

2. COURSE OBJECTIVES

To introduce students to basic concepts in mathematics to enable them understand basic engineering concepts.

The **specific objective** is to cover mathematics at beginner's undergraduate level to serve as a prerequisite for Engineering Mathematics II.

3. RECOMMENDED REFERENCES FOR READING

4. COURSE CONTENT, METHODS OF INSTRUCTION, TOOLS AND EQUIPMENT REQUIRED

TOPIC	CONTENT	METHOD OF INSTRUCTION / Time allocated	TOOLS / EQUIPMENT NEEDED
Lecture 1. Concept of a function	<ul style="list-style-type: none">• Elementary and transcendental functions of a real variable• Exponential, hyperbolic, and logarithmic functions• Roots, quadratic formula, factor/remainder theorems and synthetic division• Linear equations, characteristics and formulation• Composite functions• Loci problems	Interactive lectures (9 hrs)	Chalk / BB or LC-projector and laptop
Lecture 2. Complex numbers	<ul style="list-style-type: none">• Definition• The Argand Diagram• Polar and exponential representation	Interactive lectures (9 hrs)	Chalk / BB or LC-projector and laptop

	<ul style="list-style-type: none"> Algebra of complex numbers Application to engineering problems: impedance, concept of phasers 		
Lecture 3. Trigonometry	<ul style="list-style-type: none"> Introduction to trigonometry, the general angle Pythagoras theorem Graphs of trigonometric functions The sine, cosine, tangent and the half angle formulas Double Angle Formulae, T-Formulae and the Factor Formulae. Trigonometric identities: Sum & Differences of Angles Applied Trigonometry: sine rule, cosine rule, area of triangles 	Interactive lectures (10 hrs)	Chalk / BB or LC-projector and laptop
Lecture 4. Vector algebra	<ul style="list-style-type: none"> Introduction to vectors and scalars Components of a vector Area as a vector Algebraic operations of vectors and applicable laws Engineering application of vectors: forces, torque, potential and magnetic fields 	Interactive lectures (10 hrs)	Chalk / BB or LC-projector and laptop
Lecture 5 Equations	<ul style="list-style-type: none"> Definitions The general quadratic equation Simultaneous equations Application of equation 	Interactive lectures (8 hrs)	Chalk / BB or LC-projector and laptop
Lecture 6 Matrices and Determinants	<ul style="list-style-type: none"> Definitions Matrix algebra Types of matrices Determinants and their properties Use of matrices to solve linear equations Consistency of equations 	Interactive lectures (8 hrs)	Chalk / BB or LC-projector and laptop
Lecture 7 Elements of Mathematics	<ul style="list-style-type: none"> Set theory Theory of relations and functions Number systems and types such as decimal, binary and octal Conversions between all systems, addition 	Interactive lectures (6 hrs)	Chalk / BB or LC-projector and laptop

	and subtraction • Boolean algebra		
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5. OVERALL COURSE EVALUATION

Continuous Assessment Test and assignment 40%
Final examination 60%