

Module Code	MA1013	Title	Mathematics			
Credits	03	Hours/Week	Lectures	03	Prerequisites	
			Lab/Tutorial	01		

Learning Outcomes

After completing this module, the students should be able to:

- Use discrete mathematical structures such as Logic and Set Theory in applications.
- Use algebraic structures such as Real Numbers, Vectors and Matrices in applications.
- Apply the basic concepts of limits, differentiation and integration in engineering applications.

Outline Syllabus

Logic and Set Theory

- Propositions, truth tables, symbolic statements, conditional connectives, quantifiers;
- Techniques of proof: Direct, contradiction, induction, pigeon-hole principle;
- Sets, cardinality, Cartesian product, ordered pairs;
- Relations, functions, Boolean algebra: Disjunctive and conjunctive normal forms, logic gates, Karnaugh maps, minimization and applications.

Real Analysis

- Real number system, supremum and infimum, completeness axiom
- Basic functions: Polynomial, exponential, trigonometric, hyperbolic and their inverses.
- Limit of a function, continuity, differentiability, derivatives,
- Rolle's theorem, mean value theorem, L' Hospital's rule;
- Sequences and series of real numbers.
- Tests for convergence of sequences and series.

Vectors, and Matrices

- Vector algebra, vector product, scalar product, scalar triple product, vector triple product,
- Equations of lines and planes;
- Matrix operations, transpose, adjoint and inverse of a matrix, echelon forms, rank, determinants.
- Systems of linear equations

Note: This is for all MPR,ER,TT and TLM students.