Course Name Mathematics I

Course Code M(EE)101

Course Credit 4

Contact Hour 3L-1T

Prerequisite

Course Objective

The objectives of this course are

Course Outcome

At the end of this course

CO Mapping with departmental POs

H: High, M: Medium, L: Low

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1												
CO 2												
CO 3												
CO 4												
CO 5												

Course Content

Module I: Matrix Algebra **10L**

Elementary row and column operations on a matrix, Rank of matrix, Normal form, Inverse of a matrix using elementary operations, Consistency and solutions of systems of linear equations using elementary operations, Linear dependence and independence of vectors, Concept & Properties of different matrices (unitary, orthogonal, symmetric, skew-symmetric, hermitian, skew-hermitian), Eigen values and Eigen vectors of a square matrix (of order 2 or 3), Characteristic polynomials, Caley-Hamillton theorem and its applications, Reduction to diagonal form (upto 3^{rd} order).

Module II: Calculus-I (Functions of single variable) **10L**

Rolle's theorem, Mean value theorem- Lagrange & Cauchy, Taylor's and Maclaurin's theorems, Expansion of simple functions by Taylor's and Maclaurin's Theorems, Fundamental theorem of integral calculus, Evaluation of plane areas, volume and surface area of a solid of revolutionand lengths, Convergence of Improper integrals, Beta and Gamma Integrals - Elementary properties and the Inter relations.

Module III: Calculus-II (Functions of several variables) **12L**

Introduction to functions of several variables with examples, Knowledge of limit and continuity, Partial derivatives, Total Differentiation, Derivatives of composite and implicit functions, Euler's theorem on homogeneous functions, Chain rule, Maxima and minima of functions of two variables – Lagrange's method of Multipliers, Change of variables-Jacobians (up to three variables), Double and triple integrals.

Module IV: Vector Calculus **8L**

Scalar and vector triple products, Scalar and Vector fields, Vector Differentiation, Level surfaces, Directional derivative, Gradient of scalar field, Divergence and Curl of a vector field and their physical significance, Line, surface and volume integrals, Green's theorem in plane, Gauss Divergence theorem, Stokes' theorem, Applications related to Engineering problems.

Text / Reference Books:

1. E. Kreyszig, Advanced engineering mathematics (8th Edition), John Wiley, 1999.
2. B.S.Grewal, Higher Engineering Mathematics, Khanna Publications, 2009.
3. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, Narosa Pub. House, 2008.
4. H. Anton, Elementary linear algebra with applications (8th Edition), John Wiley, 1995.
5. G. Strang, Linear algebra and its applications (4th Edition), Thomson, 2006.
6. S. Kumaresan, Linear algebra - A Geometric approach, Prentice Hall of India, 2000.
7. M. Apostol, Calculus, Volumes 1 and 2 (2nd Edition), Wiley Eastern, 1980.
8. TG. B. Thomas and R. L. Finney, Calculus and Analytic Geometry (9th Edition), ISE Reprint, Addison-Wesley, 1998.
9. Hughes-Hallett et al., Calculus - Single and Multivariable (3rd Edition), John-Wiley and Sons, 2003.
10. J. Stewart, Calculus (5th Edition), Thomson, 2003.
11. J. Bird, Higher Engineering Mathematics (4th Edition, 1st India Reprint), Elsevier,2006.
12. L.Rade and B.Westergen, Mathematics Handbook: for Science and Engineering (5th edition, 1st Indian Edition), Springer, 2009.
13. Murray R Spiegel and Seymour Lipschutz, Schaum's Outline of Vector Analysis.
14. Richard Bronson , Schaum's Outline of Matrix Operations.