

Indian Institute of Engineering Science and Technology, Shibpur

Department of Mathematics

B.Tech. Programme

Second Semester (For all Engineering Branches)

Subject : Mathematics-II (MA-1201)

Weekly contact periods: 3– 1 - 0 (L – T - P)

Full Marks: 100

Credit-4

Sl. No.	Module Name and Topics	No. of Classes
1.	Vector Space and Linear Transformation: Definition, subspace, linear combination, linear dependence and independence of vectors, span, basis, dimension of a vector space, linear transformation and some elementary properties.	6
2.	Matrices: Concept of Rank of matrices, reduction to Normal and Echelon forms, consistency of a system of linear equations, Orthogonal matrix, Hermitian and Unitary matrices, eigenvalues and eigenvectors, similarity transformation, diagonalization.	8
3.	Vector: Brief review of vector algebra, Shortest distance between skew lines, work done by a force, moment of a force about a point and about an axis, motion of a rigid body about a fixed axis, Directional derivatives, Gradient, Divergence, Curl, Line integral, Surface integral, Volume integral, Irrotational vector field, Gauss' divergence theorem and Stokes' theorem (statements only), Green's theorem in the plane, illustrations.	8

4.	Fourier Series: Fourier series, Dirichlet's conditions, Half range series as Fourier sine and cosine series.	5
5.	Complex Variables : Introduction to Complex variable, Function, concept of limit and continuity, Derivative of complex function, Analytic function, Cauchy-Riemann equations, Harmonic function, line integral, Cauchy-Goursat theorem (statement only), Cauchy's Integral formula, Generalized Cauchy's Integral formula (Statement only), Taylor's and Laurent's series (statements only), Type of singular points, Residue, Cauchy's Residue theorem and its application to evaluate real integrals using unit circle and semi-circle (without indentation).	12
	First half: Sl. No. 1,2,4 Second half: Sl. No. 3,5	39

Suggested Reading: (1) Advanced Engineering Mathematics - E. Krysizig (2) Engineering Mathematics - B. S. Grewal (3) Engineering Mathematics - S. S. Sastry (4) Higher Algebra- Chakraborty & Ghosh (5) Vector Analysis – Ghosh & Maity.