

JIS College of Engineering
(NAAC 'A' Accredited Autonomous Institution)

Syllabus for M. Tech (NST) 1ST YEAR 1ST SEM

Paper Name: Advanced Engineering Mathematics

Paper Code: M (NST) 101

Contact: 3L+1T

Course contents

The Bessel and Legendre functions and Spherical harmonics: *Bessel functions:* Bessel functions of the first kind Orthogonality. A brief mention of the Neumann functions. Definitions of Hankel function and spherical Bessel functions. *Legendre functions:* Generating function. Recurrence relations and special properties. Orthogonality. *Associated Legendre functions* 10L

Set and Group Theory Set and Groups: Definitions and operations involving sets, algebra of sets, union and intersection, Cartesian products of sets, mappings, closed and open sets, convergence and completeness. Definition of groups, multiplication table, conjugate elements and classes, subgroups; direct product of groups; isomorphism & homomorphism, Permutation groups 10L

Integral equations: Types of linear integral equations-definitions. Transformation of a differential equation into an integral equation. Neumann series, separable kernels. 10L

Green's Functions – definition and properties (for self adjoint differential operators only); computation of Green's function – direct computation, eigenfunction expansion, integral transform method. Standard equations like Laplace and Poisson equations, diffusion equation, Helmholtz equation, wave equation etc. 10L