Department of Mathematics
NATIONAL INSTITUTE OF TECHNOLOGY JAMSHEDPUR

Syllabus for Engineering Mathematics-II

Linear dependence and independence, rank and inverse of a matrix, solution of algebraic equations-consistency conditions. Eigen values and Eigen vectors, Hermitian and skew Hermitian matrices. **[10 Lectures]**

Improper integral: Convergence of improper integrals, test of convergence, Beta and Gamma functions elementary properties, differentiation under the integral sign. **[6 Lectures]**

Rectification, double and triple integrals, computations of surfaces and volumes, change of variables in double integrals, Jacobians of transformations. **[5 Lectures]**

Vector Calculus: Scalar and vector fields, level surfaces, Gradient, Divergence, Curl, Laplacian, line and surface integrals, theorems of Green, Gauss and Stokes. **[5 Lectures]**

Solution of polynomial and transcendental equations-bisection method, Secant method and Newton-Raphson method. Difference operators (Forward, backward, central and shift operators) and relation between these, Interpolation: Lagrange's, Newton's divided difference. Numerical Integration: Quadrature formula, Trapezoidal, Simpson's $1/3^{rd}$ and Simpson's $3/8^{th}$ rule. Numerical solution of first order ordinary differential equations: Taylor's series method, Euler method and Euler modified formula. **[16 Lectures]**

Books:

Advanced Engineering Mathematics by R. K. Jain and S R K Iyengar.
Numerical Methods by R K Jain and S R K Iyengar
Advanced Engineering Mathematics by Erwin Kreyszig
Engineering Mathematics by B S Grewal