

**NATIONAL INSTITUTE OF TECHNOLOGY, JAMSHEDPUR**  
**JHARKHAND - 831014**  
**Department of Mathematics**  
**Mathematics-II**

**Course Code:** MA- 1202

**Credit :** 4 (3-1-0)

**Course description**

- 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.  
(7 lectures)
- Convergence of improper integrals, test of convergence, Beta and Gamma functions elementary properties, differentiation under the integral sign  
(5 lectures)
- Series solution, Frobenius Method, Legendre's and Bessel's differential equation, Recurrence formula, Generating functions, orthogonality  
(7 lectures)
- Rectification, double and triple integrals, computations of surfaces and volumes, change of variables in double integrals, Jacobians of transformations.  
(7 lectures)
- Scalar and vector fields, level surfaces, directional derivative, Gradient, Divergence, Curl, Laplacian, line and surface integrals, theorems of Green, Gauss and Stokes  
(7 lectures)
- Finite differences, Newton's forward and backward interpolation formulae, Central difference interpolation. Lagrange's interpolation. Trapezoidal rule and Simpson's 1/3<sup>rd</sup> rule of integration. Solution of polynomial and transcendental equations-bisection method, Newton-Raphson method and Regula-falsi method  
(7 lectures)

**References:**

- Higher Engineering Mathematics by Dr. B. S. Grewal
- Numerical methods by T. Veerarajan/ Babu Ram
- Advanced Engineering Mathematics by Erwin Kreyszig