Code	Subject Title	Cr. Hrs	Semester
MATH-403	**Numerical Analysis - I**	**3**	**VII**
Year	Discipline		
4	**Mathematics**		

Objectives:

Number Systems and Errors

- Round off errors and computer arithmetic
- Error estimation
- Floating point arithmetic

Solution of Non-Linear Equations

- Iterative methods and convergence: Bisection method, fixed point iterative method, Regula Falsi, Secant and Newton's method

Systems of Linear Equations

- Direct methods: Gaussian elimination method, Gauss-Jordan method, matrix inversion
- method, factorization (Doolittle, Crout and Cholesky) method and its various forms
- Iterative methods and convergence: Gauss-Jacobi method and Gauss-Seidel method
- Ill-condition system and condition number
- Eigen values and eigenvectors
- Power and Rayleigh quotient method

Interpolation and Polynomial Approximation

- Difference operators
- Interpolation with unequal intervals: Lagrange's interpolation formula, Newton's divided difference formula, error in polynomial interpolation
- Interpolation with equal intervals: Gregory Newton forward/backward interpolation formula, error in polynomial interpolation
- Central difference interpolation formulae: Gauss's forwar d/backward interpolation formula, Stirling's formula, Laplace Everett's formula, Bessel's formula

Recommended Books:

- Curtis F. Gerald and Patrick O. Wheatley, Applied Numerical Analysis, 6th edition, (Addison-Wesley Pearson Education, 2003)
- Richard L. Burden and J. Douglas Faires, Numerical Analysis, 6th edition, (Brooks/Cole Publishing Company,1997)
- John H. Mathews, Numerical Methods for Mathematics, 3rd edition (Prentice Hall International, 2003)
- V. N. Vedamurthy and N. Ch. S. N. Iyenger, Numerical Methods, (Vikas Publishing House Pvt. Ltd, 2002)
- Steven C. Chapra and Raymond P. Canale, Numerical Methods for Engineers, 3rd edition, (McGraw Hill International Edition, 1998)