Branch: BCA	Semester-III
Subject Code: 3103	Lecture: 04 Credit: 04
Course Opted	Core Course - 9
Subject Title	**MATHEMATICS II**

Course objectives:

- To provide suitable and effective methods called numerical methods for obtaining approximate numerical results of the problems.
- To deal with various topics like finding roots of the equations, solving systems of linear algebraic equations, interpolation, numerical integration and differentiation, solution of differential equations and solution of matrix problems.
- To facilitate numerical computing.

Course Outcomes:

- Apply numerical methods to find solutions of algebraic equations using different methods viz. Bisection method, Regula - Falsi, Newton Raphson's, Ramanujan's method, Matrix Inversion and Gauss Elimination
- Apply Least squares Curve fitting procedures.
- Derive numerical methods for various mathematical operations and tasks such as interpolation, differentiation, integration, the solution of linear and non linear equations and solution of differential equations.

Modules	Sr. No.	Topic and Details	No. of Lectures Assigned	Marks Weightage %
UNIT-I	1	**Floating Point Arithmetic and Errors:** Floating Point Representation, Sources of Errors . Propagated Errors	4	8
	2	**Roots of non-linear equations** a)Bisection Method b)Regula-falsi Method c)Newton-Raphson Method d)Ramanujan's Methods	6	12
	3	**Direct solution of linear equation** a) Matrix Inversion, b) Gauss-Elimination Method c) Gauss Jordan Method	6	12
UNIT-II	4	**Interpolation:** Finite Differences, a) Newton-Gregory Forward and Backward Formula b) Lagrange's Interpolation Formula for unequal Intervals c) Newton divided difference formula for unequal intervals	8	16
UNIT-III	5	**Numerical Integration** a) Trapezoidal Rule b) Simpson's 1/3 Rule c) Simpson's 3/8 Rule Error estimation for all above 3 methods	6	12

	6	**Numerical Differentiation** Differentiating Newton's Forward and Backward formula	6	12
UNIT-IV	7	**Numerical solution of Differential equation** Taylor's Series, Euler's Method, Runge-Kutta Method	8	16
	8	**Curve Fitting** Least Square regression Fitting, Multiple linear regression, m conditioning in Least square	6	12
Total			**50**	**100**

Text Book:

1. S.S. Shastri "Introductory methods of numerical analysis" Vol-2, PHI, SECOND edition, 1994.

Reference:

1. Numerical Methods: V. Rajaraman "Computer oriented numerical methods (third edition) 1993.
2. Gupta and Kapoor Fundamental of Mathematical Statistics.
3. E. Balaguruswamy, Numerical Methods - Tata McGraw Hill Publication.