VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State
DEPARTMENT OF MATHEMATICS

NUMERICAL METHODS
(Open Elective)
For B.E., V - Semester – CBCS
(*for CSE & IT only)*

Name of the Faculty : Mr. M. Venkateswar Rao

L:T:P (Hrs./week):2:0:0	SEE Marks :60	Course Code: **U18OE510MA**
Credits : 2	CIE Marks: 40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	***At the end of the course students will be able to:***
1. Study various numerical methods to solve Algebraic and Transcendental equations. **2. Understand** the methods to solve algebraic equations. **3. Understand** the numerical methods in interpolation and extrapolation. **4. Understand** numerical solutions of ordinary differential equations. ***5.*** **Understand** various numerical methods for evaluation of definite and double integrals.	***1.*** **Apply** numerical methods to solve Algebraic and Transcendental equations which cannot be solved by traditional algebraic methods ***2.*** **Solve** simultaneous algebraic equations using direct and iteration methods. ***3.*** **Use** various numerical methods in interpolation and extrapolation. ***4.*** **Find** numerical solutions of ordinary differential equations. ***5.*** **Apply** various numerical methods for evaluation of definite and double integrals.

Unit – I: (8 Hours)
Solution of Algebraic and Transcendental equations:
Errors in computation-Types of errors- Useful rules for estimating errors- Intermediate value property of equations-Solution of Algebraic and Transcendental equations: Bisection method, Newton-Raphson method Regula-Falsi method.

Unit – II: (8 Hours)
Solution of linear system of equations:
Direct methods- Gauss elimination method- Factorization method- Iterative methods: Jacobi's Iteration method- Gauss - Seidel Iteration method-Ill-conditioned system of equations.

Unit – III: (8 Hours)
Numerical differences
Introduction to finite differences -Central differences interpolation-Gauss's forwards and backward difference formulae-Stiriling's formula- Bessel's formula.

Unit – IV: (8 Hours)
Numerical Integration
Inroduction to Numerical Integration - Boole's Rule – Weddle's Rule – Evaluation of Double Integrals using Numerical Methods – Trapezoidal Rule - Simpson's Rule.

Unit – V: (8 Hours)
Numerical Solutions of Ordinary Differential Equations
Numerical Solutions of Ordinary Differential Equations: Euler's Method - Modified Euler's Method – Predictor–Corrector methods- Milne's method –Adam's Bashforth method.

Text Books:
1. Numerical methods in engineering and science by B.S.Grewal, Khanna publishers
2. Advanced Engineering Mathematics by R.K.Jain & S.R.K.Iyengar, Narosa publishing house.

Reference Books:
1. Numerical Analysis by S.S.Sastry, PHI Ltd.