

with effect from: 2022-23

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

Accredited by NAAC with A++ Grade
9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF MATHEMATICS

NUMERICAL METHODS

(Open Elective)

For B.E., IV - Semester – CBCS

(for CSE, CSE-AIML & IT only)

Instruction : 3 Hours per week	Sem. End Exam Marks : 60	Subject Reference Code : U22OE410MA
Credits : 3	Sessional Marks : 40	Duration of Semester End Exam : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
<i>The course will enable the students to:</i>	<i>At the end of the course students will be able to:</i>
<ol style="list-style-type: none">1. Study various numerical methods to solve Algebraic and Transcendental equations.2. Understand the methods to solve linear system of equations.3. Understand the numerical methods in interpolation and extrapolation.4. Understand the numerical methods in interpolation using central differences.5. Understand numerical methods in solving ordinary differential equations.	<ol style="list-style-type: none">1. Apply numerical methods to solve Algebraic and Transcendental equations which cannot be solved by traditional algebraic methods2. Solve linear system of equations using direct and iteration methods.3. Use various numerical methods in interpolation and extrapolation.4. Use various numerical methods in interpolation using central differences.5. Find numerical solutions of ordinary differential equations.

Unit – I: (8 Hours)

Solution of Algebraic and Transcendental equations:

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-I

Introduction to finite differences - Interpolation- Newton's Forward and Backward Interpolation Formulae - Interpolation with unequal intervals - Lagrange's Interpolation Formula - Divided differences - Newton's divided difference formula.

Unit – IV: (8 Hours)

Numerical differences-II

Central differences interpolation - Gauss's forwards and backward difference formulae - Stirling's formula - Bessel's formula.

Unit – V: (8 Hours)

Numerical Solutions of Ordinary Differential Equations

Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method - Euler's Method - Modified Euler's Method – Runge-Kutta of 4th order (without proofs).

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.

Online Resources :

- 1 <http://mathworld.wolfram.com/topics>
- 2 <http://www.nptel.ac.in/course.php>

The break-up of CIE : Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:	90 Minutes			

TS a 4/01/24
HDD marks