## SKILL BASED SUBJECT -III NUMERICAL METHODS

| Semester | Subject <br> Code | Category | Lecture |  | Theory | Practical | Credit |  |
| :---: | :--- | :--- | :--- | :---: | :---: | :---: | :---: | :---: |
| V |  | Skill <br> based <br> subject- <br> III |  | Hrs/Week | Hrs/Sem | Hrs/week | Hrs/Sem | 0 |$⿻$| 2 |
| :---: |

## COURSE OBJECTIVES:

The students will be able to

- Understand the basic methods for forming difference table and learn the essence of interpolation techniques
- Solve algebraic equations, system of linear equations and to find numerical differentiation, numerical integration and numerical solution of ordinary differential equations.


## COURSE OUTCOMES:

On the successful completion of the course, the students will be able to

| CO <br> Number | CO Statement | Knowledge <br> Level <br> (K1-K4) |
| :---: | :--- | :---: |
| $\mathbf{C O 1}$ | Find the solution of algebraic and transcendental equation using <br> different methods | K 2 |
| $\mathbf{C O 2}$ | Understand and apply the concepts of finite differences | K 3 |
| $\mathbf{C O 3}$ | Calculate numerical differentiation and integration | K 3 |
| $\mathbf{C O 4}$ | Evaluate the problems on linear systems | K 3 |
| $\mathbf{C O 5}$ | Acquire the knowledge of numerical Solution of ordinary <br> differential equations | K 3 |

Knowledge Level: K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze.

## MAPPING WITH PROGRAMME OUTCOMES:

| Cos | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| CO1 | S | M | M | S | S | M |
| CO2 | S | M | S | S | S | S |
| CO3 | S | M | M | M | S | M |
| C04 | S | M | S | S | M | S |
| C05 | S | M | S | S | M | M |

[^0]UNIT I: SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATION
Solution of Algebraic and Transcendental equation - Iteration Method, Method of False position, Newton Raphson Method - Simple Problems.
(Section SE. 4 - SE.36)

## UNIT II: FINITE DIFFERENCES

6 Hours
Finite differences-Forward differences, Backward difference, Newton's formula for interpolation.
Lagrange's interpolation formula - Simple Problems.
(Section IA - IA.4, IA. 31 to IA.34)

## UNIT III- NUMERICAL DIFFERENTIATION AND INTEGRATION

6 Hours
Numerical differentiation and integration - Numerical differentiation- Errors in Numerical DifferentiationDifferentiation Formulae with function values, Numerical integration - Trapezoidal Rule and Simpson's Rule - Simple Problems.
(Section D1.1- D1.6, D1.20-D1.24)

UNIT IV - SOLUTION OF LINEAR SYSTEMS
6 Hours
Solution of linear Systems - Direct Methods -Gaussian Elimination method, Gauss Jordan method - Simple Problems.
(Section SE. 42-SE.44)

## UNIT V- NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS 6 Hours

Numerical Solution of ordinary differential equations - Solution by Taylor Series, Picard's method of Successive approximations, Euler method, Runge- Kutta method (Only D.E. of II Order) - Simple Problems. (Section OD.1- OD.22, OD.31, OD: 45-61)

TEXT BOOK

| S.NO | AUTHORS | TITLE | PUBLISHERS | YEAR OF <br> PUBLICATION |
| :--- | :--- | :--- | :--- | :--- |
| 1. | S.Kalavathy <br> and M.Joice <br> Punitha | Numerical Methods | Vijay Nicole <br> Imprints Private <br> Limited, Chennai | 2010 |

## REFERENCE BOOKS

| S.NO | AUTHORS | TITLE | PUBLISHERS | YEAR OF <br> PUBLICATION |
| :--- | :--- | :--- | :--- | :---: |
| 1 | M.K Jain, S.R.K <br> Iyengar, and R.K <br> Jain | Numerical Methods for <br> Scientific and <br> Engineering <br> Computation | New age <br> International <br> Publisher, India | 2012 |
| 2. | E. Balagurusamy | Numerical Methods | Tata McGraw <br> Hill Publishing <br> Company, New <br> Delhi | 2004 |
| 3. | P.Kandasamy, <br> K.Thilagavathi, <br> K.Gunavathi | Numerical Methods |  <br> Company Ltd, <br> New Delhi | 1997 |
| 4. | A.Singaravelu | Numerical Methods | Meenakshi <br> Publications, <br> Chennai | 2002 |

## WEB RESOURCES

1. http://nptel.ac.in/courses/122102009/,
2. http://www.math.ust.hk/~machas/numerical-methods.pdf

## TEACHING METHODOLOGY

1. Class room Teaching
2. Assignments
3. Seminars
4. Discussions
5. PPT Presentations

[^0]:    S- Strong: M- Medium: L- Low

