NUMERICAL ANALYSIS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
III	21CPMA3E	Elective Paper III	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	3
			6	90	6	90		

COURSE OBJECTIVES:

The students will be able to

- Solve the non-linear equations, interpolation, differentiation and integration using Numerical Methods.
- Improve their skills and the scientific computation techniques in numerical methods

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Apply the numerical methods (such as Bisection, Regula falsi method, Newton-Raphson) to solve the nonlinear equations.	K3
CO2	Solve problems using Gauss Seidal, Relaxation and iterative methods in system of linear equations	K3
CO3	Apply the knowledge of interpolation in analyzing the data	K3
CO4	Apply the concepts of numerical differentiation and numerical integration, errors and accuracy of data and functions	K3
CO5	Construct the numerical method to solve an ordinary differential equations.	K3

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

MAPPING WITH PROGRAMME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	M	S	S	S	M
CO2	M	S	S	M	S	S
CO3	S	S	S	M	S	M
CO4	S	M	S	M	M	S
CO5	S	S	S	S	M	S

S- Strong: M- Medium: L- Low

UNIT - I: FINITE DIGIT ARITHMETIC AND ERRORS **18 Hours**

Floating point arithmetic- Propagated error, Generated Error - Error in Evaluation of a function f(x).

Chapter 1: 1.1 to 1.4

Non linear equation: Bisection method - Secant method - Regular -falsie method - Newton's method - Muller's method - Fixed point method - Newton's method for multiple roots.

Chapter 2: 2.1 to 2.7

UNIT – II: SYSTEM OF LINEAR EQUATIONS **18 Hours**

Gauss - elimination method - Gauss Jordan method - Evaluation of determinant algorithm of gauss - Elimination - Crout's method - Inverse of matrix- Condition numbers and errors - Iterative methods - Gauss - Siedal method - Relaxation method.

Chapter 3: 3.1 to 3.5, 3.6.

UNIT - III: INTERPOLATION **18 Hours**

Lagrangian interpolating polynomial - Error in Lagrangian interpolation - Newton's form of interpolating polynomial - Newton's divided differences - Newton's divided difference form of polynomial - Error in Newton's divided difference form - Divided differences for repeated abscissa - Newton's forward form and Newton's backward form interpolation with repeated abscissa- Hermits interpolating polynomial - Oscillatory interpolating polynomial.

Chapter 4: 4.1 to 4.4

UNIT - IV: NUMERICAL DIFFERENTIATION AND INTEGRATION **18 Hours**

Numerical differentiation - Numerical integration - Newton - cotes formulas method of undetermined parameters - Gaussian quadratures -double integral.

Chapter 5: 5.1 to 5.5 and 5.7 [omit 5.6]

UNIT - V: ORDINARY DIFFERENTIAL EQUATIONS **18 Hours**

Difference equation - Differential equations: Single step methods- Global error in Euler's method and its convergence - Runge -Kutta method- Multistep methods- system of differential equations.

Chapter6: 6.1 to 6.5

DISTRIBUTION OF MARKS: THEORY 20% AND PROBLEMS 80%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Devi Prasad.	An Introduction to Numerical Analysis House (3rd edition)	Narora Publishing House, New Delhi.	2003

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Conte and de Boor	Numerical Analysis	McGraw Hill, New York	1990
2.	John H. Mathews,	Numerical methods for Mathematical Science and engineering [2nd Edition]	Prentice Hall, New Delhi	2000

WEB RESOURCES

1.https://fac.ksu.edu.sa/sites/default/files/numerical_analysis_9th.pdf

2. http://www.ikiu.ac.ir/public-files/profiles/items/090ad_1410599906.pdf

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5 .PPT Presentations

SYLLABUS DESIGNERS

Ms. C.Revathi, Assistant Professor of Mathematics.