## **RECOMMENDED BOOK(S)**

Lab Manual

## **COURSE OBJECTIVES**

To provide understanding of main sources of numerical errors and the power of numerical methods that minimize these errors

To understand the implementation of numerical methods to the solution of engineering problems

S. No.	CLO/PLOS MAPPING	DOMAIN	PLO
1	Manipulate MATLAB from numerical analysis perspective	Р3	02
2	Make MATLAB algorithms for various numerical analysis techniques.	P4	02
3	<b>Design</b> MATAB algorithm for given engineering/sciences problems.	C5	03
COURSE CONTENTS			

Introduction, basic ideas, concepts and terminology, , essential elements of numerical analysis, continuum formulation, solution domain, discretization, solution algorithm, polynomials and finite differences, round-off and solution errors, introduction to Least-square, Min-max, cubic splines, and piece-wise osculating polynomials, collocation polynomials and finite differences, round-off and solution errors, introduction to Least-square, Min-max, cubic splines osculating polynomials, collocation polynomials and finite differences, round-off and solution errors, introduction to Least-square, Min-max, cubic splines, and piece-wise osculating polynomials, collocation polynomials with advantages and disadvantages, Newton forms of linear interpolation and quadratic interpolation polynomials, Progression of forward, backward and central differences in tabular form, and construction of polynomials, operator algebra, solution of equation with one, two and three variables, III-conditioning of equations set, direct methods of solution, Eign-value problems, characteristics polynomial and the stability criterion, solution of first order ordinary differential equations, initial value and boundary value problems, Euler predictor method and Euler predictor cum corrector method of solving and ordinary differential equation, one-step solution methods second order Runge-Kutta method.

## Lab Outline:

According to course outline