MATH-II LINEAR ALGEBRA AND ORDINARY DIFFERENTIAL EQUATIONS(GS-104)

Pre-requisite: None Credit Hours: 03 Contact Hours: 48

RECOMMENDED BOOK(S)

Linear Algebra and Its Applications by David C. Lay, 4th Edition Differential equation with modeling applications by D. G. Zill, 9th Ed.

REFERENCE BOOK(S)

Advanced Engineering Mathematics, By Erwin Kreyszig, 8th Edition Elementary Linear Algebra with Applications, H. Antone, Chris Rorres

COURSE OBJECTIVES

An ability to define linear equation and identify system of linear equations and non-linear equations, describe linear transformation and matrix of linear transformation, classification eigen value and eigen vectors problems

| S. No. | CLO/PLOS MAPPING | DOMAIN | PLO |
|--------|---|--------|-----|
| 1 | Student will develop the capability to classify and apply basic rules to solve various types of linear upto second order ordinary differential equations. | C3 | 01 |
| 2 | Apply the knowledge of linear algebra to model and solve linear systems that appear in engineering sciences. | C3 | 01 |
| 3 | Capability to develop, solve and analyze mathematical model for a given physical problem of practical engineering interest. | C3, C4 | 02 |

COURSE CONTENTS

Basic Concept Linear Algebra System of Linear Equations and Matrices Introduction to System of Linear Equations Matrix Form of a System of Linear Equations Gaussian Elimination Method

Gauss-Jordan Method Consistent and Inconsistent Systems Homogeneous System of Equations Matrix Algebra Definitions An Algorithm for finding the Inverse of a matrix Characterization of Invertible Matrices LU Factorization **Applications of Linear Systems Traffic Flow Problems Electric Circuit Problems Economic Models** Linear Transformations Introduction Matrix Transformations Domain and Range of Linear Transformations Geometric Interpretation of Linear Transformations Matrix of Linear Transformations **Eigenvalues and Eigenvectors** Definition of Eigenvalues and Eigenvectors Properties of Eigenvalues Diagonalization **Applications of Eigenvalues** Introduction and classification of Differential Equations of ODE's Separable Differential Equation (DE) Homogenous DE Exact and non-exact DE Linear DE Nonlinear DE's Berneullies's DE's Higher order DE's Homogenous DE's Non homogenous DE's Cauchy Euler's DE's Operator Methods to solve non homogenous DE's Applications of Higher order DE's