

ENGINEERING MATHEMATICS – II

Lectures : 4 periods / week
Tutorials : 1 period / week
Semester End Exam : 3 hrs

Sessional Marks : 40
Semester End Exam Marks : 60
Credits : 4

Course Objectives:

- To apply rank concept of matrices in solving linear system of equations, finding the eigen values and eigen vectors and inverse of a matrix and getting familiarity with diagonalization and quadratic forms
- To get knowledge of mean value theorems, writing series expansion of functions and finding extreme values or stationary values of functions of two (or) three variables.
- To provide sufficient theoretical and analytical background of differentiation and integration of vector functions.
- To make the student to learn Laplace and inverse transforms of a function and able to solve differential equation using Laplace transforms.

Course Outcomes:

- Understand the basic linear algebraic concepts.
- Assess the importance of derivative in mean value theorems and extreme values.
- Able to solve gradient, divergence, curl and integration of vector function problems.
- Obtain the solution of differential equation using Laplace transform.
- Ability of applying mathematical concepts in relevant engineering applications.

UNIT – I

Matrices:

Rank of a matrix, vectors, Consistency of linear system of equations, Linear transformations, Characteristic equation, Properties of Eigen values (without proofs), Cayley-Hamilton theorem (without proof), Reduction to diagonal form.

UNIT- II

Reduction of quadratic form to canonical form,

Nature of a quadratic form, Complex matrices.

Differential Calculus:

Rolle's Theorem (without proof), Lagrange's Mean value Theorem (without proof), Taylor's and Maclaurin's Series for single variable (without proof). Maxima and minima of two variables, Lagrange's method of undetermined multipliers.

UNIT-III

Vector Calculus:

Scalar and vector point functions, Del applied to scalar point functions, Gradient, Del applied to vector point functions, Physical interpretation of divergence and curl, Del applied twice to point functions, Del applied to products of point functions. Integration of vectors, Line integral, Surface integral, Green's theorem in the plane (without proof), Stoke's theorem (without proof), Volume integral, Gauss divergence theorem (without proof).

UNIT-IV

Laplace Transforms:

Introduction, Transforms of elementary functions, properties of Laplace Transforms, Existence conditions, Transforms of derivatives, Transforms of integrals, multiplication by t^n , division by t . Evaluation of integrals by Laplace Transforms, Periodic function, Inverse Transforms, Convolution theorem(without proof), Application to Differential equations with constant coefficients.

TEXT BOOK:

Higher Engineering Mathematics by B.S. Grewal, Khanna publishers, 40th edition, 2007.

REFERENCE BOOK:

Advanced Engineering Mathematics by Kreyszig, 8th edition, 2007.