

MTH165:MATHEMATICS FOR ENGINEERS

L:3 T:1 P:0 Credits:4

Course Outcomes: Through this course students should be able to

CO1 :: apply matrix methods to determine rank, inverse, eigenvalues, eigenvectors, and solve systems of linear equations.

CO2 :: apply differential calculus techniques to evaluate derivatives, solve optimization problems, determine limits using L'Hospital's rule, and construct Taylor and Maclaurin series expansions.

CO3 :: apply integration techniques, including substitution, integration by parts, partial fractions, and properties of definite integrals, to solve mathematical problems.

CO4 :: apply partial differentiation, chain rule, Euler's theorem, and Lagrange multipliers to solve multivariable optimization problems.

CO5 :: apply double and triple integration techniques to evaluate area, volume, and related engineering problems.

CO6 :: understand the concepts of Fourier series and determine Fourier expansions of periodic functions over full and half-range intervals.

Unit I

Matrix methods and linear systems : review of matrices, elementary operations of matrices, rank of a matrix, linear dependence and independence of vectors, solution of linear system of equations, inverse of matrices, eigen values and eigen vectors, properties of eigen values, Cayley-Hamilton theorem

Unit II

Differential calculus and its applications : derivatives of standard functions and general rules of differentiation, derivatives of parametric forms, derivatives of implicit functions, logarithmic differentiation, higher order derivatives of simple functions, Rolle's theorem, mean value theorems, Taylor's theorems and Maclaurin theorems, indeterminate forms, L' Hospital's rule, maxima and minima

Unit III

Fundamentals of integral calculus : general rules of integration, integration by substitution, integration by parts, integration by partial fraction, properties of definite integrals

Unit IV

Multivariate differentiation : limits and continuity, partial derivatives and total derivative, chain rule, Euler's theorem for homogeneous functions, maxima and minima for a function of two variables, Lagrange method of multiplier

Unit V

Multivariable integration and applications : double integrals, change of order of integration, triple integrals, change of variables, application of double integrals to calculate area and volume, application of triple integrals to calculate volume

Unit VI

Introduction to Fourier series : introduction and Euler's formulae, conditions for a Fourier expansion and functions having points of discontinuity, change of interval, even and odd functions, half range series

Text Books:

1. ADVANCED ENGINEERING MATHEMATICS by R.K.JAIN, S.R.K. IYENGER, NAROSA PUBLISHING HOUSE

References:

1. HIGHER ENGINEERING MATHEMATICS by B.S. GREWAL, KHANNA PUBLISHERS
2. MATHEMATICS TEXT BOOK FOR CLASS XII PART I by -, NCERT
3. MATHEMATICS TEXT BOOK FOR CLASS XII PART II by -, NCERT

