# MTH174:ENGINEERING MATHEMATICS

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

**Course Outcomes:** Through this course students should be able to

CO1 :: recall the concepts of matrices and its application to solve the system of linear equations.

CO2 :: understand the use of different methods for the solution of linear differential equations.

CO3 :: use the concept of Fourier series for learning advanced Engineering Mathematics.

CO4 :: apply the concept of multi-variable differential calculus for solving the problems in the field of sciences and engineering.

CO5 :: analyze the surface and volume integral using various concepts of multi-variable integral calculus.

**Unit I**

**Matrix Algebra** : elementary operations and their use in getting the rank, inverse of a matrix and solution of linear simultaneous equations, eigen-values and eigenvectors of a matrix, Cayley-Hamilton theorem

**Unit II**

**Linear differential equation-I** : introduction to linear differential equation, solution of linear differential equation, linear dependence and linear independence of solution, method of solution of linear differential equation- differential operator, solution of second order homogeneous linear differential equation with constant coefficient, solution of higher order homogeneous linear differential equations with constant coefficient

**Unit III**

**Linear differential equation-II** : solution of non-homogeneous linear differential equations with constant coefficients using operator method, method of variation of parameters, method of undetermined coefficient, solution of Euler-Cauchy equation

**Unit IV**

**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

**Unit V**

**Multivariate Calculus** : limit, continuity and differentiability of functions of two variables, chain rule, change of variables, Euler’s theorem for homogeneous equations, Jacobians, extrema of functions of two variables, Lagrange’s method of undetermined multipliers

**Unit VI**

**Integral Calculus** : double integrals, change of order of integration, change of variables, application of double integrals to calculate area and volume, triple integrals, application of triple integrals to calculate volume

**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