## MA 102 Mathematics - II (3-1-0-8)

Vector functions of one variable – continuity and differentiability; functions of several variables – continuity, partial derivatives, directional derivatives, gradient, differentiability, chain rule; tangent planes and normals, maxima and minima, Lagrange multiplier method; repeated and multiple integrals with applications to volume, surface area, moments of inertia, change of variables; vector fields, line and surface integrals; Green's, Gauss' and Stokes' theorems and their applications. First order differential equations – exact differential equations, integrating factors, Bernoulli equations, existence and uniqueness theorem, applications; higher-order linear differential equations – solutions of homogeneous and nonhomogeneous equations, method of variation of parameters, operator method; series solutions of linear differential equations, Legendre equation and Legendre polynomials, Bessel equation and Bessel functions of first and second kinds; systems of first-order equations, phase plane, critical points, stability.

*Texts:*


[1] G. B. Thomas (Jr.) and R. L. Finney, Calculus and Analytic Geometry, 9th Ed., Pearson Education India, 1996.

[2] S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.


*References:*


[1] T. M. Apostol, Calculus - Vol.2, 2nd Ed., Wiley India, 2003.

[2] W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Ed., Wiley India, 2009.

[3] E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.

[4] E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.