

Mathematics II

Course Objectives:

- 1.To develop the skill of solving differential equations and to provide knowledge of vector algebra and calculus
- 2.To make students familiar with calculus of several variables and infinite series

1.Calculus of Two or more variables(6 hours)

- a.Introduction: Limit and Continuity
- b.Partial Derivatives
 - i.Homogeneous function, Euler's theorem for the function of two and three variables
 - ii.Total Derivatives
- c.Extrema of functions of two and three variables: Lagrange's Multiplier

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2.Multiple Integrals(6 hours)

- a.Introduction
- b.Double Integrals in Cartesian and Polar form: Change of order of integration
- c.Triple Integrals in Cartesian, Cylindrical and Spherical coordinates
- d.Area and Volume by Double and Triple Integrals

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3.Three Dimensional Solid Geometry(11 hours)

- a.The Straight Line; Symmetric and General form
- b.Coplanar Lines
- c.Shortest Distance
- d.Sphere
- e.Plane Section of a Sphere by Planes
- f.Tangent Planes and Lines to the Spheres
- g.Right Circular Cone
- h.Right Circular Cylinder

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4.Solution of Differential Equations in Series and Special Functions(9 hours)

- a.Solution of Differential Equation by Power Series Method
- b.Legendre's Equation
- c.Legendre's Polynomial function: Properties and Applications.
- d.Bessel's Equation
- e.Bessel's Function of First and Second kind: Properties and Applications

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5.Vector Algebra and Calculus(8 hours)

- a.Introduction
- b.Two and Three dimensional vectors
- c.Scalar Products and Vector Products
- d.Reciprocal System of Vectors
- e.Application of Vectors: Lines and Planes
 - f.Scalar and Vector fields
- g.Derivatives– Velocity and Acceleration
- h.Directional Derivatives

6. Infinite Series(5 hours)

- a.Introduction
- b.Series with Positives terms
- c.Convergence and Divergence
- d.Alternating series: Absolute convergence
- e.Radius and Interval of Convergence

References:

- 1.Erwin Kreyszig, "Advanced Engineering Mathematics" , John Wiley and Sons Inc
- 2.Thomas, Finney, "Calculus and Analytical Geometry" Addison- Wesley
- 3.M. B. Singh, B. C. Bajrachrya,"Differential Calculus", Sukunda Pustak Bhandar,Nepal
- 4.M. B. Singh, B. C. Bajrachrya, "A text book of Vectors", Sukunda Pustak Bhandar,Nepal
- 5.M. B. Singh, S. P. Shrestha, "Applied Mathematics"
- 6.G.D. Pant, G. S. Shrestha, "Integral Calculus and Differential Equations", Sunila Prakashan,Nepal
- 7.Y. R. Sthapit, B. C. Bajrachrya, "A text book of Three Dimensional Geometry", Sukunda Pustak Bhandar,Nepal
- 8.Santosh Man Maskey,"Calculus", Ratna Pustak Bhandar, Nepal