

2.3 Differentiable function, Differentials

2.4 Chain Rule, Homogeneous Functions, Euler's theorem

Unit-3 Extreme Values

[08 lectures]

3.1 Extreme values of functions of two variables.

3.2 Necessary conditions for extreme values.

3.3 Second Derivative Test (without proof).

3.4 Lagrange Multipliers (with one constraints)

Unit-4 Multiple Integrals

[12 lectures]

4.1 Iterated Integrals, Fubini's Theorem (Statement only)

4.2 Double integral over general regions, Change of order of integration for two variables.

4.3 Double integral in Polar coordinates.

4.4 Triple integrals , Evaluation of triple integrals. Triple integrals in spherical coordinates

4.5 Jacobians , Change of variables in multiple integrals .(Results without proofs)

Text book: Multivariable Calculus 7th Edition By James Stewart, Brooks/Cole, Cengage Learning, 2012, 2008.

Unit 1:- Chapter 14: Sec- 14.1, 14.2

Unit 2:- Chapter 14: Sec- 14.3(except the Cobb-Douglas production function), 4.4 (except Tangent Planes and Linear Approximations), Sec-14.5

Unit 3:- Chapter 14: Sec 14.7, 14.8 (except two constraints)

Unit 4:- Chapter 15: Sec 15.2, 15.3, 15.4, 15.7 (without Riemann sum and Application), 15.9, 15.10

Reference Books:

1. Basic Multivariable Calculus, J. E. Marsden, A. J. Tromba , A. Weinstein, Springer Verlag (Indian Edition).
2. Shanti Narayan, R.K. Mittal, A Text-book of Vector Calculus, S.Chand and Company.
3. D.V. Widder, Advanced Calculus (2nd Edition), Prentice Hall of India ,NewDelhi,(1944).
4. T.M. Apostol , Calculus Vol. II (2nd Edition), John Wiley, New York, (1967).

MT-232(A): Numerical Methods and It's Applications

Unit1: Solution of Algebraic and Transcendental Equations

[10 Lectures]

1.1 Errors and their computations

1.2 Bisection method.

1.3 The method of False position

1.4 Newton- Raphson method

Unit 2: Interpolation

[12 Lectures]

2.1 Finite Difference Operators and their relations (Forward, Backward difference and Shift operator).

2.2 Differences of a polynomial

2.3 Newton's Interpolation Formulae (Forward and Backward)

2.4 Lagrange's Interpolation Formula

Unit 3: Numerical Differentiation and Integration [06 Lectures]

3.1 Numerical Differentiation (Derivatives using Newton's forward difference formula)

3.2 Numerical Integration, General quadrature formula.

3.3 Trapezoidal rule.

3.4 Simpsons's 1/3rd rule.

3.5 Simpsons's 3/8th rule.

Unit 4: Numerical solution of first order ordinary differential equations [08 Lectures]

4.1 Taylor's Series method

4.2 Picard's method of successive approximations

4.3 Euler's method.

4.4 Modified Euler's methods.

4.5 Runge - Kutta Methods.

Text book:

1. S.S. Sastry, Introductory Methods of Numerical Analysis, 5th edition, Prentice Hall of India.

Unit 1: Chapter 1: section 1.3, Chapter 2: section 2.2, 2.3, 2.5

Unit 2: Chapter 3: section 3.3, 3.5, 3.6, 3.9(3.9.1 only)

Unit 3: Chapter 4: section 6.2 (excluding 6.2.1 to 6.2.3), 6.4

Unit 4: Chapter 5: section 8.2, 8.3, 8.4 (excluding 8.4.1).

Reference Books:

1. C.F. Gerald and O.P. Wheatley, Applied Numerical Analysis, Addison Wesley;

7thedition (2003).

2. K.E. Atkinson; An Introduction to Numerical Analysis, Wiley Publications.

3. T. Sauer, Numerical analysis, 3rd edition, Pearson.

4. M. K. Jain, SRK Iyengar and R.K. Jain, Numerical Methods For Scientific & Engg 5e,

New Age International (P) Ltd (2008).

MT-232(B) : Graph Theory

Unit 1. Introduction

[04 Lectures]

1.1 What is a Graph?

1.2 Application of Graphs

1.3 Finite and Infinite Graphs

1.4 Incidence and Degree

1.5 Isolated Vertex, Pendant Vertex and Null Graph

Unit 2. Paths and Circuits

[12 Lectures]