CC II - REAL ANALYSIS

UNIT I

Basic Topology: Finite, Countable and Uncountable Sets – Metric spaces – Compact sets – Perfect sets – Connected sets.

Numerical Sequences and Series: Sequences – Convergence – Subsequences - Cauchy Sequences – Upper and Lower Limits - Some Special Sequences – Tests of convergence – Power series – Absolute convergence – Addition and multiplication of series – Rearrangements.

UNIT II

Continuity: Limits of functions – Continuous functions – continuity and Compactness – Continuity and connectedness – Discontinuities – Monotonic functions – Infinite limits and limits at infinity. Differentiation: Derivative of a real function – Mean value Theorems - Intermediate value theorem for derivatives – L'Hospital Rule – Taylor's Theorem – Differentiation of vector valued functions.

UNIT III

Riemann – Stieltjes Integral: Definition and Existence – Properties – Integration and Differentiation – Integration of vector valued functions.

UNIT IV

Sequences and series of functions: Uniform Convergence and Continuity – Uniform Convergence and Differentiation – Equicontinuous families of functions – The Stone – Weierstrass Theorem.

UNIT V

Functions of several variables: Linear Transformations - Differentiation – The Contraction Principle – The Inverse Function Theorem - The Implicit Function Theorem.

TEXT BOOK(S)

[1]   Walter Rudin, Principles of Mathematical Analysis Third Edition, Mcgraw Hill, 1976.
  UNIT – I   - Chapters 2 and 3
  UNIT – II   - Chapters 4 and 5
  UNIT – III   - Chapter 6
  UNIT – IV   - Chapter 7
  UNIT – V   - Chapter 9 Sections 9.1 to 9.29

REFERENCE(S)

[1]   Tom P. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
[2]   A.J. White, Real Analysis : An Introduction, Addison Wesley Publishing Co., Inc. 1968.
[3]   Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1969.