Subject Code : RNENS2

PAPER II - REAL ANALYSIS

Unit I

Basic topology: Finite, Countable 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 series.

Unit II

Continuity: Limits of functions – Continuous Functions - Continuity and Compactness – Continuity and connectedness – discontinuities – Monotonic functions- Infinite limits and Limit at infinity.
Differentiation: Derivative of real functions – mean value theorems – intermediate value theorems for derivatives – L' hospital rule – Taylor's Theorem – differentiation of vector – valued functions.

Unit III

Riemann – Stieltjes integrals: definition and existence – properties – integration and differentiations – Integration of vector valued functions.

Unit IV

Sequence and Series of functions – Discussions of main problem – uniform convergence – Uniform convergence and continuity – Uniform convergence and integration – Uniform convergence and different ion – equi continuous – family of functions – Stone – Weierstrass theorem.

Unit V

The Lebesgue theory – set functions. Construction of Lebesgue measure – measure spaces – measurable functions – simple functions – integration – comparisons with the Riemann integral – integration of Complex function – function of class L_2.

Text Books:

1. Walter Rudin, "Principles of Mathematical Analysis", Third edition, Mc-Graw Hill, 1976
   Unit I: Chapter 2 and 3
   Unit II: Chapter 4 and 5
   Unit III: Chapter 6
   Unit IV: Chapter 7
   Unit V: Chapter 11

Books for Reference:

1. T.M. Apostol, "Mathematical Analysis", Second edition, Addison Wesley publication, Tokyo 1981.
2. V.Ganapathy Iyer, "Introduction to Real Analysis", PHI.