**II B Sc MATHEMATICS**

**THIRD SEMESTER**

**PAPER-IV- REAL ANALYSIS**

**60 Hrs**

**UNIT I (12 hrs)-REAL NUMBERS :**

The algebraic and order properties of R, Absolute value and Real line, Completeness property of R, Applications of supreme property; intervals.

**Real Sequences:** Sequences and their limits, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence.The Cauchy’s criterion, properly divergent sequences, Monotone sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences and the Bolzano-Weierstrass theorem – Cauchy Sequences – Cauchy’s general principle of convergence theorem.

**UNIT II (12 hrs )INFINITIE SERIES :**Introduction to series, convergence of series. Cauchy’s general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms.

1. P-test 2. Cauchy’s nth root test or Root Test.

3. D-Alembert’s Test or Ratio Test. 4. Alternating Series – Leibnitz Test.

Absolute convergence and conditional convergence.

**UNIT III (12 hrs) - CONTINUITY :**

**Limits :** Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits. Limits at infinity.

**Continuous functions:** Continuous functions, Combinations of continuous functions, Continuous Functions on intervals, uniform continuity.

**UNIT IV (12 hrs) -DIFFERENTIATION AND MEAN VALUE THEORMS :**

The derivability of a function on an interval, at a point- Derivability and continuity of a function- Graphical meaning of the Derivative- Mean value Theorems; Role’s Theorem, Lagrange’s Theorem, Cauchy’s Mean value Theorem

**UNIT V (12 hrs) - RIEMANN INTEGRATION**

Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for R – integrability, Properties of integrable functions, Fundamental theorem of integral calculus, integral as the limit of a sum, Mean value Theorems.

**Reference Books :**

1. Real Analysis by Rabert & Bartely and .D.R. Sherbart, Published by John Wiley.

2.A Text Book of B.Sc Mathematics by B.V.S.S. Sarma and others, Published by S. Chand & Company     Pvt. Ltd., New Delhi.

3.Elements of Real Analysis as per UGC Syllabus by Shanthi Narayan and Dr. M.D. Raisinghania     Published by S. Chand & Company Pvt. Ltd., New Delhi.

**Suggested Activities**:

Seminar/ Quiz/ Assignments/ Project on Real Analysis and its applications