B.Sc. SECOND YEAR MATHEMATICS SYLLABUS

**SEMESTER – IV, PAPER- 4**

**REAL ANALYSIS**

***UNIT – I : REAL NUMBERS :***

The algebraic and order properties of R, Absolute value and Real line, Completeness property of R, Applications of supreme property; intervals. No. Question is to be set from this portion.

***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 – Cauchey’s general principle of convergence theorem.

***UNIT –II : INFINITIE SERIES :***

***Series :*** Introduction to series, convergence of series. Cauchey’s general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms.

1. P-test

2. Cauchey’s nth root test or Root Test.

3. D’-Alemberts’ Test or Ratio Test.

4. Alternating Series – Leibnitz Test.

Absolute convergence and conditional convergence, semi convergence.

***UNIT – III : CONTINUITY :***

***Limits :*** Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits. Limits at infinity. No. Question is to be set from this portion.

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

***UNIT – IV : 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 : 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.

**Outcomes:**

* They have a complete knowledge on Series, Sequences and Limits.
* Able to evaluate limits Analytically.
* They go through different theorems such as Mean Value Theorems, Rolle’s Theorem, Cauchy’s Mean Value Theorem etc.,
* These are useful in their P.G, NET & SET also.