

## Syllabus for B.A/B.Sc., Mathematics, Semester - III

**Course Name: Real Analysis (6 credits)**  
**Course No: BMM-CR-16301**

### Unit-I

Finite and infinite sets, examples of countable and uncountable sets, real line, bounded sets, suprema and infima, completeness property of  $\mathbb{R}$ , Archimedean property of  $\mathbb{R}$ , intervals, concept of cluster points and statement of Bolzano-Weierstrass theorem.

### Unit-II

Real sequence, bounded sequence, Cauchy convergence criterion of sequences, Cauchy's theorem on limits, nested intervals and squeeze theorem, monotone sequences and their convergence (monotone convergence theorem without proof).

### Unit-III

Infinite series, Cauchy convergence criterion for series, positive term series, geometric series, comparison test, convergence of p-series, Root test, alternating series, Leibniz's test, definition and examples of absolute, conditional and uniform convergence.

### Unit-IV

Sequences and series of functions, point wise and uniform convergence, Mn-test, M- test, statements of the results about uniform convergence and integrability and differentiability of functions, power series and radius of convergence.

### **Books recommended**

1. T.M.Apostol, *Calculus* (Vol I), John Wiley and Sons (Asia) P. Ltd., 2002.
2. R.G.Bartle and D.R. Sherbert, *Introduction to Real Analysis*, John Wiley and Sons (Asia) P. Ltd., 2000.
3. E. Fischer, *Intermediate Real Analysis*, Springer Verlag, 1983.
4. K.A.Ross, *Elementary Analysis – The Theory of Calculus Series*- Undergraduate Texts in Mathematics, Springer Verlag 2003.