PROGRAME NAME: **: B.Sc(H) Mathematics**
COURSE NAME : Real Aanalysis
SEMESTER DURATION: **January to May**

Week	**Topic(s)**	**Teaching Methodology Adopted/ Continous Internal Evaluation**
1	Algebraic and order properties of Absolute value of a real number	Lectures
2	Bounded above and bounded below sets, Supremum and infimum of a nonempty subset	Lectures
3	The completeness property, Archimedean property, Density of rational numbers	Discussion
4	Definition and types of intervals, Nested intervals property; Neighborhood of a point , Open and closed sets	Tutorials
5	Sequences and their limits	Presentation
6	Bounded sequence, Limit theorems.	Tutorials
7	Monotone sequences, Monotone convergence theorem and applications.	Assignments
8	Subsequences and statement of the Bolzano-Weierstrass theorem. Limit superior and limit inferior for bounded sequence of real numbers with illustrations only.	Self- Instruction
9	Cauchy sequences of real numbers and Cauchy's convergence criterion	Lectures
10	Convergence and divergence of infinite series, Sequence of partial sums of infinite series, Necessary condition for convergence, Cauchy criterion for convergence of series.	Examples
11	Tests for convergence of positive term series**:** Integral test statement and convergence of *p*-series,	Seminars/Videos

12	Basic comparison test, Limit comparison test with applications, D'Alembert's ratio test and Cauchy's *n*th root test.	Assignments
13	Alternating series, Leibniz test,	lectures
14	Absolute and conditional convergence	discussion

Course Objectives: The course will develop a deep and rigorous understanding of real line and of defining terms to prove the results about convergence and divergence of sequences and series of real numbers. These concepts have wide range of applications in real life scenario.

Course Learning Outcomes: This course will enable the students to:
i) Understand many properties of the real line and learn to define sequence in terms of functions from to a subset.
ii) Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence.
iii) Apply the ratio, root, alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.