SEMESTER- III

MJC-03: Real Analysis

Course Outcomes

After the completion of the course, the student will be able to:

CO1: Understand many properties of the real line and learn to define sequence in terms of functions.
CO2: Recognize bounded, convergent, divergent, Cauchy and monotonic sequences.
CO3: Apply tests for convergence and absolute convergence of an infinite series of real numbers.

MJC-03: Real Analysis (5 credits) Full Marks- 100		
Unit	**Topics to be covered**	**No. of Lectures**
1	Dedekind theory of real numbers, Algebraic and order properties of R, Archimedean Property, Density Theorem, Completeness property of R, Bounded sets, Theorems on Suprema and Infima.	10
2	Neighbourhood of a point in R, Open and closed sets, Limit points and isolated points of a set, Bolzano-Weierstrass theorem for a set, Derived set, Clouser and Interior of a set.	12
3	Sequence and its convergence, Bounded sequence, Monotone sequences, Subsequences, Limit of a sequence, Limit Theorem, Bolzano-Weierstrass theorem for sequences, Limit superior and limit inferior for bounded sequence, Cauchy sequence, Cauchy's general principle of convergence.	14
4	Infinite series and their convergence, Cauchy Criterion, Tests for convergence: Comparison test, D'Alembert Ratio Test, Cauchy's root test, Rabbe's test, Logarithmic test,D'Morgan and Bertrand's test, Cauchy integral test, Cauchy condensation test, Gauss's test, Alternating series, Leibnitz test, Absolute and Conditional convergence.	14
	TOTAL	50

Book References:

1. Bartle, Robert G., &Sherbert, Donald R. (2015). Introduction to Real Analysis (4th ed.). Wiley India Edition. New Delhi.
2. Ross, Kenneth A. (2013). Elementary Analysis: The theory of calculus (2nd ed.). Undergraduate Texts in Mathematics, Springer. Indian Reprint.
3. Malik, S. C. & Arora, Savita. (2021). Mathematical Analysis (6th ed.). New Age International Publishers, New Delhi
4. Jha,K.K. Advanced Course in Real Analysis and Higher Analysis. New Bharat Publishing House.