Programme: Diploma Class: B.Sc.	Year: II	Semester: IV
Subject: Mathematics		
Course Code:	**Course Title: Real Analysis**	
Course Outcome	**CO1:**Real analysis is one of the building blocks of analysis. Objective of this course is to introduce students to basic concepts of real numbers and their properties. **CO2:**On successful completion of the course, students have gained knowledge about basic concept of real numbers set, limit point of sets, sequence and series of real numbers and their properties. They have the foundation for higher course in real analysis. **CO3:** This course will lead the student to basic course in advanced real analysis, metric spaces, etc.	

Unit No.	Course Content	Hours
I	**Order Structure, Boundedness of set, Equivalence and Countability:** Concept of field Structure and order structure, Order completeness in R, Archimedean properties of real numbers (Only basic concepts), Dedekind's form of Completeness Property, Real valued function and absolute value of real numbers, Equivalent sets and countable sets (Denumerable sets), Bounded set, Least upper bound (l.u.b.) and greatest lower bound (g.l.b.).	12
II	**Limit Point of Set:**Neighbourhood of a point, Deleted Neighbourhood, Interior points and interior of a set, open set, Isolated and Adherent points of set, Limit point of a set, Derive set, Perfect set, Bolzano-Weierstrass theorem (For sets), Closed set and Closures of a set, Dense set, Compact set and their properties, Open cover, Heine-Borel property and theorem.	12
III	**Limit and Continuity of Single Variable Function:** Limit of function, Algebra of limits of functions, Monotonic functions, Squeeze theorem (statement and example) Continuity and discontinuity of functions, Types of discontinuity, Algebra of continuity, Uniform Continuity, Borel's theorem (statement and example), Boundedness theorem (statement and example), Intermediate value theorem (statement and example), Derivative of function and examples.	12
IV	**Sequence of Real Numbers:** Sequence of real numbers, Bounded sequence, Limit of a sequence, Subsequence, Oscillating and Divergent sequences, Convergence sequence, Algebra of convergent sequences, Cauchy sequence, Limit inferior and limit superior, Bolzano-Weierstrass theorem for sequences (statement and examples), Cauchy general principle of convergence, Monotonic and nested sequences, Squeeze theorem (statement and examples), Cauchy's first and second theorem on limits (statement and examples).	12
V	**Infinite Series of Real Numbers:** Infinite series, Partial sum of series, Necessary condition for convergence, Cauchy's general principle of convergence for series, Comparison test (First and second), Cauchy's root test, Cauchy's condensation test, D'Alembert's ratio test, Raabe's test, Logarithmic test, Cauchy's integral test, Abel's test. Dirichlet's test, Alternating series, Leibnitz test, Absolute convergence and conditional convergence,	12

Suggested Books

1. R. R. Goldberg, Method of Real Analysis, Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi
2. S. C. Malik and SavitaArora, Mathematical Analysis, New Age International (P) Ltd Publishers.
3. T.M. Apostol, Calculus (Vol. I), John Wiley and Sons (Asia) P. Ltd..
4. R.G. Bartle and D. R Sherbert, Introduction to Real Analysis, John Wiley and Sons (Asia) P. Ltd. .
5. K. A. Ross, Elementary Analysis- The Theory of Calculus Series- Undergraduate Texts in Mathematics, Springer Verlag.
6. E. Fischer, Intermediate Real Analysis, Springer Verlag.

Mapping of course outcomes with program outcomes & program specific outcomes:

CO's No.	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	3	2	2	2	2	1	1	1
CO2	3	3	3	3	2	3	1	1	1
CO3	3	2	3	2	1	2	1	1	1