

Program: Diploma	Year: Second	Semester: III
Class: UG		
Subject: Mathematics		
Course Code: MN-1B	Course Title: Real Analysis	
<p>Course Learning Outcomes: This course will enable the students to:</p> <p>a) Understand many properties of the real line \mathbb{R} and learn to define sequence in terms of functions from \mathbb{R} to a subset of \mathbb{R}.</p> <p>b) Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence.</p> <p>c) Apply the ratio, root, alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.</p> <p>d) Learn some of the properties of Riemann integrable functions, and the applications of the fundamental theorems of integration.</p>		
Credit: 4 (Theory)	Compulsory	
Full Marks: 75	Time: 3 Hours	
Unit	Content	Hours
I	<p>Real Number System Axioms in \mathbb{R}, Absolute value of a real number; Bounds of a sets, Supremum and infimum of a nonempty subset of \mathbb{R}, The completeness property of \mathbb{R}, Archimedean property, Definition and types of intervals, Neighborhood of a point in \mathbb{R}, Open, closed and perfect sets in \mathbb{R}</p>	15 h
II	<p>Sequences of Real Numbers: Convergent sequence, Limit of a sequence, Bounded sequence, Limit theorems, Monotone sequences, Weierstrass' theorem for-sequences, Monotone convergence theorem, Subsequences, Bolzano sequences, Limit superior and limit inferior of a sequence of real numbers, Cauchy sequence, Cauchy's first theorem on limit, Cauchy's convergence criterion, Completeness property of set of real number.</p>	15 h
III	<p>Infinite Series Convergence and divergence of infinite series of positive real numbers, Necessary condition for convergence, Cauchy criterion for convergence; Tests for convergence of positive term series; Basic comparison test, Limit comparison test, D'Alembert's ratio test, Raabe's test, Logarithmic test, Cauchy's condensation Test, De Morgan & Bertrand's test.</p>	20 h
IV	<p>Alternating series: Alternating series, Leibniz test, Absolute and conditional convergence. Properties of absolutely convergent series.</p>	10 h
<p>Sessional Internal Assessment (SIA) Full Marks . 25 Marks A Internal written Examination . 20 Marks (1 Hr) B Over All Performance including Regularity . 05 Marks</p>		
<p>Books Recommended:</p> <ol style="list-style-type: none"> 1. Real Analysis: Dasgupta & Prasad 2. Real Analysis: Lalji Prasad 3. Real Analysis: K.K. Jha 4. Principle of Real Analysis: S. C. Malik 		