

Title of The Paper: REAL ANALYSIS

LEARNING OBJECTIVES

The aim of this course is to learn the properties of real number system, real functions, continuity and differentiability of real functions.

LEARNING OUTCOMES

- Understand the concept of real number system
- Development of mathematical explanations in analysis
- Practical orientation in solving real life problems

UNIT – I :

REAL NUMBERS : The algebraic and order properties of \mathbb{R} , Absolute value and Real line, Completeness property of \mathbb{R} , Applications of supreme property; intervals. No. Question is to be set from this portion. Real Sequences: Sequences and their limits, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence. The Cauchy's criterion, properly divergent sequences, Monotone sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences and the Bolzano-weierstrass theorem – Cauchy Sequences – Cauchy's general principle of convergence theorem.

UNIT –II :

INFINITIE SERIES : Series : Introduction to series, convergence of series. Cauchy's general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms. 1. P-test 2. Cauchy's nth root test or Root Test. 3.D'-Alemberts' Test or Ratio Test. 4.Alternating Series – Leibnitz Test. Absolute convergence and conditional convergence, semi convergence.

UNIT – III :

CONTINUITY : Limits : Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits.Limits at infinity. No. Question is to be set from this portion. Continuous functions : Continuous functions, Combinations of continuous functions, Continuous Functions on intervals, uniform continuity.

UNIT – IV :

DIFFERENTIATION AND MEAN VALUE THEORMS : The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the Derivative, Mean value Theorems; Role's Theorem, Lagrange's Theorem, Cauchy's Mean value Theorem

UNIT – V :

RIEMANN INTEGRATION : Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for \mathbb{R} – integrability, Properties of integrable functions, Fundamental theorem of integral calculus, integral as the limit of a sum, Mean value Theorems.

Reference Books :

1. Real Analysis by Rabert&Bartely and .D.R. Sherbart, Published by John Wiley.
2. A Text Book of B.Sc Mathematics by B.V.S.S. Sarma and others, Published by S. Chand & Company Pvt. Ltd., New Delhi.

3. Elements of Real Analysis as per UGC Syllabus by Shanthi Narayan and Dr. M.D. Raisingania Published by S. Chand & Company Pvt. Ltd., New Delhi.