

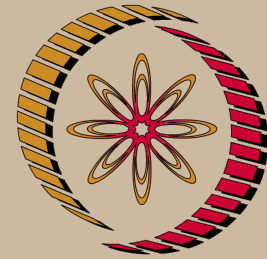
A Basic Course in Real Analysis - Video course

COURSE OUTLINE

It is a first level course on Functional Analysis. The motto is to familiarize the students with basic concepts, principles and methods of Functional analysis and its applications.

COURSE DETAIL

Module	Learning Units	Lectures
Module I	<p>1. Dedekind Theory of Irrational numbers:-</p> <ul style="list-style-type: none"> Rational numbers, section of Rational numbers, Irrational numbers, real Numbers, Dedekind Theorem, The Continuum Exercise- Tutorial <p>2. Cantor's Theory of Irrational numbers:-</p> <ul style="list-style-type: none"> Cantor's Theory, Convergent sequence of real numbers, Equivalence of the definition of Dedekind & Cantor <p>3. Sets of Points-</p> <ul style="list-style-type: none"> The upper & lower bounds, l.u.b. & g.l.b. of sets, limiting point, Weierstrass Theorem, Derived sets, Countable & Non constable sets, Cardinal numbers, Open & Closed sets, Closure of a set, Perfect set, Heine-Borel Theorem 	14
Module II	<p>1. Limit of Sequences of Real Numbers:-</p>	13



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Mathematics

Pre-requisites:

- Nil.

Additional Reading:

- Nil.

Hyperlinks:

- Nil.

Coordinators:

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	<ul style="list-style-type: none"> Bounded sequences, Null sequences, Monotone sequences, Convergent sequences, Fundamental theorems on limit, limit sup, limit inf of sequences, Ratio Test & other Tests, Cauchy theorems, Cauchy Convergence Criteria Exercises- Tutorial <p>2. Infinite Series of Real numbers:-</p> <ul style="list-style-type: none"> Introduction of infinite series, Tests for its convergence, Absolute convergence, Conditional convergence <p>3. Limit of functions</p> <ul style="list-style-type: none"> Concepts of Limit of functions, Limit Theorems, Some extension of Limit Concepts, Exercises- Tutorials 		
<p>Module III</p>	<p>1. Continuity of Functions:-</p> <ul style="list-style-type: none"> Cauchy's and Heine's definitions of continuity, Properties of Continuous functions, Uniform continuity, Absolute continuity, Discontinuous Functions, Types of Discontinuities <p>2. Differentiability:-</p> <ul style="list-style-type: none"> Concept of Derivatives, Rolle's theorem, Mean value theorem, L' Hospital Rule, Taylors Theorem Exercises- Tutorial 	<p>9</p>	
<p>Module IV</p>	<p>1. Riemann Integration / Reimann-Stieltjes Intergral:-</p> <ul style="list-style-type: none"> The Upper and lower R-integrals, Integrable (R) functions, Properties of definite and indefinite integral, Mean value theorems, Absolute convergence, convergence, Test for improper integrals. Definition & Existence of the Reimann-Stieltjes Integral & its properties Exercise, Tutorial 	<p>8</p>	

References:

1. W. Rudin - Principles of Mathematica Analysis - Mc. Graw Hill Int. Edition (3rd)
2. Robert G. Bartle and Donald R. Shebert - Introduction to Real Analysis - Wiley India, 3rd ed.
3. Sterling K. Berberian - A First course in Real Analysis - 1994, Springer Verlag, Ny. Inc.
4. N. Saran - Theory of Function of Real Variable