

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS) , VISAKHAPATNAM

**IV SEMESTER
M 4301 (4)**

MATHEMATICS

5 Hrs/Week

w.e.f : 2017 - 2018

**REAL ANALYSIS
SYLLABUS**

Max. Marks : 100

OBJECTIVES : To enable the students to –

- a. Know and understand the definition and theorems of Real Analysis
- b. Apply the knowledge in higher studies like P.G. and Research.
- c. Compare with other fields like engineering , physics and other allied sciences.

COURSE

UNIT – I :

(a) REAL NUMBERS :

The algebraic and order properties of \mathbb{R} , Absolute value and Real line, Completeness property of \mathbb{R} , Applications of supremum property, intervals.

No Question is to be set from this portion.

(b) 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 or Convergence theorem, Cauchy's first theorem on limits, Cauchy's second theorem, Cesaro's theorem

UNIT –II :

INFINITIE SERIES :

Introduction to Series, Convergence of Series. Cauchy's General Principle of Convergence, Series of Non-Negative Terms

1. Comparison Tests
2. Auxiliary Series or P - Series Test
3. Cauchy's n^{th} Root test or Root Test.
4. D'-Alemberts' Test or Ratio Test.
5. Raabe's Test

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 :

Upper and Lower Riemann Sums, Upper and Lower Riemann Integrals, The Riemann Integral, Riemann Integral Functions, Darboux's Theorem. Necessary and Sufficient Condition for R – Integrability, Properties of Integrable Functions, Fundamental Theorem of Integral Calculus, Integral as the Limit of a Sum, Mean value Theorems.

Prescribed Text Book : A Text of Mathematics B.Sc. Mathematics Vol – II by S. CHAND Publications(2016)

Reference Books :

1. Real Analysis by Rabert & Bartely and .D.R. Sherbart, Published by John Wiley. (1997)
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.(2007)
3. Elements of Real Analysis as per UGC Syllabus by Shanthi Narayan and Dr. M.D. Raisingkania Published by S. Chand & Company Pvt. Ltd., New Delhi. (2006)

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS) , VISAKHAPATNAM

**IV SEMESTER
M 4351 (1)**

MATHEMATICS

1 Hr/Week

REAL ANALYSIS

Max. Marks : 50

w.e.f : 2017 - 2018

PRACTICAL SYLLABUS

OBJECTIVES : To enable the students to –

- a. Know and understand the definition and theorems of Real Analysis
- b. Apply the knowledge in higher studies like P.G. and Research.
- c. Compare with other fields like engineering , physics and other allied sciences.

COURSE

UNIT – I :

(a) REAL NUMBERS :

(b) REAL SEQUENCES:

UNIT –II :

INFINITIE SERIES :

Introduction to Series, Convergence of Series. Cauchy's General Principle of Convergence, Series of Non-Negative Terms

- 1.Comparison Tests
- 2.Auxiliary Series or P - Series Test
3. Cauchy's n^{th} Root test or Root Test.
4. D'-Alemberts' Test or Ratio Test.
5. Raabe's Test

Alternating Series – Leibnitz Test, Absolute Convergence and Conditional Convergence, Semi Convergence.

UNIT – III :

CONTINUITY :

Limits :

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 :

Upper and Lower Riemann Sums, Upper and Lower Riemann Integrals, The Riemann Integral, Riemann Integral Functions, Darboux's Theorem. Necessary and Sufficient Condition for R – Integrability, Properties of Integrable Functions, Fundamental Theorem of Integral Calculus, Integral as the Limit of a Sum, Mean value Theorems.

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