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

VII SEMESTER **MATHEMATICS** TIME: 4Hrs/Week

M 7302(3) **REAL ANALYSIS** Max.Marks:100

w.e.f .20AH Batch **SYLLABUS**

Course Objectives: To enable the students to

- Understand the concepts of finite, countable, and uncountable sets., limits of functions and their behavior.
- Explore compact sets and their significance in topology, the relationship between continuity and compactness, Mean Value Theorems and their applications.
- Analyze the behavior of monotonic functions, the continuity of derivatives, the various aspects of integral calculus.
- Investigate the integration of Vector Valued Functions, connected sets and their role in topology.

Learning Outcomes:

After successful completion of the course, students will be able to

- understand to form a metric space from any non-empty set, compact sets and connectedsets
- understand continuity of functions, compactness and connectedness
- know the derivative of a real valued function and the applications of Mean valuetheorems
- know the conditions for existence of integrals and some applications of integrals
- know the vector valued functions, differentiation and integration of vector valuedfunctions and their applications

UNIT I
Basic Topology

Finite, countable and uncountable sets – Metric spaces – Compact sets – Perfect sets –Connected sets (Sections 2.1 to 2.47)

UNIT II
Continuity

Limits of functions - Continuous functions – Continuity and Compactness – Continuity andConnectedness – Discontinuities. Monotonic functions (Sections 4.1 to 4.31)

UNIT III
Differentiation

The derivative of a real function – Mean Value Theorems – The continuity of DerivativesL'Hospital's Rule. (Sections 5.1 to 5.13)

UNIT IV
Riemann Stieltjes Integrals

Definition and existence of integral – properties of integrals –. (Sections 6.1 to 6.19)

UNIT V
FTC and Vector Valued Functions

Integration and differentiation - Differentiation of Vector Valued Functions – Integration of Vector valued functions – Rectifiable curves. (Sections 6.20 to 6.27)
(FTC : Fundamental Theorem of Calculus)

Activities:

1. Assignments
2. Student Seminars and Guest Lecturers
3. Problem Solving Sessions

Text Book:

1. Principles of mathematical Analysis by Walter Rudin, Mc Graw Hill InternationalEdition, 3rd Edition

Reference Book :

Mathematical Analysis by Tom M .Apostal, Narosa Publishing House 2nd Edition 1985