

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN MATHEMATICS
SYLLABUS WITH EFFECT FROM 2020-2021

BMA-CSC10

CORE-X: REAL ANALYSIS-I
(Common to B.Sc. Maths with Computer Applications)

Inst.Hrs : 6

Credits : 4

YEAR: III

SEMESTER: V

Learning outcomes:

Students will acquire knowledge to

- Apply Mathematical concepts and Principles to perform numerical and symbolic computations.
- Understand and perform simple proofs.
- Know how abstract ideas and rigorous methods in Mathematical Analysis can be applied to practical problems.

UNIT I

Sets and Functions: Sets and elements- Operations on sets- functions- real valued functions- equivalence- countability - real numbers- least upper bounds.

Chapter 1 Section 1.1 to 1.7

UNIT II

Sequences of Real Numbers: Definition of a sequence and subsequence- limit of a sequence- convergent sequences- divergent sequences- bounded sequences- monotone sequences-

Chapter 2 Section 2.1 to 2.6

UNIT III

Operations on convergent sequences- operations on divergent sequences- limit superior and limit inferior- Cauchy sequences.

Chapter 2 Section 2.7 to 2.10

UNIT IV

Series of Real Numbers: Convergence and divergence- series with non-negative terms- alternating series- conditional convergence and absolute convergence- tests for absolute convergence- series whose terms form a non-increasing sequence- the class \mathcal{I}^2

Chapter 3 Section 3.1 to 3.4, 3.6, 3.7 and 3.10

UNIT V

Limits and Metric Spaces: Limit of a function on a real line-. Metric spaces - Limits in metric spaces.

Continuous Functions on Metric Spaces: Function continuous at a point on the real line- Reformulation- Function continuous on a metric space.

Chapter 4 Section 4.1 to 4.3 Chapter 5 Section 5.1-5.3

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Contents and Treatment as in

“Methods of Real Analysis” : Richard R. Goldberg (Oxford and IBH Publishing Co.).

Reference:

1. Principles of Mathematical Analysis by Walter Rudin, TataMcGrawHill.
2. Mathematical Analysis Tom M Apostol, Narosa Publishing House.

e-Resources:

1. <https://mathcs.org/analysis/reals/numseq/sequence.html>.
2. <http://www-groups.mcs.st-andrews.ac.uk/~john/analysis/index.html>
3. <http://www.phengkimving.com>.