

(Applicable to the batch of students admitted in the academic year 2025-2026)

B.Sc..(Mathematics) (CBCS)

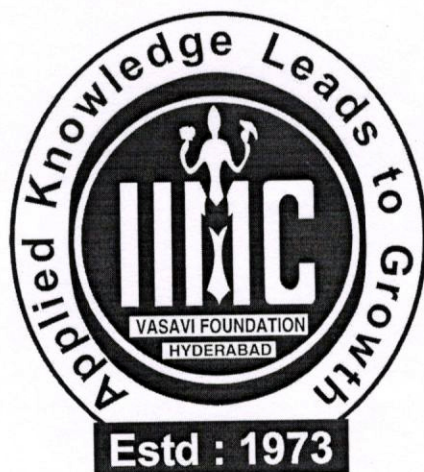
FACULTY OF SCIENCE, IIMC

B.Sc.(MATHEMATICS)

Syllabus (CBCS)

(w.e.f. 2025-26)

Semester I -VI



FACULTY OF SCIENCE
Department of Mathematics
INDIAN INSTITUTE OF
MANAGEMENT & COMMERCE
Autonomous College (UG & PG)

6-1-91, Khairatabad, Hyd- 500 004, T.S

R. f.

Chairman
Board of Studies
Dept. of Mathematics

D. R.

Dean (Academic)
Indian Institute of Management and Commerce
6-1-91, Khairatabad, Hyderabad-500 004.

D. H.

PRINCIPAL
Indian Institute of
Management & Commerce

B. Sc. (Mathematics) Course Structure

with effect from the academic year 2025-2026

Sem	Paper	Subject	Hours/ per week		Credits	Marks (IA)	Marks (ESE)	Total Marks
			Theory	Tutorials*				
I	DSC 1	Differential Equations	4	1	5	30	70	100
II	DSC 2	Real Analysis	4	1	5	30	70	100
III	DSC 3	Differential & Vector Calculus	4	1	5	30	70	100
IV	DSC 4	Algebra	4	1	5	30	70	100
V	DSC 5	Linear Algebra	4	1	5	30	70	100
V	Multi - Disciplinary (MDC)	(A) Mathematics of Finance & Insurance OR (B) Basic Mathematics	4	—	4	30	70	100
VI	DSE	(A) Numerical Analysis OR (B) Integral Transforms OR (C) Analytical Solid Geometry	4	1	5	30	70	100
VI	SEC-IV	(A) Number Theory OR (B) Verbal Reasoning OR (B) Quantitative Aptitude	2	—	2	10	40	50
VI	Project/ Internship		4	—	4			100

*Tutorials: Problems solving session for each 20 student's in one batch.

IA - Internal Assessment

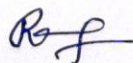
ESE - End Semester Examination

DSC - Discipline Specific Course

DSE - Discipline Specific Elective

SEC - Skill Enhancement Course

MDC - Multi Disciplinary Course



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PROFESSOR,
Department of Mathematics,
OSMANIA UNIVERSITY,
HYDERABAD-500 007

SEMESTER-II

REAL ANALYSIS

Theory: 4 hours per week and **Tutorials:** 1 hour per week

DSC-II

Objectives: To introduce the rigorous foundations of Real Analysis and highlight their importance in the development of modern mathematics. To develop the skill of analyzing the concepts of limits, continuity, and differentiability of real functions with precision. To familiarize students with classical theorems such as Rolle's Theorem, Mean Value Theorems, and the Fundamental Theorem of Calculus. To provide an understanding of Riemann integration and its applications in connecting differentiation and integration.

Outcomes: Distinguish between open, closed, countable, and uncountable sets, and analyze limit points. Apply the theory of sequences and series, including convergence tests, to solve mathematical problems. Compute and analyze Riemann integrals, apply Darboux's Theorem, and use the Fundamental Theorem of Calculus in solving problems.

UNIT-I

Real Numbers: Field Structure and Order Structure—Bounded and Unbounded Sets—Completeness in the Set of Real Numbers—Absolute Value of a Real Number. (Chapter 1: Sec. 2,3,4,5)

Open Sets, Closed Sets and Countable Sets: Limit Points of a Set—Closed Sets—Countable and Uncountable Sets. (Chapter 2: Sec. 2,3,4)

Real Sequences: Sequences—Limit points of a Sequence—Convergent Sequences—Non Convergent Sequences (Definitions)—Cauchy's General Principle of Convergence—Algebra of Sequences—Some Important Theorems—Monotonic Sequences. (Chapter 3: Sec. 1,2,4,5,6,7,8,9)

UNIT-II

Infinite Series: Positive Term Series—Comparison tests for Positive Term Series—Cauchy's Root test—D'Alembert's Ratio Test—Integral Test—Alternating Series (Leibnitz Test). (Chapter 4: Sec. 2,3,4,5,8,10.1, 10.2)

Functions of a Single Variable (I): Limits—Continuous Functions—Functions Continuous on Closed Intervals. (Chapter 5: Sec. 1,2,3)

UNIT -III

Functions of a Single Variable (II): The Derivative—Increasing and Decreasing Functions—Rolle's Theorem—Lagrange's Mean Value Theorem—Cauchy's Mean Value Theorem—Higher Order Derivatives. (Chapter 6: Sec. 1,3,5,6,7,8)

UNIT -IV

Riemann Integral: Definition and Existence of the Integral—Refinement of Partitions—Darboux's Theorem—Conditions of Integrability—Integrability of the Sum and Difference of Integrable Functions—The Integral as a Limit of Sums—Some Integrable Functions—Integration and Differentiation—The Fundamental Theorem of Calculus. (Chapter 9: Sec. 1,2,3,4,5,6,7,8,9)

TEXT BOOKS:

1. S.C. Malik and Savita Arora, *Mathematical Analysis*, Fourth Edition, New Age International Publishers.

REFERENCE BOOKS:

1. Kenneth A. Ross – *Elementary Analysis: The Theory of Calculus*, Springer, Second Edition, 2013
2. William F. Trench – *Introduction to Real Analysis*, Prentice Hall / Pearson Education, First Edition, 2003
3. Lee Larson – *Introduction to Real Analysis I*, University of Louisville (course notes), 2014
4. Shanti Narayan & P. K. Mittal – *A Course of Mathematical Analysis*, S. Chand & Company Ltd., Revised (29th Edition), 2005
5. Brian S. Thomson, Judith B. Bruckner & Andrew M. Bruckner – *Elementary Real Analysis*, Prentice Hall, First Edition 2001; Second Edition 2008


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