(Applicable to the batch of students admitted in the academic year 2025-2026) **FACULTY OF SCIENCE, IIMC** B.Sc..(Mathematics) (CBCS)

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

Rof D. R

Board of Studies Indian Institute of Management and Commerce Dept. of Mathematics 6-1-91, Khairatabad, Hyderabad-500 004.

Indian Institute of

Management & Commerce

B. Sc. (Mathematics)CourseStructure

with effect from the academic year 2025-2026

Sem	Paper	Subject	Hours/ per week		Credits	Marks	Marks(ESE)	Total
				Tutorials*		(IA)		Marks
I	DSC 1	Differential Equations	4	1	5	20	80	100
п	DSC 2	Real Analysis	4	1	5	20	80	100
ш	DSC 3	Differential & Vector Calculus	4	1	5	20	80	100
IV	DSC 4	Algebra	4	1	5	20	80	100
v	DSC 5	Linear Algebra	4	1	5	20	80	100
v	Multi - Disciplinary (MDC)	(A) Mathematics of Finance & Insurance OR (B) Basic Mathematics	4	<u>-</u>	4	20	80	100
VI	DSE	(A)Numerical Analysis OR (B)Integral Transforms OR (C) Analytical Solid Geometry	4	1	5	20	80	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: Problemssolvingsessionforeach20student'sin onebatch.

IA - Internal Assessment

ESE - End Semester Examination

DSC - Discipline Specific Course

DSE - Discipline Specific Elective

SEC - Skill Enhancement Course

MDC - Multi Disciplinary Course

Chairman

Board of Studies Dept. of Mathematics D. Than Dean (Academic)

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

PRINCIPAL Indian Institute of Indian instruction Management & Commer Page 2

> Cepartment of Mathematics, SMANIA UNIVERSITY, 4YDERABAD-500 607

SEMESTER- I DIFFERENTIAL EQUATIONS

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

DSC-I

Objectives: Introduce the fundamental concepts and methods of solving first-order and higher-order differential equations. Provide an understanding of the role of integrating factors, substitutions, and transformations in solving exact and reducible equations. Introduce higher-order linear differential equations, their solutions using operator methods, undetermined coefficients, and variation of parameters.

Outcomes: Solve first-order and first-degree differential equations using separable, homogeneous, linear, exact, and reducible forms. Apply the concepts of integrating factors and transformations to simplify and solve differential equations. Solve higher-order linear differential equations with constant coefficients, both homogeneous and non-homogeneous, using operator methods and the method of undetermined coefficients.

UNIT-I

Differential Equations of first order and first degree: Introduction- Equations in which Variables are Separable – Homogeneous Differential Equations - Differential Equations Reducible to Homogeneous Form – Linear Differential Equations - Differential Equations Reducible to Linear Form – Exact Differential Equations – Integrating Factors – Change in Variables. (Sec. 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9)

UNIT-II

Differential Equations of first order but not of first degree: Equations solvable for p— Equations solvable for x—Equations that do not contain x (or y) — Equations Homogeneous in x and y— Equations of First Degree in x and y— Clairaut's equation.

Applications of first order Differential Equations: Growth and Decay – Dynamics of Tumor Growth – Radioactivity and Carbon Dating – Compound Interest – Orthogonal Trajectories. (Sec. 3.1, 3.2, 4.1, 4.2, 4.3, 4.4, 4.20)

UNIT-III

Higher order Linear Differential Equations: Solution of Homogeneous Linear Differential Equations with constant coefficients - Solution of Non-Homogeneous Differential Equations P(D)y = Q(x) with constant coefficients by means of polynomial operators when $Q(x) = be^{ax}/V e^{ax}/b \sin(ax)/b \cos(ax)/b x^k$, Method of undetermined coefficients. (Sec. 5.1, 5.2, 5.3, 5.4)

UNIT-IV

Method of variation of parameters – Linear Differential Equations with non-constant coefficients – The Cauchy – Euler Equation – Legendre's Linear Equations – Miscellaneous Differential Equations – Total Differential Equations – Simultaneous Total Differential Equations – Equations of the form $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$. (Sec. 5.5, 5.6, 5.7, 5.8, 5.9 and Sec. 2.10, 2.11, 2.12)

TEXT BOOK:

1. Zafar Ahsan — Differential Equations and Their Applications, PHI Learning Pvt. Ltd., Third Edition, 2016.

REFERENCE BOOKS:

- Frank Ayres Jr Theory and Problems of Differential Equations: Schaum Publishing Co. (McGraw-Hill), 1952.
- 2. L. R. Ford Differential Equations: McGraw-Hill, Second Edition, 1955
- 3. Daniel Murray Differential Equations.
- 4. S. Balachandra Rao Differential Equations with Applications and Programs: Sangam Books, illustrated edition, 1996.

5. Stuart P. Hastings & J. Bryce McLeod — Classical Methods in Ordinary Differential Equations.

Board of Studies
Dept. of Mathematics

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

Page3

PRINCIPAL Indian Institute of Management & Commerce

&&h==

Department of Mathematics, USMANIA UNIVERSITY, UYDERABAD-500 007,