

UNIVERSITY OF MADRAS
B.Sc. DEGREE PROGRAMME IN CHEMISTRY
 SYLLABUS WITH EFFECT FROM 2023-2024

Year: I

Semester: I

Title of the Course		MATHEMATICS – I (Common to B.Sc Physics, Physics with CA, Computer Science, ECS, Data Science, Artificial Intelligence, Software Applications & BCA)					
Paper Number		ELECTIVE COURSE I					
Category	Elective	Year	I	Credits	3	Course Code	124E1A
		Semester	I				
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total		
		4	1	--	5		
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ul style="list-style-type: none"> • Students gain knowledge about the basic concepts of Algebra, Theory of Equations. • They also gain the basic knowledge in Matrices, Trigonometry and Differential Calculus. 					
Course Outline		UNIT-I: Summation of series: Binomial series -Exponential series - Logarithmic series -Simple Problems. Hours: 15					
		Chapter 2: Sections: 2.1.3, 2.2, 2.2.1, 2.3, 2.3.3.					
		UNIT II: Matrices: Symmetric– Skew-Symmetric–Hermitian– Skew-Hermitian –Orthogonal and Unitary matrices– Cayley-Hamilton theorem (without proof) – Verification- Computation of inverse of matrix using Cayley - Hamilton theorem.					
		Chapter 4: Sections: 4.1.1 –4.1.6, 4.5.2 and 4.5.3. Hours: 15					
		Unit III: Numerical Methods: Newton’s method to find a root approximately. Finite Differences: Interpolation: Operators, Δ , ∇ , E, E^{-1} difference tables. Interpolation formulae: Newton’s forward and backward interpolation formulae for equal intervals, Lagrange’s interpolation formula. Hours:15					
		Chapter 3: Sections 3.4.1. Chapter 5: Sections: 5.1 and 5.2.					
		Unit IV: Trigonometry: Expansions of $\sin^n\theta$, $\cos^n\theta$ in a series of powers of $\sin\theta$ and $\cos\theta$ - Expansions of $\sin(n\theta)$ and $\cos(n\theta)$ in a series sines and cosines of multiples of “ θ ” - Expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in a series of powers of “ θ ” – Hyperbolic and inverse hyperbolic functions . Hours:15					
		Chapter 6: Section 6.1 – 6.3 Hours:15					
		Unit V: Differential Calculus: Successive differentiation, n th derivatives, Leibnitz theorem (without proof) and applications, Jacobians, maxima and minima of functions of two variables- Simple problems					
		Chapter 1, Section 1.1 to 1.3.1. Hours: 15					
		Total Hours:75					

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Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	Allied Mathematics, Volume I and Volume II by P. Duraipandian and S.Udayabaskaran, S. Chand Publications Volume I: Unit I – IV, Volume II – Unit V
Reference Books	1. Ancillary Mathematics by S. Narayanan and T.K. Manickavachagom Pillay, S. Viswanathan Pinters, 1986, Chennai 2. Allied Mathematics by A. Singaravelu 3. Allied Mathematics by P.R. Vittal
Website and e-Learning Source	1. http://www.themathpage.com 2. http://nptel.ac.in

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 1: Understand the concepts of Summation of Series.

CLO 2: Understand the concepts of Cayley Hamilton Theorem and inverse matrices.

CLO 3: Understand the concepts of finite differences.

CLO 4: Understand the knowledge about expansions, hyperbolic and inverse hyperbolic functions.

CLO 5: Understand the concept of Leibnitz theorem and functions of two variables

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO 1	2	3	1	3	1	1	3	1	1
CLO 2	3	2	1	3	1	1	3	1	1
CLO 3	3	2	1	3	1	1	3	1	1
CLO 4	3	3	1	3	1	1	3	1	1
CLO 5	3	2	1	3	1	1	3	1	1