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

Year: I   **Semester: I**

Title of the Course	MATHEMATICS – I (Common to B.Sc Physics, Physics with CA, Chemistry, ECS, Data Science, Artificial Intelligence, Software Applications & BCA)					
Paper Number	**ELECTIVE COURSE I**					
Category	Elective	**Year**	I	**Credits**	3	**Course Code**	**125E1A**
		Semester	I				
Instructional Hours per week	**Lecture**		**Tutorial**	**Lab Practice**		**Total**
	4		1	--		5
Pre-requisite	12th Standard Mathematics					
Objectives of the Course	• Necessary skills to analyze and make decision on Assignment and Transportation problems Simple Harmonic Motion • To solve real world problems on Sequencing and Network and its applications					
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 sinθ and cosθ - Expansions of sin(nθ) and cos(nθ) in a series sines and cosines of multiples of "θ" - Expansions of sinθ, cosθ and tanθ in a series of powers of "θ" – Hyperbolic and inverse hyperbolic functions . **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

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.themathpaage.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

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