

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

Title of the Course		MATHEMATICS – II (Common to B.Sc-Physics with CA, Chemistry, Computer Science, ECS, Data Science, Artificial Intelligence, Software Applications & BCA)					
Paper Number		ELECTIVE COURSE II					
Category	Elective	Year	I	Credits	3	Course Code	137E2A
		Semester	II				
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 some knowledge in Integral Calculus, Differential Equations. • They also learn the basic concepts in Laplace Transforms and Vector Calculus 					
		Unit I: Integral calculus: Bernouli's Formula, Reduction Formula <i>Sinⁿθ, Cosⁿθ, Sin^mθ Cosⁿθ</i> – Simple Problems. Hours: 15					
		Unit II : Fourier Series: Fourier series for functions $(0, 2\pi), (-\pi, \pi)$ Chapter 4: Section : 4.1, 4.1.1 Hours: 15					
		Unit III: Differential Equations: Ordinary Differential Equations: second order non- homogeneous differential equations with constant coefficients of the form $ay'' + by' + cy = X$ where X is of the form \cos and \sin - Related problems only. Partial Differential Equations: Formation, complete integrals and general integrals, four standard types and solving Lagrange's linear equation $Pp + Qq = R$. Chapter 5: Section 5.2.1, Chapter 6: Section 6.1 to 6.4 Hours: 15					
		Unit IV: Laplace Transforms: Laplace transformations of standard functions and simple properties, inverse Laplace transforms. Chapter 7: Section 7.1.1 to 7.1.4 & 7.2 to 7.2.3 Hours: 15					
		Unit V: Vector Differentiation: Introduction, Scalar point functions, Vector point functions, vector differential operator Gradient, Divergence, Curl, Solenoidal, irrotational, identities. Chapter 8, Section 8.1 to 8.4.4 Hours: 15					

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Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Total Hours: 75 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 II by P. Duraipandian and S.Udayabaskaran, S. Chand Publications
Reference Books	<ol style="list-style-type: none"> Ancillary Mathematics by S. Narayanan and T.K. Manickavachagom Pillay, S. Viswanathan Pinters, 1986, Chennai Allied Mathematics by A. Singaravelu Allied Mathematics by P.R. Vittal
Website and e-Learning Source	<ol style="list-style-type: none"> http://www.themathpage.com http://nptel.ac.in

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 1: Understand the various concepts of Bernoulli's and Reduction Formula.

CLO 2: Understand the concepts of Fourier Series

CLO 3: Understand the concepts of Non-Homogenous and Partial Differential Equations

CLO 4: Understand the Laplace Transforms

CLO 5: Understand the concepts of Vector Differentiation.

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