

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

Title of the Course		TRANSFORM TECHNIQUES					
Paper Number		ELECTIVE COURSE – IV					
Category	Elective	Year	II	Credits	3	Course Code	234E4A
		Semester	IV				
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total		
		3	1	--	4		
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ul style="list-style-type: none"> • The basic knowledge about Laplace Transforms and its inverse • Apply Laplace Transform in solving ODE • To solve problems in Fourier Series and Fourier Transforms 					
Course Outline		<p>Unit I: Laplace Transforms: Definition – Sufficient Condition for the Existence of Laplace Transforms (Without Proof) – Laplace Transform of Periodic Functions – Some General Theorems – Evaluation of Integrals Using Laplace Transform – Problems. Chapter: 5 Sections 1 – 5 Hours: 12</p> <p>Unit II: The Inverse Laplace Transforms: Application of Laplace Transforms to Ordinary Differential Equations with Constant Coefficients and Variable Coefficients – Simultaneous Equations – Equations Involving Integrals – Problems. Hours: 12 Chapter: 5 Sections 6 – 12</p> <p>Unit III: Fourier Series: Fourier Series – Expansion of Periodic Functions of Period 2 – Expansion of Odd and Even Functions – Half Range Fourier Series – Change of Intervals – Problems Hours: 12 Chapter: 6 Sections 1 – 6</p> <p>Unit IV: Fourier Transforms: Fourier Transform – Infinite Fourier Transform (Complex Form) – Properties of Fourier Transforms. Hours: 12 Chapter: 6 Sections 8 – 10</p> <p>Unit V: Fourier Transforms (Continued): Fourier Cosine and Sine Transform – Properties – Parseval’s Identity – Convolution Theorem - Problems. Hours: 12 Chapter 6 Sections 11 – 15</p>					
		Total Hours: 60					

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Extended Professional Component (is apart 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	Calculus Volume III by S. Narayanan and T.K. Manickavachagom Pillay, S. Viswanathan Publishers Pvt. Ltd. 2006
Reference Books	1. Engineering Mathematics Volume III, P. Kandasamy and Others, (S. Chand and Co) 2. Advanced Engineering Mathematics – Stanley Grossman and William R. Devit 3. Engineering Mathematics III, A. Singaravelu, Meenakshi Agency, Chennai 2008.
Website and e-Learning source	https://nptel.ac.in https://www.mathhelp.com/

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 1: Find the Laplace Transform and evaluation of integrals using Laplace Transform

CLO 2: Apply Laplace transform to solve ordinary differential equations and equations

involving integrals

CLO 3: Expansion of Periodic Functions of Period 2, Expansion of Odd and Even Functions, Half Range Fourier Series and Change of Intervals

CLO 4: Find the Fourier Transforms, Infinite Fourier Transforms and their properties

CLO 5: Evaluate Fourier sine and cosine transform, Parseval's identity and learn convolution theorems.

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