

Course Code	21MAB201T	Course Name	Transforms and boundary value problems	Course Category	B	Basic Sciences	L	T	P	C
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Pre-requisite Courses	NIL	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Mathematics	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR)		The purpose of learning this course is to:		Learning	Program Outcomes (PO)											
CLR-1:	Analyze partial differential equations, and interpret the solutions related to PDE in engineering problems.	Blooms Level (1-6)	Engineering Knowledge		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	Compute the Fourier series expansion and express the sine and cosine series			Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning		
CLR-3:	Analyze one-dimensional wave and heat equations using PDE and Fourier series concepts.															
CLR-4:	Analyze Fourier transforms and their properties.															
CLR-5:	Analyze Z transform for solving discrete-time Signal problems.															
Course Outcomes (CO):		At the end of this course, learners will be able to:														
CO-1:	Construct and solve partial differential equations using various techniques.	4	3	3	-	-	-	-	-	-	-	-	-	-	-	
CO-2:	Explain the Fourier series expansion of a function in terms of sine and cosine series.	4	3	3	-	-	-	-	-	-	-	-	-	-	-	
CO-3:	Identify partial differential equations and utilize Fourier series techniques to solve one dimensional wave and heat equations.	4	3	3	-	-	-	-	-	-	-	-	-	-	-	
CO-4:	Apply Fourier transforms techniques in signal analysis.	4	3	3	-	-	-	-	-	-	-	-	-	-	-	
CO-5:	Solve discrete-time signal problems using Z transforms.	4	3	3	-	-	-	-	-	-	-	-	-	-	-	

#### Unit-1: Partial Differential Equations

Formation of partial differential equations by eliminating arbitrary constants & arbitrary functions- Solutions of standard types of first order partial differential equations – Lagrange's linear equation – Linear partial differential equations of second and higher order with constant coefficients of homogeneous types.

#### Unit-2: Fourier Series

Dirichlet's conditions – General Fourier series – Odd and even functions - Half range sine and cosine series - Parseval's identity – Harmonic Analysis.

#### Unit-3: Applications of Partial differential equations

Classification of second order partial differential equations - Method of separation of variables – Solutions of one dimensional wave equation - One dimensional equation of heat conduction (Insulated edges excluded) - Steady state condition with zero boundary - Steady state condition with non-zero boundary conditions.

#### Unit-4: Fourier Transforms

Fourier transform pair – Properties -Fourier sine and cosine transforms – Properties– Transforms of simple functions - Convolution theorem (without proof) – Parseval's identity.

#### Unit-5: Z Transforms

Z - transforms – Properties of Z transforms – Inverse Z transforms – Convolution theorem (without Proof) – Solution of linear difference equations with constant coefficients using Z-transform

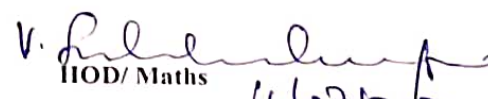
<b>Learning Resources</b>	<ol style="list-style-type: none"> <li>1. Erwin kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley &amp; Sons, 2015.</li> <li>2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition, 2015.</li> <li>3. Veerarajan T., Transforms and Partial Differential Equations, Tata McGraw-Hill, New Delhi, 3rd edition, 2012.</li> <li>4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 2010 3rd Edition.</li> <li>5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, New Delhi, 10th edition, 2016.</li> <li>6. Kandasamy P., etal. Engineering Mathematics, Vol.II &amp; Vol.III (4<sup>th</sup> revised edition), S. Chand &amp; Co., New Delhi, 2000</li> </ol>
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Student learning shall be assessed with a weightage of 60% for internal assessment and 40% for end semester examination.

	Bloom's Level of Thinking	Continuous Learning Assessment (CLA) - By the Course Faculty				By The CoE	
		Formative CLA-1 Average of unit test (50%)		Life Long Learning CLA-2 (10%)		Summative Final Examination (40% weightage)	
		Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	-	20%	-	20%	-
Level 2	Understand	20%	-	20%	-	20%	-
Level 3	Apply	30%	-	30%	-	30%	-
Level 4	Analyze	30%	-	30%	-	30%	-
Level 5	Evaluate	-	-	-	-	-	-
Level 6	Create	-	-	-	-	-	-
	Total	100 %		100 %		100 %	

Course Designers		
<b>a) Experts from Industry</b>	<b>b) Experts from Higher Technical Institutions</b>	<b>c) Internal Experts</b>
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 Course Co-ordinator  
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 HOD/ Maths  
 16/07/24