

<b>22MYB04 – TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS</b> <i>(Common to BME and ECE Branches)</i>				
	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
<b>PRE-REQUISITE : NIL</b>				
<b>Course Objectives:</b>	<ul style="list-style-type: none"> <li>To make the Conversant with concepts of Z-transforms, Fourier series, Fourier transforms to represent periodical physical problems in engineering analysis.</li> <li>To provide adequate knowledge in partial differential equation and to analyze the boundary value problems.</li> </ul>			
<b>Course Outcomes</b> The Student will be able to		<b>Cognitive Level</b>	<b>Weightage of COs in End Semester Examination</b>	
CO1	Interpret the Fourier series in various fields such as signal processing, communications, control systems, and biomedical engineering.	Ap	30%	
CO2	Solve the initial and boundary value problems by using Fourier series in wave equation.	Ap	30%	
CO3	Apply the methods of partial differential equations in Circuit Analysis and Biomedical Signal Processing.	Ap	20%	
CO4	Analyze the concepts of Transform Techniques to solve the engineering problem.	An	20%	
CO5	Identify the mathematical tools for solving transform techniques in real time applications.	Ap	Internal Assessment	

<b>UNIT I – FOURIER SERIES</b>	<b>(9+3)</b>
Dirichlet's condition – Fourier series – Odd and even functions – Half range sine series – Half range cosine series – Parseval's identity – RMS value – Harmonic Analysis.	
<b>UNIT II – PARTIAL DIFFERENTIAL EQUATIONS</b>	<b>(9+3)</b>
Formulation of partial differential equations by eliminating arbitrary constants and functions – Solution of standard types first order partial differential equations of the type $f(p,q)=0$ , Clairaut's form – Lagrange's linear equations – Linear partial differential equation of second and higher order with constant coefficient of homogeneous types.	
<b>UNIT III – APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS</b>	<b>(9+3)</b>
Classification of second order Quasi linear partial differential equations – Solution of one dimensional wave equation (Zero and non-zero velocity) – One dimensional heat equation (Temperature reduced to zero and non zero boundary conditions) – Steady state solution of two dimensional heat equation (Finite and infinite plate).	
<b>UNIT IV – FOURIER TRANSFORM</b>	<b>(9+3)</b>
Fourier integral theorem (Statement only) – Fourier transform pair - Sine and Cosine transforms – Properties -Transforms of simple functions – Convolution theorem – Parseval's identity (Excluding proof).	
<b>UNIT V – Z-TRANSFORM AND DIFFERENCE EQUATIONS</b>	<b>(9+3)</b>

Z-transforms – Elementary properties – Inverse Z-transform (Partial fraction method and Residue method) – Convolution theorem (Excluding proof) – formation of difference equations – Solution of difference equation using Z transform.

**TOTAL (L:45+T:15) :60 PERIODS**

**TEXT BOOKS:**

1. Veerajan.T, "Engineering Mathematics (for semester III), 3rd ed., Tata Mc Graw Hill, New Delhi.
2. Kandasamy. P, Thilagavathy. K and Gunavathy. K., "Engineering Mathematics; Volume III", S. Chand & Co. Ltd., 2008.
3. Grewal B.S,"Higher Engineering Mathematics", 42nd Edition, Khanna Publishers, New Delhi, 2012.

**REFERENCES:**

1. Goyal Manish and Bali. N.P,"A Text book of Engineering mathematics", 6th Edition, Laxmi Publication (P) Ltd, New Delhi, 2012.
2. Kreyszig, Erwin, "Advanced Engineering Mathematics", 9th Edition, Wiley Publications, New Delhi, 2006.
3. Singaravelu. A,"Transforms and Partial Differential Equations", Reprint Edition 2013, Meenakshi Publications, Tamilnadu.

**WEB REFERENCES:**

1. <https://youtu.be/B025yIUWkvl>
2. <https://youtu.be/lkAvgVUvYvY>
3. <https://youtu.be/RtVE2Gt-KQ4>
4. [https://youtube.com/playlist?list=PLs7oDAL8\\_ouKSagWiC\\_lwrEsRwvD2WJ73](https://youtube.com/playlist?list=PLs7oDAL8_ouKSagWiC_lwrEsRwvD2WJ73)

**Mapping of COs with POs / PSOs**

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3												2	
2	3												2	
3	3												2	
4		2											2	
5	3				2				3			3	2	
CO (W.A)	3	2			2				3			3	2	

\*Ratified by Eleventh Academic Council