

22EDA01 ADVANCED MATHEMATICS					
		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>
<b>PRE REQUISITE :</b>					
<b>Course Objectives</b>			<b>Course Outcomes</b>		
<b>1.0</b>	Acquire knowledge of the random variable and moments & moments generating functions	<b>1.1</b>	The students will be able to infer expectation, variance, standard deviation moments and moment generating function for discrete and continuous random variables.		
<b>2.0</b>	Aware the knowledge of calculus of variations.	<b>2.1</b>	The students will be able to solve problems involving functional, that occurs in various branches of engineering disciplines.		
<b>3.0</b>	To understand the method of solving Laplace transform and Fourier transform.	<b>3.1</b>	The students will be able to apply Laplace and Fourier transforms to solve initial and boundary value problems in Partial Differential Equations.		
<b>4.0</b>	Gain knowledge of solving ordinary differential equations.	<b>4.1</b>	The students will be able to solve ordinary differential equations using numerical methods.		
<b>5.0</b>	Study numerical solution for solving partial differential equations	<b>5.1</b>	The students will be able to solve elliptic partial differential equations by using finite difference methods.		

<b>UNIT I : PROBABILITY AND RANDOM VARIABLES</b>	<b>(9)</b>
Random variables: Probability mass function – Probability density function – Properties - Moments – Moment generating functions.	
<b>UNIT II : CALCULUS OF VARIATIONS</b>	<b>(9)</b>
Calculus Of Variations: Concept of variation and its properties – Euler’s equation – Functional dependant on first and higher order derivatives – Functional dependent on functions of several independent variables – Direct methods : Ritz and Kantorovich methods.	
<b>UNIT III: TRANSFORM METHODS</b>	<b>(9)</b>
Transform Methods: Laplace transform methods: Solution of one-dimensional wave equation - Solution of one- dimensional heat equation – Fourier transform methods: Solution of Diffusion equation – Solution of one-dimensional wave equation – Solution of Laplace equation.	
<b>UNIT IV : NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS</b>	<b>(9)</b>
Numerical solution of Ordinary differential equations: Runge - Kutta methods for system of IVPs – Numerical stability – Milne’s method - Adams Bashforth multistep method – Shooting method.	
<b>UNIT V : NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS</b>	<b>(9)</b>
Numerical Solution of Partial Differential Equations: Solution of one dimensional wave equation – Solution of diffusion equation – Explicit and implicit methods – Solution of Elliptic equation: Solution of Laplace equation – Solution of Poisson equation.	
<b>TOTAL (L:45) : 45 PERIODS</b>	

**REFERENCES:**

1. Richard Johnson, Miller & Freund's, "Probability and Statistics for Engineers", Eight Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2011.
2. Veerarajan, T, "Probability, Statistics and Random Process", 3rd Edition, Tata McGraw Hill Publication Company Ltd., 2016.
3. Gupta, A.S, "Calculus of variations with Applications", Prentice Hall of India Pvt. Ltd., New Delhi, 1996.
4. Smith, G.D., "Numerical Solutions of Partial Differential Equations: Finite difference Methods", 3rd Edition, Clarendon Press, 1985.

**Mapping of Course Outcomes (COs) with Programme Outcomes (POs) / Programme Specific Outcomes (PSOs)**

COs	POs						PSOs	
	1	2	3	4	5	6	1	2
1	2	-	1	3	1	1	1	1
2	2	-	1	3	1	1	1	1
3	2	-	1	3	1	1	1	1
4	2	-	1	3	1	1	1	1
5	2	-	1	3	1	1	1	1
<b>CO (W.A)</b>	2	-	1	3	1	1	1	1

