PVP 19

ENGINEERING MATHEMATICS-III
(PDE, COMPLEX VARIABLES &TRANSFORM TECHNIQUES)

Course Code	19BS1301	**Year**	II	**Semester**	I
Course Category	Basic Sciences course	**Branch**	ME	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Nil
Continuous Internal Evaluation:	30	**Semester End Evaluation:**	70	**Total Marks:**	100

Course Outcomes

After successful completion of the course, the student will be able to

CO1	Determine Laplace transform and inverse Laplace transforms of given function(s).
CO2	Develop a Fourier seriesin terms of sine and cosine of a given function.
CO3	Find out Fourier sine and cosine transforms.
CO4	Determine complex potential function, evaluate integrals by applying Cauchy's integral formula and construct series expansions of complex functions.
CO5	Apply method of separation of variables to find the solution of wave, heat, Laplace equations with given boundary conditions.

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3-High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2										2	2	
CO2	3	2										2	2	
CO3	3	2										2	2	
CO4	3	2										2	2	
CO5	3	2										2	2	

UNIT No.	Contents	Mapped COs
I	**Laplace Transforms & Inverse Laplace Transforms** **12hrs** Definition of Laplace transform, properties of Laplace transforms, transforms of derivatives, transforms of integrals, multiplication by t^n, division by t, unit step function, unit impulse function. Inverse Laplace transforms by partial fractions, convolution theorem (All theorems/properties without proofs)	CO1
II	**Fourier Series** **7hrs** Fourier series, Dirichlet's conditions, functions of any period, odd and even functions - half range series. (All theorems/properties without proofs)	CO2
III	**Fourier Transforms** **6hrs** Fourier integrals, Fourier cosine and sine integrals, Fourier transform, sine and cosine transform. (All theorems/properties without proofs)	CO3
IV	**Complex Variables** **12hrs** Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate. Cauchy theorem, Cauchy integral formula, Taylor's series, Laurent's series. (All theorems/properties without proofs)	CO4

V	**Applications of Partial Differential Equations** **7hrs** Classification of second order partial differential equations, method of separation of variables, solutions of one dimensional wave equation, one dimensional heat equation and two dimensional Laplace's equation in cartesian coordinates.(All theorems/properties without proofs)	CO5

Learning Recourse(s)
Text Book(s)
1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44/e, 2019. 2. Erwin Kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2006.
Reference Book(s)
1. N.P. Bali and Manish Goyal, A Text book of Engineering Mathematics, Laxmi Publications, 2008.
e- Resources & other digital material
1. https://www.nptel.ac.in/courses/111/105/111105123/ 2. https://www.nptel.ac.in/courses/111/105/111105134/ 3. https://www.nptel.ac.in/courses/111/105/111105093/