

Branch Name:	Mechanical Engineering/Civil Engineering/ Electrical Engineering
Program Code:	ET 101/ET106/ ET109
Course Name:	Engineering Mathematics - III
Course Code:	2ET1000305T
Pre-requisite Course:	Basic knowledge of Differentiation, Integration and Differential Equations

Course Objectives:

After the completion of the course, the students should be able to

1. Express physical phenomenon in Fourier Series & Laplace Transforms.
2. Solve higher order differential equations.
3. Use basic knowledge of Statistics and their applications in Civil engineering to cater various problems.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
05	03	02	-	05	24	60	16	40	-	-	-	-	100

Course Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Laplace Transforms: Definition, Laplace transform of elementary functions, Properties of Laplace transform, Inverse Laplace transform, transform of derivatives, Transform of integration, Multiplication by t^n , Division by t , Convolution theorem, Unit step and Heaviside's unit function, Solution of ordinary linear differential equations.	09	20
2	Fourier Series and Fourier Transforms: Periodic function, Trigonometric series, Fourier series, Functions of any period, Even and odd functions, Half-range Expansion, Definition, Fourier integral, Fourier sine and cosine integration, Complex form of Fourier integral, Fourier sine transform, Fourier cosine transform, Inverse Fourier transforms.	09	20
3	Ordinary Differential Equation (Higher Order): Ordinary differential equation with constant coefficient, Variation of parameter methods, Cauchy – Euler differential equations, Simultaneous differential equations with constant coefficient, Applications of ordinary differential equation.	09	20

4	Partial Differential Equation: Formation of partial differential equations, LaGrange's first order partial differential equations, Directly integral equations, Method of separable of variables, Application to wave equations, Diffusion equation and Laplace equation.	08	20
5	Statistics: Random variable, Mathematical Expectation, Standard Deviation, Binomial, Poisson and Normal distributions, Mean, Median, Mode. Bivariate distribution, Correlation coefficients, Regression lines, Formulas for Regression coefficients, Rank correlation. Fitting of Linear, Quadratic, Exponential and Logarithmic curves, Least squares method.	10	20

Text Books:

1. Numerical and Statistical methods by Dr. K.R. Kachot, 4th Edition
2. Higher engineering mathematics. By B.S.Grewal

Reference Books:

1. E. Kreyszig, Advanced Engineering Mathematics (8th Edition), John Wiley (1999)
2. Johnson Richard A., Miller and Freund's - Probability and Statistics (8th Edition), PHI.
3. S.C. Gupta and V. K. Kapoor, Fundamentals of Mathematical Statistics (11th Edition), Sultan Chand & Sons.
4. Textbook of Ordinary and Partial Differential Equations by M. D. Raisinghania.
5. Dr. K. R. Kachot, "Higher Engineering Mathematics", Vol.2, Mahajan Publication.
6. Engineering mathematics. By Srivastava.
7. Textbook of engineering mathematics By A. B. Mathur and V. P. Jaggi.

ICT/MOOCs:

1. <https://nptel.ac.in/courses/111104031> (For Ordinary Differential Equations By Raghavendra V., IIT Kanpur, India)
2. <https://nptel.ac.in/courses/111103021> (For Partial Differential Equations By Rajen Kumar Sinha, IIT Guwahati, India)

List of Open Sources/Learning Websites:

1. NPTEL Video Lectures: <https://nptel.ac.in/> .
For example: <https://archive.nptel.ac.in/courses/111/106/111106139/> (for the Laplace Transform)

Course Learning Outcomes (CLO):

CLO	Description	Bloom's Taxonomy Level
CLO1	Convert a function into its Laplace Transform and apply the concept to solve differential equations.	3-Apply 6-Create
CLO2	Represent a periodic function as the Fourier Series expansion.	1- Remember 5-Evaluate
CLO3	Form and solve the ordinary differential equations and apply the concept to analyze the problems in engineering.	2 -Understand 3-Apply
CLO4	Form and solve the partial differential equations and apply the learning to some special differential equations that arise in engineering.	2 -Understand 3-Apply
CLO5	To analyze a given statistical data by using the statistical tools.	4-Analyze 5-Evaluate
CLO6	To learn the practical application of mathematics	2 -Understand 3-Apply

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CLO1	M		M			M						L	M	M
CLO2		H	M			M	M					L	M	L
CLO3	M	H	M	M		M	M					L	M	L
CLO4	H	M	M	M	M								M	
CLO5	H	L	M										L	
CLO6	M			M	H	M					L		H	

H: High, M: Medium, L: Low