

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

CO-1 Express physical phenomenon in Fourier Series & Laplace Transforms.

CO-2 Solve Higher order differential equations.

CO-3 Use basic knowledge of Statistics and their applications in Civil/ME/EE engineering to cater various problems.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								
					Theory (Marks)				Practical (Marks)				Total (Marks)
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
5	3	2	-	5	24	60	16	40	-	-	-	-	100

Subject 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 , Laplace transforms of periodic functions, Convolution theorem, Unit step and Heaviside's unit function, Solution of ordinary linear differential equations.	9	20
2.	Fourier Series and Fourier Transforms: Periodic function, Trigonometric series, Fourier series, Functions of any period, Even and odd functions, Half-range Expansion, Fourier integral, Fourier sine and cosine integrals, Complex form of Fourier integral, Fourier sine transform, Fourier cosine transform, Inverse Fourier transforms.	9	20
3.	Ordinary Differential Equations (Higher Order): CF, PI, Solution of ODE (Higher Order), Ordinary differential equation with constant coefficients, Method of undetermined coefficients, Variation of parameter methods, Cauchy – Euler differential equations, Simultaneous differential equations with constant coefficient, Applications of ordinary differential equation.	9	20
4.	Partial Differential Equations: Formation of partial differential equations, Lagrange's first order partial differential equations, Equations solvable by direct integration, Non-linear PDEs, Method of separation of variables, Applications to wave equations, diffusion equation and Laplace equation.	8	20
5.	Statistics: Random variable: Continuous and discrete, Mathematical Expectation, Variance, Standard Deviation, Coefficient of variation, Binomial, Poisson	10	20

	and Normal distributions, Mean, Median, Mode, Skewness, Karl Pearson's coefficient of skewness, Kurtosis. Bivariate distribution, Correlation coefficients, Regression lines, Formulas for Regression coefficients, Rank correlation.		
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Text Books:

1. Higher Engineering Mathematics. By Dr. B. S. Grewal
2. Statistical Methods by S. P. Gupta

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. Textbook of Ordinary and Partial Differential Equations By M. D. Raisinghania.
4. Dennis G. Zill, 4th edition, Advanced Engineering Mathematics, 4th Edition, Jones and Bartlett Publishers.

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): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Convert a function into its Laplace Transform and apply the concept to solve differential equations.	L3-Apply
CLO2	Represent a periodic function as the Fourier Series expansion.	L1- Remember L5-Evaluate
CLO3	Form and solve the ordinary differential equations and apply the concept to analyse the problems in engineering.	L2 -Understand L3-Apply
CLO4	Form and solve the partial differential equations and apply the learning to some special differential equations that arise in engineering.	L2 -Understand L3-Apply
CLO5	Analyse a given statistical data by using the statistical tools.	L4-Analyze L5-Evaluate

Mapping of CLOs with PO's & PSO's

Course Learning Outcomes	Program Outcomes(POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	M	M	L		L											
CLO2	M	M	L		L											
CLO3	M	M	L		L											
CLO4	M	L	L													
CLO5	H	M	L		M											

H: High, M: Medium, L: Low