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ENGINEERING MATHEMATICS

Paper Code	**ECS-301**
Course Credits	4
Lectures/ Week	3
Tutorials/ Week	1
Course description	

UNIT- I   APPLICATIONS OF MULTIPLE INTEGRALS AND VECTOR CALCULUS

Applications of double and triple integrals (Cartesian, polar, cylindrical and spherical coordinate) in finding the centre of gravity, moment of inertia, curved surface area and volume; Problems on Green's theorem, Gauss Divergence theorem, Stoke's curl theorem (Cartesian forms without proof).

UNIT- II   APPLICATIONS OF LAPLACE TRANSFORM

Applications of Laplace and inverse Laplace transform in finding the particular solution of ordinary linear differential equation of higher order with constant and variable coefficients, integral equations, integro-differential equations.

UNIT- III   FOURIER SERIES, FOURIER TRANSFORM

Fourier's series (full range and half range) for arbitrary period, Representation of a function in terms of Fourier integrals, Fourier Sine Integral and Fourier Cosine Integral, Fourier transform-finite& infinite, Fourier sine & cosine transforms and their inverse transforms, Properties of different transforms and associated theorems.

UNIT- IV   DIFFERENCE EQUATIONS AND Z-TRANSFORM

Complementary function and particular integral of linear difference equations with constant and variable coefficients, Z-Transform and inverse Z-Transform (without proof) and its application in the solution of linear difference equations with constant coefficients.

UNIT-V   HIGHER CALCULUS

Extremals of functionals by calculus of variations, Beta and Gamma functions, Legendre and Jacobi forms of Elliptic integrals of different kinds.

Pre-requisite Course/Paper:	Basic Mathematics
Text Book:	B.S. Grewal, "Elementary Engineering Maths and HigherEngineering Maths", Khanna Publishers
Reference Books:	1. A.B. Mathur & V.P. Jaggi, "A text book of Engineering Maths and Advanced Engineering Mathematics", Khanna Publishers.
	2. E. Kreyszig, "Advanced Engineering Mathematics", John Wiley and Sons Inc.
	3. B. V. Ramana, "Higher Engineering Mathematics", Tata Mc Graw Hill
	4. R. K. Jain and S. R. K. Iyengar, "Advanced Engineering Mathematics", Narosa Publishing house
	5. Rakesh Dubey, "Mathematics for Engineers, Vol- I and II", Narosa Publishing house
Course Outcome:	**CO1.** Thorough understanding of applications of multiple integrals and vector calculus.
	CO2. An ability to apply Laplace transform to engineering problems.
	CO3. An ability to apply Fourier series and Fourier transform and understand its physical implications.
	CO4. Thorough understanding of Difference equations and z-transform.
	CO5. An ability to solve engineering problems by application of higher calculus such as Beta and Gamma functions, Legendre and Jacobi forms of Elliptic integrals of different kinds.
Computer usage/ Software required:	EXCEL, MATHEMATICA, MATLAB