MATHEMATICS – III

Common to ECE , EEE, MECH, CIVIL & CHEMICAL

Credits	Periods			Exam Hrs.	Sessional Marks	Exam Marks	Total Marks
	Theory	Tutorial	Lab				
3	3	1	-	3	40	60	100

COURSE OUTCOMES

1: Understanding the concepts of Gradient, Divergence and Curl and finding scalar potential function of irrrotational vector fields.

2: Understanding the concepts of Green's Theorem, Stokes' Theorem and the Divergence Theorem and to evaluate line integrals, surface, integrals and flux integrals.

3: Understand some basic techniques for solving linear partial differential equations and how to identify a partial differential equation in order to determine which technique(s) can best be applied to solve it.

4: Understand the methods to solve the Laplace, heat, and wave equations.

5: To gain good knowledge in the application of Fourier Transforms.

UNIT-I : VECTOR DIFFERENTIATION (12 Periods)

Differentiation of Vectors – Scalar and Vector point function – Del applied to Scalar point functions - Gradient geometrical interpretations – Directional Derivative - Del applied to vector point function – divergence - Curl – Physical interpretation of Divergence and Curl - Del applied twice to point functions- Del applied to product of point functions.

UNIT-II : VECTOR INTEGRATION (12 Periods)

Integration of vectors – Line integral – Surface – Green's theorem in the plane – Stokes theorem – Volume integral – Gauss Divergence theorems (all theorems without proofs) – Irrotational fields .

UNIT-III : PARTIAL DIFFERENTIAL EQUATIONS (12 Periods)

Introduction – Formation of Partial Differential Equations – Solution of Partial Differential Equations by Direct Integration – Linear Equations of the First order – Higher order Linear Equations with Constant Co-efficients – Rules for finding the complementary function - Rules for finding the Particular integral – Non- Homogeneous linear equations with constant coefficients.

UNIT –IV : APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS

(12 Periods)

Introduction – Method of separation of variables – Vibrations of a stretched string- Wave equation – One dimensional Heat flow - Two dimensional Heat flow – Solution of Laplace's equation.- Laplace's equation in Polar Co-ordinates.

UNIT-V : FOURIER TRANSFORMS (12 Periods)

Introduction – definition – Fourier integral theorem - Fourier sine and cosine integrals – Complex form of Fourier integrals – Fourier integral representation of a function – Fourier Transforms – Properties of Fourier Transforms – Convolution Theorem – Parseval's identity for Fourier transforms – Fourier Transforms of the Derivatives of functions – Application of Transforms to Boundary value problems – Heat conduction – Vibrations of a string.

Text Books:

1. Dr. B.S. Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers, New Dehli, 2014.

Reference books:

1. A Text book on Engineering Mathematics by N.P. Bali Etal, Laxmi pub.(p)Ltd , 2001.
2. Advanced Engineering Mathematics by H.K.Dass , S.Chand Publications, 2007.
3. Advanced Engineering Mathematics by Erwin kreyszig, John Wiley Publications, 1999.