ENGINEERING MATHEMATICS - III

B.Tech. Second Year, I - Semester

Common for ECE , EEE, MECH, CIVIL & CHEMICAL

[R-15 Regulation]

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

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the engineering and science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their engineering degree in different disciplines.

Course Outcomes : At the end of the course, the student will be able to

1	Understand the concepts of Gradient, Divergence and Curl and finding scalar potential function of irrotational 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	Gain good knowledge in the application of Fourier transforms.

CO – PO Mapping :

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO-1	3	2										1
CO-2	3	2										1
CO-3	3	2										1
CO-4	3	2										1
CO-5	3	2										1

SYLLABUS

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 coefficients – 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 coordinates.

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 BOOK:

1. **Dr. B.S. Grewal**, "*Higher Engineering Mathematics*", 43rd edition, Khanna Publishers, New Dehli.

REFERENCE BOOKS:

1. **Dr. N.P. Bali, Dr. Ashok Saxena, Dr. N.Ch. S. Narayana**, "*A Text book on Engineering Mathematics*", Laxmi Publications (P)Ltd., New Delhi.
2. **H. K. Dass**, "*Advanced Engineering Mathematics*", S. Chand and Company Ltd.
3. **Erwin Kreyszig**. "*Advanced Engineering Mathematics*", John Wiley and Sons, New York.