1/4 B.Tech. SECOND SEMESTER
ENGINEERING MATHEMATICS -II
(Common to all branches during I B.Tech., II Semester)
Course Code(s): CE2T1, ME2T1, CS2T1, IT2T1, AE2T1, EE2T1, EC2T1

Credits: 3

Lecture: 3 periods/week **Internal assessment: 30 marks**
Tutorial: 1 period /week **Semester end examination: 70 marks**

Course Objectives:

- After completion of this course engineers will be able to apply the concepts of matrices, Laplace transforms, Fourier series, Fourier transforms in solving engineering problems.
- Linear algebra in the course cover material which is essential to anyone who does mathematical computation in Engineering and sciences.

Course Outcomes:

At the end of the course student will be able to

1. Solve linear system of equations.
2. Determine the eigen values and eigen vectors of given square matrix and able to find inverse, power of a matrix using Cayley-Hamilton theorem.
3. Find Laplace transforms, inverse Laplace transforms of the given functions and able to apply Laplace transforms to solve differential equations with initial conditions.
4. Write given function in terms of sine and cosine terms in Fourier series and also to get knowledge in Fourier transforms.
5. Solve finite difference equations using Z-transforms.

UNIT I
MATRICES AND LINEAR SYSTEMS OF EQUATIONS:

Rank-Echelon form, Normal form-definition of a vector, linear independence – Solution of Linear System of equations – Direct Methods- Gauss Elimination - Gauss Jordon and Gauss Seidal Methods.

UNIT II
EIGEN VALUES - EIGEN VECTORS:

Eigen values - Eigen vectors - Properties – Cayley-Hamilton Theorem - Inverse and powers of a matrix by using Cayley-Hamilton theorem- some applications of eigen value problems-Diagonalization of a matrix.

UNIT III
LAPLACE TRANSFORMS & INVERSE LAPLACE TRANSFORMS

LAPLACE TRANSFORMS: Laplace transforms of standard functions –Shifting Theorems, Transforms of derivatives and integrals – Unit step function –Dirac's delta function.

INVERSE LAPLACE TRANSFORMS: Convolution theorem - Application of Laplace transforms to ordinary differential equations with given initial conditions.

UNIT IV
FOURIER SERIES AND FOURIER TRANSFORMS:

FOURIER SERIES: Determination of Fourier coefficients – Fourier series – even and odd functions – Fourier series in an arbitrary interval– Half-range sine and cosine series.

FOURIER TRANSFORMS: Fourier integral theorem (only statement) – Fourier sine and cosine integrals - Fourier transform – sine and cosine transforms – properties – inverse

transforms – Finite Fourier transforms.

UNIT V

Z-TRANSFORMS:

Introduction, properties of Z-transforms-initial value theorem-final value theorem-inverse Z-transforms-applications to difference equations.

Learning Resources

Text Books:

1. Higher Engineering Mathematics – Khanna Publishers – B.S. Grewal – 42nd Edition.
2. Advanced Engineering Mathematics – Wiley – Erwin Kreyszig- 8th Edition.

Reference Book:

Engineering Mathematics Vol-II, Iyengar,T.K.V, Krishna Gandhi, et.al S.Chand Co. New Delhi.

Web Resources:

1. http://nptel.ac.in/courses.php
2. http://jntuk-coeerd.in/