1/4 B.Tech. SCOND SEMESTER
ENGINEERING MATHEMATICS-II

CS 2T1 **Required** **Credits: 4**

Lecture: 4 periods/week **Internal assessment: 30 marks**
Tutorial: 1 period /week **Semester end examination: 70 marks**

Course context and Overview: The aims of the modules are - To develop further the students' abilities in mathematics, in particular calculus, linear algebra and complex numbers. To deepen the students' appreciation of the central role that mathematics plays in the development and practice of engineering. To further motivate the comprehension and use of important analytical concepts, calculus methods and linear mathematics fundamental to engineering. To help students to further develop the skill of analysing problems in a rational (rigorous, logical) and methodical manner. To further develop the students' ability to transfer their mathematical understanding (and the associated methods) to diverse engineering application areas. To help students towards self-diagnosis and self-help in filling gaps in their mathematical education.

Prerequisites: -

Objectives:

1. To handle linear systems using matrices.
2. To understand different solution techniques and use tools like Fourier transforms, Fourier.
3. Series, Z-transforms, Beta and Gamma functions in problem solving.

Learning Outcomes:
The Student will be able to

1. Able to solve linear system of equations by direct, iterative methods.

2. Expand given function in sine, cosine functions using Fourier transforms.

3. Z- transforms are used in solving difference equations.

4. Get the knowledge of using Beta, gamma functions in solving improper integrals.

5. Use method of least squares to find the curve of best fit for the given data.

6. Able to solve first order partial differential equations.

UNIT – I
Linear systems of equations: Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods- Gauss Elimination - Gauss Jordon and Gauss Seidal Methods.

UNIT – II
Eigen values - Eigen vectors – Properties – Cayley-Hamilton Theorem - Inverse and powers

of a matrix by using Cayley-Hamilton theorem.

UNIT – III
Fourier
Series:

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

UNIT – IV

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-transform – properties – Damping rule – Shifting rule – Initial and final value theorems - Inverse z-transform -Convolution theorem – Solution of difference equation by z-transforms.

UNIT – VI

Gamma and Beta Functions – Properties – Evaluation of improper integrals.

UNIT – VII

Curve fitting: Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares.

UNIT – VIII

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations.

Learning Resources

Text Books:

1. Erwin Kreszig, "Advanced Engineering Mathematics", 8 Ed Wiley Student Edition.
2. Higher Engineering mathematics by B.S. Grewal.
3. Iyengar,T.K.V, Krishna Gandhi, et.al Engineering Mathematics Vol-II, S.Chand Co. New Delhi.