I Year-I Semester		L	T	P	C
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MATHEMATICS-II (Mathematical Methods) (R13107)

Prerequisite Course: Operation of Scientific Calculator

Course Description and Objectives:

1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.
3. Understand the most basic numerical methods to solve simultaneous linear equations.

Course Outcomes:

Upon completion of the course, the student will be able to achieve the following outcomes.

CO	Course Outcomes	POs
1	Calculate a root of an algebraic and transcendental equations.	4
2	Establish the relation between the finite difference operators. Compute interpolating polynomial for the given data.	5
3	Solve ordinary differential equations numerically using Euler's and RK method.	5
4	Find Fourier series for certain functions.	4
5	Find Fourier transforms for certain functions.	4
6	Evaluating Z-transforms and solving Difference equations using Z-transforms	5

Syllabus:

UNIT I:

Solution of Algebraic and Transcendental Equations:

Introduction- Bisection method – Method of false position – Iteration method – Newton-Raphson method (One variable and simultaneous Equations).

UNIT II:

Interpolation:

Introduction- Errors in polynomial interpolation – Finite differences- Forward differences-Backward differences –Central differences – Symbolic relations and separation of symbols - Differences of a polynomial-Newton's formulae for interpolation – Interpolation with unevenly spaced points - Lagrange's interpolation formula.

UNIT III:

Numerical solution of Ordinary Differential equations:

Solution by Taylor's series-Picard's method of successive approximations-Euler's method - Runge-Kutta methods.

UNIT IV:

Fourier Series:

Introduction- Determination of Fourier coefficients – Even and odd functions –Change of interval– Half-range sine and cosine series.

Application: Amplitude, spectrum of a periodic function

UNIT V:

Fourier Transforms:

Fourier integral theorem (only statement) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT VI:

Z–transform:

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

TEXT BOOKS:

1. B.S.Grewal**,** Higher Engineering Mathematics, 42nd Edition, Khanna Publishers.
2. Dean G. Duffy**,** Advanced engineering mathematics with MATLAB, CRC Press
3. V.Ravindranath and P.Vijayalakshmi**,** Mathematical Methods, Himalaya Publishing House.
4. Erwin Kreyszig**,** Advanced Engineering Mathematics, 9th Edition, Wiley-India

REFERENCE BOOKS:

1. David Kincaid, Ward Cheney, Numerical Analysis-Mathematics of Scientific Computing, 3rd Edition, Universities Press
2. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
3. Dass H.K., Rajnish Verma. Er**.,** Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.
4. N.P.Bali, Engineering Mathematics, Lakshmi Publications