II B.Tech - I Semester (20MA3005) NUMERICAL AND TRANSFORMATION TECHNIQUES

Int. Marks	Ext. Marks	Total Marks	L	Т	Р	С
30	70	100	3	-	-	3

Pre-Requisites: Mathematics

Course Objectives:

- The course is designed to equip the students with necessary mathematical skills and techniques that are essential for an engineering course.
- The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.

UNIT-I:

Iterative methods: Introduction – Bisection method – Secant method – Method of false position – Iteration method – Newton-Raphson method

UNIT-II:

Interpolation: Introduction– Finite differences – Forward differences – Backward differences – Central differences – Relations between operators – Newton's forward and backward formulae for interpolation – Interpolation with unequal intervals – Lagrange's interpolation formula

UNIT-III:

Numerical integration and solution of ordinary differential equations: Trapezoidal rule – Simpson's 1/3rd and 3/8th rule – Solution of ordinary differential equations by Taylor's series – Picard's method of successive approximations – Euler's method – Runge-Kutta method (second and fourth order).

UNIT-IV:

Fourier series and Fourier Transforms: Fourier Series: Introduction – Periodic functions – Fourier series of periodic function – Dirichlet's conditions – Even and odd functions – Change of interval – Half-range sine and cosine series.

Fourier Transforms: Fourier integral theorem (without proof) – Fourier sine and cosine integrals – Sine and cosine transforms – Properties – inverse transforms – Finite Fourier transforms.

UNIT-V:

Z Transforms: Z-transform – properties –Damping rule – Shifting rule – Initial and Final value theorems – Inverse z- transform – Convolution theorem – Solution of Difference equation by Z-transforms.

Course Outcomes:

After successful completion of the course, the students can be able to:

S.No	Course Outcomes						
1	Determine the numerical solution of the algebraic and transcendental equations.	1, 2, 3					
2	Determine interpolation techniques for data analysis.	1, 2, 3					
3	Determining the numerical solutions of the ordinary differential equations.	1, 2, 3					
4	Find the Fourier series and Fourier transforms for certain functions.	1, 2, 3					
5	Develop to ability to compute Z-transforms and Inverse Z transforms	1, 2, 3					

Correlation of COs with POs& PSOs:

Raghu Engineering College (A)

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	3	-	-	-	-	2	-	-	1	2	-
CO2	2	2	-	2	-	-	-	-	2	-	-	1	2	-
CO3	2	3	-	-	-	-	-	-	-	-	-	1	2	-
CO4	1	2	-	1	•	-	-	-	-	-	-	1	2	-
CO5	1	2	-	1	-	1	-	-	-	-	-	1	2	-

Text Books:

- 1. B. S. Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
- 2. B. V. Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.

Reference Books:

- 1. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley India Edition.
- 2. Advanced Engineering Mathematics: Michael Greenberg, Pearson.

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