PDA COLLEGE OF ENGINEERING, KALABURAGI B E. Third Semester

Numerical Methods and Integral Transforms

(Common to E&CE, EEE & E&I)

[As per Choice Based Credit System (CBCS) scheme] (From the academic year 2022 23)

(From the academic year 2022-23)					
	Course Code	21MA31C	CIE Marks	50	
	Credits	03	SEE Marks	50	
	Contact Hours/Week (L-T-P)	3-0-0	Total Marks	100	
	Contact Hours	42	Exam Hours	03	

Course Learning Objectives: To enable the students to obtain the knowledge of Engineering Mathematics in the following topics

- 1. Numerical methods to solve algebraic and Transcendental equations
- 2. Interpolation methods, Numerical differentiation and Numerical integration
- **3.** Fourier Series, Fourier transforms and Z-transforms and its application in engineering fields

Module-I

9 Hours

Algebraic And Transcendental Equations, Solution by Newton's Raphson and Regula falsi methods.

Finite differences (Forward and Backward differences), Interpolation, Newton's Forward and Backward formulae. Langrange's interpolation and inverse interpolation formulae

RBT Levels: L1, L2 & L3

Module-II

9 hours

Numerical differentiation: Numerical differentiation using Newton's forward and backward interpolation formulae and problems.

Numerical integration: Introduction, Trapezoidal rule, Simpson's 1/3rd, Simpson's 3/8th rule and Weddle's rule. (all formulae and rules without proof).

Numerical solutions of first order and first degree ordinary differential equations: Taylors series method, Runge –Kutta method of fourth order, modified Euler's method and Milne's-Thomson's predictor and corrector methods and problems.(all formulae without proof)

RBT Levels: L1, L2 & L3

Module-III	8 hours			
Difference equations and Z-Transforms : Basic definitions, , standard Z-transforms, linearity property , damping rule, shifting rule , initial value theorem ,final value theorem and problems . Inverse Z-Transforms and application of Z-Transforms to solve difference equations. RBT Levels: L1, L2 & L3				
Module –IV	8 hours			
Fourier series:				
Periodic functions, Fourier series with periods $(0, 2\pi)$, $(-\pi, \pi)$, $(0, 2l)$ and $(-l, l)$. Half range Fourier series, Practical harmonic analysis and problems.				
RBT Levels: L1, L2 & L3				
Module- V	8 hours			
Fourier Transforms:				
Finite and Infinite Fourier transforms, Fourier sine and cosine transforms, properties, Inverse Fourier transforms and problems.				
RBT Levels: L1, L2 & L3				
 1 Higher Engineering Mathematics by B.S.Grewal, Khanna publishers; 40th Edition.2007 2 Engineering Mathematics by N. P. Bali and Manish Goval. Lawrin publications, latest edition. 				
2 Engineering wathematics by 13.1. Dan and wathem Goyal. Laxini publications, fatest cuttion				
Reference books: 1.Advanced Engineering Mathematics by E. Kreyszig, John Willey & sons 8 th Edn.				
2.A short course in differential equations – Rainvile E.D.9th Edition.				
3.Advanced Engineering Mathematics by R.K.Jain & S.R.K Iyengar; Narosa publishing House.				
4.Introductory methods of numerical analysis by S.S.Sastry				

Course Outcomes: On completion of this course, students are able to:

- CO1: Solve the numerical problems in algebraic, transcendental equations. Computation of interpolation polynomials
- CO2: Compute derivatives of the functions numerically using given data and Evaluate integrations numerically.
- CO3: Understanding the characteristics and properties of the Z-transform
- CO4: Construction of Fourier series for periodic signals and Fourier series to analyze circuits.
- CO5: Determine Fourier transformation for continuous time signals and systems

Method of Examination:

Note:- The SEE question paper will be set for 100 marks and the marks scored by the student will be proportionately reduced to 50.

- The question paper will have **ten** full questions carrying equal marks.
- Each full question carries **20**marks.
- There will be **two** full questions (with a **maximum** of **four** sub questions) from each module.
- Each full question will have sub question covering all the topics under a module.

The students will have to answer **five** full questions, selecting **one** full question from each module.