SWARNANDHRA
COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

Accredited by National Board of Accreditation, AICTE, New Delhi,Accredited by NAAC with "A" Grade – 3.32 CGPA,Recognized under 2(f) & 12(B) of UGC Act 1956, Approved by AICTE, New Delhi,Permanent Affiliation to JNTUK, Kakinada
Seetharampuram, W.G.DT., Narsapur-534280, (Andhra Pradesh)

DEPARTMENT OF S&H

TEACHING PLAN

Course Code	Course Title	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
23BS3T04	NUMERICAL METHODS& TRANSFORM TECHNIQUES	III	MECHANICAL &ROBOTICS	60/6	2024-25	30-07-2024

COURSE OUTCOMES: At the end of this course, the student will be able to

CO1	Evaluate the approximate roots of polynomial and transcendental equations by different algorithms and apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (K3)
CO2	Apply numerical integral and differential methods to different Engineering problems. (K3)
CO3	Apply the Laplace transform for solving differential equations (K3)
CO4	Compute the Fourier series of periodic signals (K3)
CO5	Apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (K3)

UNIT	Out Comes / Bloom's Level	Topic No.	Topics/Activity	Text Book/ Reference	Contact Hour	Delivery Method
I	CO1 Students are able to evaluate the approximate roots of polynomial and transcendental equations by different algorithms and apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (K3)		Iterative Methods			
		1.1	Introduction – Solutions of algebraic and transcendental equations: Bisection method	T_1&T_2	1	Chalk & Talk,Active learning ,PPT and Tutorial
				T_1&T_2	1	
		1.2	Secant method	T_1&T_2	1	
		1.3	Method of false position	T_1&T_2	1	
				T_1&T_2	1	
		1.4	Iteration method	T_1&T_2	1	
				T_1&T_2	1	
		1.5	Newton-Raphson method-One variable	T_1&T_2	1	
		1.6	Difference Operators-Forward,backward,central	T_1&T_2	1	

			and their properties.			
		1.7	Newton's forward formulae for interpolation	T_1&T_2	1	
		1.8	Newton's backward formulae for interpolation	T_1&T_2	1	
		1.9	Interpolation with unequal intervals – Lagrange's interpolation formula	T_1&T_2	1	
		1.10	Lagrange's interpolation formula	T_1&T_2	1	
					13	
II	CO2 Students are able to Apply numerical integral and differential methods to different Engineering problems. (K3)	**Numerical integration, Solution of ordinary differential equations with initial conditions**				
		2.1	Trapezoidal rule	T_1&T_2	1	Chalk & Talk, Active learning, PPT and Tutorial
		2.2	Simpson's 1/3rd	T_1&T_2	1	
		2.3	Simpson's 3/8th rule	T_1 &T_2	1	
		2.4	Solution of initial value problems by Taylor's series	T_1&T_2	1	
		2.5	Picard's method of successive approximations	T_1&T_2	1	
		2.6	Euler's method	T_1&T_2	1	
		2.7	Modified Euler's method	T_1&T_2	1	
		2.8	Runge-Kutta method (second & fourth order)	T_1&T_2	1	
				T_1&T_2	1	
		2.9	Milne's Predictor and Corrector Method	T_1&T_2	1	
					10	
		Laplace Transforms:				

III	CO3 Students are able to apply the Laplace transform for solving differential equations (K3)	3.1	Definition of Laplace transform - Laplace transforms of standard functions	T_1&T_2	1	Chalk & Talk,Active learning ,PPT and Tutorial
				T_1&T_2	1	
		3.2	Properties of Laplace Transforms	T_1&T_2	1	
				T_1&T_2	1	
		3.3	Shifting theorems	T_1&T_2	1	
				T_1&T_2	1	
		3.4	Transforms of derivatives and integrals	T_1&T_2	1	
				T_1&T_2	1	
		3.5	Unit step function	T_1&T_2	1	
		3.6	Dirac's delta function	T_1&T_2	1	
		3.7	Inverse Laplace transforms – Convolution theorem (without proof).	T_1&T_2	1	
				T_1&T_2	1	
		3.8	Applications: Solving ordinary differential equations (initial value problems) and integro differential equations using Laplace transforms.	T_1&T_2	1	
				T_1&T_2	1	
					14	
IV	Fourier series:					
	CO4 Students are able to compute the Fourier series of periodic signals (K3)	4.1	Introduction	T_1&T_2	1	Chalk & Talk,Active learning ,PPT and Tutorial
		4.2	Periodic functions	T_1&T_2	1	
		4.3	Fourier series of periodic function	T_1&T_2	1	
				T_1&T_2	1	
		4.4	Dirichlet's conditions	T_1&T_2	1	
				T_1&T_2	1	
		4.5		T_1&T_2	1	

			Even and odd functions	T_1&T_2	1	
		4.6	Change of interval	T_1&T_2	1	
				T_1&T_2	1	
		4.7	Half-range sine and cosine series.	T_1&T_2	1	
				T_1&T_2	1	
				Total	**12**	
V	CO5 Students are able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (K3)	Fourier Transforms:				
		5.1	Fourier integral theorem (without proof)	T_1&T_2	1	Chalk & Talk, Active learning, PPT and Tutorial
				T_1&T_2	1	
		5.2	Fourier sine and cosine integrals	T_1&T_2	1	
		5.3	Infinite Fourier transforms	T_1&T_2	1	
				T_1&T_2	1	
		5.4	Sine and cosine transforms	T_1&T_2	1	
				T_1&T_2	1	
		5.5	Properties– Inverse transforms – Convolution theorem (without proof)	T_1&T_2	1	
				T_1&T_2	1	
				T_1&T_2	1	
	:	5.6	Finite Fourier transforms.	T_1&T_2	1	
				Total	11	
				Cumulative Proposed Periods	**60**	

Text Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
T1	Dr. B.S.Grewal Higher Engineering Mathematics, 43rd Edition, Khanna Publications,2015
T2	B. V. Ramana,Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education

Reference Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
R1	Erwin Kreyszig,Advanced Engineering Mathematics,10th Edition, Wiley-India.

R2	Steven C. Chapra, Applied Numerical Methods with MATLAB for Engineering and Science,Tata Mc. Graw Hill Education.
R3	M. K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publications
R4	. Lawrence Turyn,Advanced Engineering Mathematics, CRC Press.
Web Details	
1	https://youtu.be/3j0c_FhOt5U
2	https://youtu.be/lhZYos3IL1E
3	https://youtu.be/KqokoYr_h1A
4	https://youtu.be/spUNpyF58BY

		Name	Signature with Date
i.	Faculty	Mrs.R.V.Lakshmi	R.V.Lakshmi
ii.	Course Coordinator	Mrs.R.V.Lakshmi	R.V.Lakshmi
iii.	Module Coordinator	Mr. T.V.Lakshman Rao	
iv.	Head of the Department	Dr. V.Swaminadham	V. Iwami

Principal