



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			



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			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		
		Numerical integration, Solution of ordinary differential equations with initial conditions					
	II CO2 Students are able to Apply numerical integral and differential methods to different Engineering problems. (K3)	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:					



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III	CO3 Students are able to apply the Laplace transform for solving differential equations (K3)	3.1	Definition of Laplace transform	T_1 & T_2	1	Chalk & Talk, Active learning, PPT and Tutorial	
			- Laplace transforms of standard functions	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	CO4 Students are able to compute the Fourier series of periodic signals (K3)	Fourier series:					Chalk & Talk, Active learning, PPT and Tutorial
		4.1	Introduction	T_1 & T_2	1		
		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				



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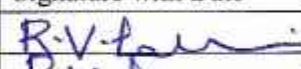
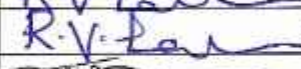

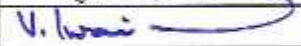
			Even and odd functions	T_1 & T_2	1		
		4.6	Change of interval	T_1 & T_2	1		
				T_1 & T_2	1		
		4.7	Half-range sine and cosine series.	T_1 & T_2	1		
				T_1 & T_2	1		
Total					12		
	CO5 Students are able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (K3)	Fourier Transforms:					
v		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, 43 rd 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, 10 th Edition, Wiley-India.						



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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	
ii. Course Coordinator	Mrs.R. V.Lakshmi	
iii. Module Coordinator	Mr. T.V.Lakshman Rao	
iv. Head of the Department	Dr. V.Swaminadham	


Principal