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
23BS3T05	Numerical Technics and Statistical Methods	III	CIVIL	60/6	2025-26	14-07-2025

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 discrete and continuous probability distributions (K3)
CO4	Use the components of a classical hypothesis test. (K3)
CO5	Examine the statistical inferential methods based on small and large sampling tests. (K3)

UNIT	Out Comes / Bloom's Level	Topic No.	Topics/Activity	Text Book/ Reference	Contact Hour	Delivery Method
			Iterative Methods			
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)	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-	T_1&T_2	1	
		1.6	Difference Operators-forward,backward,central & their properties	T_1&T_2	1	
		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**				Chalk & Talk,Active learning ,PPT and Tutorial
		2.1	Trapezoidal rule	T_1&T_2	1	
		2.2	Simpson's 1/3rd	T_1&T_2	1	
		2.3	Simpson's 3/8 th 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	
				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	
		2.9	Milne's Predictor and Corrector Method	T_1&T_2	1	
					10	
III	**CO3:** Students are able to apply discrete and continuous probability distributions (K3)	**Probability and Distributions**				
		3.1	Baye's theorem	T_1&T_2	1	
		3.2	Random variables – Discrete random variables	T_1&T_2	1	
				T_1&T_2	1	
		3.3	Random variables – Continuous random variables	T_1&T_2	1	
				T_1&T_2	1	
		3.4	Distribution functions – Probability mass function, Probability density function	T_1&T_2	1	
				T_1&T_2	1	

		3.5	Cumulative distribution functions – Mathematical Expectation and Variance	T_1&T_2	1	Chalk & Talk,Active learning ,PPT and Tutorial
		3.6	Binomial distribution	T_1&T_2	1	
		3.7	Poisson distribution	T_1&T_2	1	
				T_1&T_2	1	
		3.8	Normal distribution	T_1&T_2	1	
				T_1&T_2	1	
					13	
IV	**Sampling Theory**					
	CO4: Students are able to use the components of a classical hypothesis test (K6)	4.1	Introduction – Population and Samples	T_1&T_2	1	Chalk & Talk,Active learning ,PPT and Tutorial
		4.2	Sampling distribution of Means and Variance (definition only)	T_1&T_2	1	
		4.3	Point and Interval estimations	T_1&T_2	1	
				T_1&T_2	1	
		4.4	Maximum error of estimate	T_1&T_2	1	
				T_1&T_2	1	
		4.5	Central limit theorem (without proof)	T_1&T_2	1	
				T_1&T_2	1	
		4.6	Estimation using t-distributions.	T_1&T_2	1	
		4.7	Estimation using Chi-Square -distributions.	T_1&T_2	1	
		4.8	Estimation using F-distributions.	T_1&T_2	1	
				Total	11	
V	**CO5 :** Students are able to examine the statistical inferential methods based on small and large sampling tests (K4)	**Tests of Hypothesis**				
		5.1	Introduction – Hypothesis – Null and Alternative Hypothesis – Type I and Type II errors	T_1&T_2	1	
				T_1&T_2	1	
		5.2	Level of significance– One tail and two-tail tests	T_1&T_2	1	
		5.3	Test of significance for large samples- Single and difference means	T_1&T_2	1	
				T_1&T_2	1	
		5.4	Test of significance for	T_1&T_2	1	

			large samples-Single and two proportions	T_1&T_2	1	Chalk & Talk,Active learning ,PPT and Tutorial
		5.6	t-test for single mean	T_1&T_2	1	
		5.7	t-test for difference of means	T_1&T_2	1	
		5.8	F-test for equality of population variance	T_1&T_2	1	
		5.9	Chi-Square test(Goodness of fit)	T_1&T_2	1	
		5.10	Chi-square test (Independence of attributes)	T_1&T_2	1	
				T_1&T_2	1	
				Total	13	
			Cumulative Proposed Periods		60	

Text Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
T1	B. S. Grewal, Higher Engineering Mathematics, 44th Edition, Khanna Publishers.
T2	S. C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e,Sultan Chand &Sons Publications.

Reference Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
R1	Dr T.K.V.Iyengar & Dr B.Krishna Gandhi, Probability &Statistics,S.Chand Publishing.
R2	M. K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publications.
R3	Miller and Freund's, Probability and Statistics for Engineers,7/e, Pearson
Web Details	
1	https://swayam.gov.in/courses/1349-probability-and-stochastics-for-finance
2	https://onlinecourses.nptel.ac.in/noc18_cs17/
3	http://www.nptelvideos.in/2012/11/probability-methods-in-civil-engineering.html
4	http://www.nptelvideos.in/2012/12/probability-random-variables.html

		Name	Signature with Date
i.	Faculty	Dr.E.M.Victoria	E.Victoria 25/7/25
ii.	Course Coordinator	Dr.E.M.Victoria	E.Victoria 25/7/25
iii.	Module Coordinator	Mr. M. Ravindra Babu	M. Ravindra Babu
iv.	Head of Department	Dr. V.Swaminadham	V. Iwami

Principal