



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.D.T., 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 Techniques and Statistical Methods	III	CIVIL	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 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
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-	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	

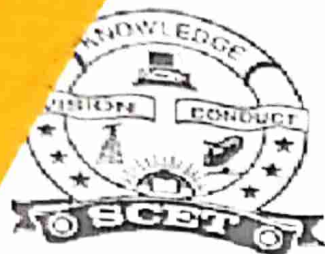


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		1.9	Interpolation with unequal intervals Lagrange's interpolation formula	$T_1 \& T_2$	1	
		1.10	Lagrange's interpolation formula	$T_1 \& T_2$	1	
					13	
II	CO2: Students are able to apply numerical integral and differential methods to different 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	
				$T_1 \& T_2$	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	



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		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	
Sampling Theory						
IV	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	
Tests of Hypothesis						
V	CO5 : Students are able to examine the statistical inferential methods based on small and large sampling tests (K4)	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	



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		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	Mrs P. Durga Bhavani	
ii. Course Coordinator	Mrs P. Durga Bhavani	
iii. Module Coordinator	Mr. M. Ravindra Babu	
iv. Head of Department	Dr. V. Swaminadham	

Principal