

20BS1301- NUMERICAL AND STATISTICAL METHODS

Offering Branches	CE, ME		
Course Category:	Basic Sciences	Credits:	3
Course Type:	Theory	Lecture-Tutorial- Practical:	3-0-0
Prerequisites:	Nil	Continuous Evaluation:	30
		Semester End Evaluation:	70
		Total Marks:	100

Course Outcomes

Upon successful completion of the course, the student will be able to:

CO1	Understand the basic concepts of Numerical and statistical Methods .	K2
CO2	Apply different Numerical methods to solve the problems of numerical differentiation, integration, ordinary differential equations.	K3
CO3	Apply concepts of probability and random variables to real life problems.	K3
CO4	Estimate the interpolated values, approximate roots, areas and derivatives.	K4
CO5	Analyse the data to test of hypothesis corresponding to mean, proportions for large and small samples.	K4
CO6	Apply different methods to solve Numerical and statistical problems and submit a report.	K3

Contribution of Course Outcomes towards achievement of Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1													3	
CO2	3								2	2			3	
CO3	3								2	2			3	
CO4		3											3	
CO5		3											3	
CO6	3								2	2			3	
Avg.	3	3							2	2			3	

Course Content

UNIT-1	Solution to Algebraic and Transcendental Equations Solution of algebraic and transcendental equations: Bisection method, method of false position and Newton-Raphson's method. Finite differences, relation between operators, interpolation using Newton's forward and backward difference formulae. Interpolation with unequal intervals: Lagrange's formula. (All theorems/properties without proofs)	CO1, CO2, CO4, CO6
UNIT-2	Numerical Differentiation and Integration Numerical Differentiation- Newton's forward and backward difference formulae. Numerical integration- trapezoidal rule, Simpson's $\frac{1}{3}$ rd and $\frac{3}{8}$ th rules. Ordinary differential equations: Euler's, modified Euler's, Runge-Kutta method of fourth order for solving first order equations. (All theorems/properties without proofs)	CO1, CO2, CO4, CO6
UNIT-3	Probability Random variables (discrete and continuous), probability density functions, probability distribution: Binomial - Poisson - normal distribution and their properties (mathematical expectation and variance). (All theorems/properties without proofs)	CO1, CO3, CO5, CO6
UNIT-4	Testing of Hypothesis Formulation of null hypothesis, critical regions, level of significance. Large sample tests: Test for single proportion, difference of proportions, test for single mean and difference of means.	CO1, CO3, CO5, CO6

UNIT-5	Small Sample Tests Student's t-distribution (single mean, two means and paired t-test), Testing of equality of variances (F-test)	CO1, CO3, CO5, CO6
Learning Resources		
Text Books	<ol style="list-style-type: none"> 3. B.S. Grewal, <i>Higher Engineering Mathematics</i>, Khanna Publishers, 44/e, 2019. 4. T.K.V.Iyenger, Krishna Gandhi and others, <i>Probability & Statistics</i>, S.Chand. 	
Reference Books	<ol style="list-style-type: none"> 1. Erwin Kreyszig, <i>Advanced Engineering Mathematics</i>, 9/e, John Wiley & Sons, 2006. 2. Miller and Freund's, <i>Probability and Statistics for Engineers</i> , Pearson. 	
e-Resources& other digital material	<ol style="list-style-type: none"> 1. https://www.nptel.ac.in/courses/111/107/111107105/ 2. https://www.nptel.ac.in/courses/111/105/111105041/ 3. https://www.nptel.ac.in/courses/111/106/111106112/ 4. https://www.nptel.ac.in/courses/111/105/111105090/ 5. FED Moodle 	