

23BS21T1 NUMERICAL AND STATISTICAL METHODS

Course Category	Basic Sciences	Credits	3
Course Type	Theory	Lecture – Tutorial –Practical	3-0-0
Prerequisite	Basic algebraic Equations, Probability, random variables (discrete and continuous) and probability distributions.	Sessional Evaluation	30
		Semester End Exam. Evaluation	70
		Total Marks	100

Course Outcomes	COs	Statements	Blooms Level
	CO1	Apply numerical methods to solve algebraic and transcendental equations.	L2, L3
	CO2	Derive interpolating polynomials using interpolation formulae.	L3, L5
	CO3	Solve differential and integral equations numerically.	L3
	CO4	To identify real life problems into Mathematical Models.	L2, L3
	CO5	To apply the probability theory and testing of hypothesis in the field of civil engineering Applications.	L3, L5
Course Content	<p style="text-align: center;">UNIT I</p> <p>Solution of Algebraic & Transcendental Equations: Introduction-Bisection Method-Iterative method, Regula-Falsi method and Newton Raphson method System of Algebraic equations: Gauss Elimination, Jacoby and Gauss Siedal method.</p> <p style="text-align: center;">UNIT II</p> <p>Interpolation: Finite differences-Newton’s forward and backward interpolation formulae – Lagrange’s formulae. Curve fitting: Fitting of straight line, second-degree and Exponential curve by method of least squares.</p> <p style="text-align: center;">UNIT III</p> <p>Solution of Initial value problems to Ordinary differential equations: Numerical solution of Ordinary Differential equations: Solution by Taylor’s series-Picard’s Method of successive Approximations-Euler’s and modified Euler’s methods-Runge-Kutta methods (second and fourth order).</p>		

	<p style="text-align: center;">UNIT IV</p> <p>Estimation and Testing of hypothesis, large sample tests: Estimation-parameters, statistics, sampling distribution, point estimation, Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test. Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems</p> <p style="text-align: center;">UNIT V</p> <p>Small sample tests: Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), χ^2 - test for goodness of fit, χ^2 - test for independence of attributes.</p>
<p>Textbooks and Reference books</p>	<p>Textbooks:</p> <ol style="list-style-type: none"> 1. S S Sastry, <i>Introductory Methods of Numerical Analysis</i>, PHI Learning Private Limited. 2. B. S. Grewal, <i>Higher Engineering Mathematics</i>, Khanna Publishers, 2017, 44th Edition. 3. Miller and Friends, <i>Probability and Statistics for Engineers</i>, 7/e, Pearson, 2008.India. <p>Reference Books:</p> <ol style="list-style-type: none"> 1. Erwin Kreyszig, <i>Advanced Engineering Mathematics</i>, John Wiley & Sons, 2018, 10th Edition. 2. R.K.Jainand S.R.K .Iyengar, <i>Advanced Engineering Mathematics</i>, Alpha Science International Ltd., 2021 5th Edition (9th reprint). 3. Ronald E. Walpole, <i>Probability and Statistics for Engineers and Scientists</i>, PNIE 4. H.K Das, Er. Rajnish Verma, <i>Higher Engineering Mathematics</i>, S. Chand Publications,2014, Third Edition (Reprint 2021) <p>Online Learning Resources:</p> <ol style="list-style-type: none"> 1. https://onlinecourses.nptel.ac.in/noc17_ma14/preview 2. https://onlinecourses.nptel.ac.in/noc24_ma05/preview 3. http://nptel.ac.in/courses/111105090