Course: BTech **Semester:** 4

Prerequisite: Basic concepts of Statistics, Probability and Fundamentals of Calculus

Rationale: The course provides introductory numerical, statistical and probability methods

Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs/Week	Tutorial Hrs/Week	Lab Hrs/Week	Hrs/Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
4	-	-	-	4	20	20	-	60	-	100

SEE - Semester End Examination, **CIA** - Continuous **I**nternal Assessment (**I**t consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

Course Content

W - Weightage (%) , **T** - Teaching hours

Sr.	Topics	W	T
1	**UNIT 1Correlation, Regression and Curve Fitting :** Correlation and Regression – Rank correlation Curve Fitting by The Method of Least Squares- Fitting of Straight Lines, Second Degree Parabolas and More General Curves	18	11
2	**UNIT 2Probability and Probability Distributions:** Probability Spaces, Conditional Probability, Bayes' Rule, Discrete and Continuous Random Variables, Independent Random Variables, Expectation and Variance of Discrete and Continuous Random Variables, Distribution and Their Properties: Binomial Distribution, Poisson Distribution, Normal Distribution	23	13
3	**UNIT 3Testing of Hypothesis:** Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations. Test for single mean, difference of means, Test for ratio of variances, Chi-square test for goodness of fit and independence of attributes.	26	15
4	**UNIT 4Solution of a System of Linear Equations, Roots of Algebraic and Transcendental Equations:** Gauss-Jacobi and Gauss Seidel Methods, Solution of Polynomial and Transcendental Equations – Bisection Method, Newton-Raphson Method and Regula-Falsi Method	11	7
5	**UNIT 5Finite Differences and Interpolation:** Finite Differences, Relation between Operators, Interpolation using Newton's Forward and Backward Difference Formulae. Newton's Divided and Lagrange's Formulae for Unequal Intervals.	11	7
6	**UNIT 6Numerical Integration:** Trapezoidal rule, Simpson's 1/3rd and 3/8th Rules, Gaussian Quadrature Formulae. **Numerical solution of Ordinary Differential Equations:** Taylor's Series, Euler and Modified Euler's Methods. Runge-Kutta Method of Fourth Order for Solving First and Second Order Equations.	11	7

Reference Books

1.	**Numerical Methods in Engineering & Science with Programs in C and C++ (TextBook)** By Dr. B. S. Grewal | Khanna Publishers
2.	**Introduction to Numerical Analysis** By C.E. Froberg | Addison Wesley Publishing Company
3.	**Introduction to Probability (TextBook)** By P. G. Hoel, S. C. Port and C. J. Stone, | UBS Publishers,
4.	**Fundamentals of Mathematical Statistics (TextBook)** By S.C. Gupta and V. K. Kapoor | Sultan Chand & Sons

Course Outcome

After Learning the Course the students shall be able to:
After learning the course the students will be able to: 1. Understand the Importance of numerical method in real world problem where analytic methods fails. 2. Formulate and solve problems involving random variables. 3. Apply statistical methods for analyzing experimental data. 4. Derive numerical methods for various mathematical operations and tasks, such as interpolation, integration, the solution of linear and nonlinear equations, and the solution of differential equations. 5. Calculate Correlation, Regression of two variables.