Program	BACHELOR OF TECHNOLOGY (B.Tech)	**Semester - 4**
Type of Course	Basic Science Course	
Prerequisite		
Rationale	-	
Effective From A.Y.	2025-26	

Teaching Scheme (Contact Hours)				Examination Scheme				
Lecture	Tutorial	Lab	Credit	Theory Marks		Practical Marks		Total Marks
				SEE TH	IAT	SEE P	CCE	
3	1	-	4	70	30	-	50	150

***SEE** - Semester End Examination, **IAT** - Internal Assessment Test, **CCE** - Continues & Comprehensive Evaluation*

Course Content — **T** - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
1	**PROBABILITY & RANDOM VARIABLE**	**10**	**20**
	Experiment, definition of probability, conditional probability, independent events, Bayes' rule, Bernoulli trials, random variables, discrete random variables, probability mass function, continuous random variables, probability density function, cumulative distribution function, and properties of cumulative distribution function.		
2	**BASIC STATISTICS**	**10**	**25**
	Measure of central tendency: Moments, Expectation, dispersion, skewness, kurtosis, expected value of two-dimensional random variable, Linear Correlation, Karl Pearson correlation coefficient, Spierman rank correlation coefficient, Regression, Bounds on probability, Chebyshev's Inequality		
3	**NUMERICAL SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS**	**7**	**15**
	Roots of Algebraic and Transcendental Equations: Bisection, false position, secant, and Newton-Raphson methods; fixed point iteration; rate of convergence.		
4	**NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS**	**6**	**15**
	Picard, Taylor, Euler and Runge-Kutta methods; Applications to civil engineering problems		
5	**NUMERICAL INTEGRATION**	**7**	**15**
	Newton-Cotes formula, Trapezoidal and Simpson's formulae, error formulae, and Gaussian quadrature formulae.		
6	**CURVE FITTING**	**5**	**10**
	Curve fitting by the method of least squares with fitting of straight lines, second-degree parabolas, and some general curves.		
	Total	**45**	**100**

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
Weightage	10	15	75	0	0	0

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes	
At the end of this course, students will be able to:	
C01	Apply the knowledge of terminologies of basic probability and their probability functions in civil problems
C02	Use the knowledge of the central tendency, correlation and correlation coefficient and also regression in civil engineering problems
C03	Solve differential equations by using numerical methods.
C04	Solve algebraic equation related to Civil engineering problem by using numerical methods
C05	Perform numerical integration to the data.
C06	Understand the concept and significance of the Least Squares Method for curve fitting.

CO PO Mapping

CO	CO - 1	CO - 2	CO - 3	CO - 4	CO - 5	CO - 6
PO - 1	1	1	1	1	1	1
PO - 2	1	1	1	1	1	1
PO - 3	1	1	1	1	1	1
PO - 4	1	1	1	1	1	1
PO - 5	1	1	1	1	1	1
PO - 6	1	1	1	1	1	1
PO - 7	1	1	1	1	1	1
PO - 8	1	1	1	1	1	1
PO - 9	1	1	1	1	1	1
PO - 10	1	1	1	1	1	1
PO - 11	1	1	1	1	1	1