CVM UNIVERSITY
Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2026-27

Programme: **BACHELOR OF TECHNOLOGY(----------)**

Semester: **3**

Course Code: Click or tap here to enter text.

Course Title: **Probability - Statistics and Numerical Methods**

Course Group:

Course Objectives: The main objective of this course is to provide students with the basics of probabilistic and statistical analysis and various numerical methods to develop problem solving skills used in varied engineering disciplines.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
3	1	0	4	50 / 18	50/18	-	-	100 /36

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**Probability:** Sample Spaces and Events, Probability, The axioms of Probability, Some Elementary Theorems, Conditional Probability, Baye's Theorem and Applications.	8
2	**Probability Distributions:** Random Variables,The Binomial Distribution,The Mean the Variance of Probability Distribution, The Poisson Distribution and Poisson Processes, Continuous Random Variables, The Normal Distribution	10
3	**Roots of algebraic and transcendental equations:** The Bisection Method, The False-Position Method, The Newton-Raphson Method, The Secant Method **Solution of a system of linear Equation:** Gauss- Jacobi method and Gauss-Seidel method	8

4	**Curve Fitting:** Linear Regression, Nonlinear Regression **Interpolation:** Newton's forward and Backward Interpolation methods, Lagrange Interpolating Polynomials, Newton's Divided-Difference Interpolating Polynomials	**6**
5	**Numerical Integration:** The Trapezoidal Rule, Simpson's Rules	**4**
6	**Numerical Solution of ODE:** Euler's Method, Improvement of Euler's Method, Runge-Kutta 4th Order	**4**
	Total	**40**

List of Practicals / Tutorials:

1	Discrete sample space, continuous sample space, classical probability concept, The axioms of probabilityfor a finite sample space,Checking possible assignments of probability
2	Probabilities add for mutually exclusive events, Using a Venn diagram to visualize probability calculations , Using the general addition rule for probability, Using the probability rule of the complement,Conditional probability
3	Independence and selection with and without replacement ,Checking if two events are independent under an assignedProbability, Assigning probability by the special product rule,The extended special product rule of probability,Baye's Theorem
4	Random Variables, Checking for nonnegativity and total probability equals one, Evaluating binomial probabilities, Evaluating cumulative binomial probabilities, Mean, Variance of Random Variable, Mean and variance of binomial distribution
5	Poisson distribution, Mean and variance of Poisson distribution, A Poisson approximation to binomial probabilities, Poisson Processes
6	Continuous Random Variables, Calculating probabilities from the probability density function, Mean and variance of a probability density, Normal distribution, Calculating standard normal probabilities, values for Zα, Standard Normal probabilities
7	The Bisection Method, The False-Position Method, The Newton-Raphson Method, The Secant Method
8	Gauss- Jacobi method and Gauss-Seidel method
9	Linear Regression, Nonlinear Regression
10	Newton's forward and Backward Interpolation methods, Lagrange Interpolating Polynomials, Newton's Divided-Difference Interpolating Polynomials
11	The Trapezoidal Rule, Simpson's Rules
12	Euler's Method, Improvement of Euler's Method, Runge-Kutta 4th Order

Reference Books:

1	Probability and Statistics for engineers by Richard A Johnson, Irwin Miller, John Freund, 8e, Pearson Publishing
2	Probability & Statistics for Engineers & Scientists, Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Prentice Hall

3	Probability and Statistics for Engineering and Sciences, Jay L. Devore, 5e, Cenage Learning
4	Numerical Methods for Engineers Steven C Chapra, Raymond P Canale, Mc Graw Hill Education
5	Introductory Methods of Numerical Analysis by S S Sastry, PHI Learning Pvt Ltd
6	Numerical Methods in Engineering & Science with Programs in C, C++ & MATLAB, B. S. Grewal, 11e, Khanna Publishers

Supplementary learning Material:

1	Lecture Note prepared by the faculties
2	https://nptel.ac.in/courses/111/105/111105041/
3	https://nptel.ac.in/courses/111/106/111106112/
4	https://nptel.ac.in/courses/127/106/127106019/

Pedagogy:

- Direct Classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment (Tutorials)
- Interactive methods
- Seminar/Poster presentation

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks						**R**: Remembering;**U**: Understanding; **A**: Application, **N**: Analyze; **E**: Evaluate; **C**: Create
R	**U**	**A**	**N**	**E**	**C**	
20%	40%	30%	10%	0%	0%	

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

Student Learning Outcomes (SLOs):

Sr.	Student Learning Outcome Statements	%weightage
SLO-1	Students will be able to understand basic probability concepts and Baye's theorem.	**20**
SLO-2	Students will be able to Apply probability distributions like Binomial, Poisson and Normal	**25**

SLO-3	Students will be able to solve equations using numerical root-finding methods	**20**
SLO-4	Students will be able to solve linear systems using Gauss-Jacobi and Gauss-Seidel methods	**15**
SLO-5	Students will be able to apply curve fitting and interpolation techniques	**10**
SLO-6	Students will be able to solve integrals and ODEs using numerical methods	**10**

Curriculum Revision:	
Version:	**2**
Drafted on (Month-Year):	Jan-26
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	Jan-26