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

FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2020-21

Programme: **Bachelor of Engineering (Information Technology)**

Semester: **III**

Course Code: **102000303**

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

Course Group: **Basic Science**

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	2	0	4	40 / 14	60 / 21	NA	NA	100 / 35

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

Detailed Syllabus:

Sr.	Contents	Hours
1	**Probability:** Sample Space, Events, Probability of an Event, Additive Rules, Conditional Probability, Independence and Product Rule, Baye's Rule.	06
2	**Random Variables and Probability Distributions:** Concept of Random Variable, Discrete Probability Distributions, Continuous Probability Distributions, Mean of a Random Variable, Variance and Covariance of Random Variable, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem.	06
3	**Correlation:** Understand the meaning of Correlation, Karl Pearson's Coefficient of Correlation, Spearman's Rank Correlation Coefficient	04
4	**Some Discrete and Continuous Probability Distributions:** The Binomial Distribution, Poisson Distribution and Poisson Process. Continuous Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Normal Approximation to the Binomial, Chi Squared Distribution	10

5	**Roots of algebraic and transcendental equations:** The Bisection Method, The False-Position Method, The Newton-Raphson Method, The Secant Method	**04**
6	**Solution of a system of linear Equation:** Gauss- Jacobi method and Gauss-Seidel method	**02**
7	**Curve Fitting:** Linear Regression, Nonlinear Regression	**03**
8	**Interpolation:** Newton's forward and Backward Interpolation methods, Lagrange Interpolating Polynomials, Newton's Divided-Difference Interpolating Polynomials	**04**
9	**Numerical Integration:** The Trapezoidal Rule, Simpson's Rules	**03**
10	**Numerical Solution of ODE:** Euler's Method, Improvement of Euler's Method, Runge-Kuta 4th Order	**03**
	Total	**45**

List of Practicals / Tutorials:

1	Basic probability
2	Conditional probability, Multiplication rule, Baye's Theorem
3	Random Variable, Mean, Variance and Covariance of Random Variable, Chebyshev's Theorem
4	Karl Pearson's Coefficient of Correlation, Spearman's Rank Correlation Coefficient
5	Binomial Distribution, Poisson Distribution and Poisson Process
6	Normal Distribution, Normal Approximation to the Binomial, Chi Squared Distribution
7	The Bisection Method, The False-Position Method, The Newton-Raphson Method, The Secant Method
8	Gauss- Jacobi method and Gauss-Seidel method, Linear Regression, Nonlinear Regression
9	Newton's forward and Backward Interpolation methods, Lagrange Interpolating Polynomials, Newton's Divided-Difference Interpolating Polynomials
10	The Trapezoidal Rule, Simpson's Rules
11	Euler's Method, Improvement of Euler's Method, Runge-Kuta 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
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
- Interactive methods
- Seminar/Poster Presentation
- Industrial/ Field visits
- Course Projects

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

Distribution of Theory Marks in %						**R**: Remembering; **U**: Understanding; **A**: Applying; **N**: Analyzing; **E**: Evaluating; **C**: Creating
R	**U**	**A**	**N**	**E**	**C**	
20%	40%	30%	10%	-	-	

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.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Students are able to understand the basic knowledge and concepts of probability.	**15**
CO-2	Able to understand the basic statistical concepts and measures	**15**
CO-3	Able to understand several well-known distributions	**20**
CO-4	Able to apply numerical methods to find solutions of (algebraic and transcendental) equation and solution of system of linear equations	**20**
CO-5	Able to apply various interpolation methods and work out numerical differentiation and integration	**20**
CO-6	Able to work out numerical solution of the ordinary differential equations using different methods	**10**

Curriculum Revision:	
Version:	1.0
Drafted on (Month-Year):	June-2020
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	June-2025