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: **V**

Course Code: **102005603**

Course Title: **Probability Theory with Applications**

Course Group: **Open Elective - I**

Course Objectives: The main objective of this course is to familiarize the students with the elementary concepts of probability theory and the methods of statistical analysis to deal with the real life problems frequently occurring in various 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	
2	2	0	3	40 / 14	60 / 21	NA	NA	100 / 35

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

Detailed Syllabus:

Sr.	Contents	Hours
1	**Descriptive Statistics:** Measures of Central Tendency, Dispersion, Moments, Skewness and Kurtosis **Correlation:** Linear Correlation, Karl Pearson's Coefficient of Correlation, Spearman's Rank Correlation Coefficient **Curve fitting:** Regression, Method of Least Squares, Fitting a Straight Line and a Polynomial, Fitting a Non-linear Function, Exponential Curve, Logarithmic Curve	06
2	**Probability:** Experiment, Outcome, Sample Space, Events, Probability of an Event, Additive Rules, Conditional Probability, Independence of events and Product Rule, Bayes' Rule.	03
3	**Discrete Probability Distributions:** Random variables, Discrete Random Variable, Probability Mass Function, Cumulative Distribution Function and its properties, Mean and Variance of a Random Variable, Expectation, Bernoulli trials, The Binomial Distribution, Poisson Distribution and Poisson Processes	05

4	**Continuous Probability Distributions:** Continuous Random Variable, Probability Density Function, Cumulative Distribution Function and its properties, Normal Distribution, Areas under the Normal Curve, Normal Approximation to the Binomial	**05**
5	**Sampling Distributions:** Populations and Samples, Sampling Distribution of the Mean (σ known and σ unknown), Sampling Distribution of the Variance (Chi Square Distribution and F Distribution)	**04**
6	**Applied Statistics:** Formation of Hypothesis, Tests of Significance: Large sample test for Single Mean, Difference of Means, and Difference of Standard Deviations, Single Proportion, Difference of Proportions **Tests of significance for Small samples:** t-Test for Single Mean, Difference of Means, Chi Square Test for Goodness of Fit and Independence of Attributes, F- test for Ratio of Variances, t-test for Correlation Coefficients	**07**
	Total	**40**

List of Practicals / Tutorials:

1	Descriptive Statistics
2	Correlation
3	Curve Fitting (Regression)
4	Basic Probability Theory
5	Discrete Probability Distributions
6	Continuous Probability Distributions
7	Sampling Distributions
8	Applied Statistics

Reference Books:

1	Fundamentals of Statistics by S C Gupta, Himalaya Publishing House
2	Probability and Statistics for engineers by Richard A Johnson, Irwin Miller, John Freund, 8e, Pearson Publishing
3	Probability & Statistics for Engineers & Scientists, Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Prentice Hall
4	Probability and Statistics for Engineering and Sciences, Jay L. Devore, 5e, Cenage Learning

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://archive.nptel.ac.in/courses/127/106/127106019/

Pedagogy:

- Direct classroom teaching
- Audio Visual presentations/demonstrations

- Assignments/Quiz
- Continuous assessment
- Interactive methods
- Industrial/ Field visits

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 will be able to derive useful statistical information from the data, understand the relationship between two variables and quantize the amount of correlation between the variables	**25**
CO-2	Students will be made familiar with the basic concepts of probability theory, types of random variables and corresponding probability distributions with their applications to real life problems	**30**
CO-3	Students will be able to realize the importance of sampling and know different types of sampling distributions corresponding to the test statistics of interest	**20**
CO-4	Students will be able to design an appropriate hypothesis to validate the claims made about various statistics and test such claims	**25**

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