GUJARAT UNIVERSITY

B. COM. (HONS)

SEMESTER – II (MINOR)

PROBABILITY AND DISCRETE PROBABILITY DISTRIBUTIONS

COURSE CODE – DSC- M STA 123

CREDIT MARK DISTRIBUTION – 04

AS PER NEP 2020 (To be effective from June 2023)

Lecture 04 Hours
Tutorial – 00
Practicum – 00

COURSE OBJECTIVES

Probability and Discrete Probability Distribution is a foundational course in probability theory that introduces students to the concepts and applications of probability in various fields. The course aims to develop students' understanding of probability and its discrete distributions, enabling them to solve problems involving uncertainty and randomness.

PRE – REQUISITE

A strong foundation in basic mathematics is essential for understanding the concepts of probability. Students should be familiar with arithmetic, algebra, and basic mathematical operations. An understanding of basic set theory is often necessary, as probability theory deals with events and their relationships in sample space. The learner should have basic knowledge of combinatorial principles, such as permutation and combination, is often required. Combinatory is used to count the number of possible outcomes in various scenarios. Familiarity with basic probability terminology, such as events, outcomes, sample space and probabilities, can be beneficial. This knowledge may be gained from introductory statistics or mathematics courses. Basic familiarity with mathematical notation, symbols, and concepts used in probability, such as summation, factorial notation, and set notation.

COURSE OUTCOMES

Upon successful completion of a course on Probability and Discrete Probability Distribution, Students will have a solid understanding of the fundamental concepts of probability, including events, sample space and the rules of probability. They will be able to interpret probabilities in various contexts involving uncertainty and randomness. Students will be proficient in applying combinatorial principles, such as permutation and combination to calculate the number of possible outcomes in different scenarios. Students will be able to define and analyze discrete random variables. They will understand the concept of probability mass function (PMF) and calculate probabilities associated with specific outcomes and sets of outcomes. Students will

be skilled in calculating the expected value (mean) and variance of discrete random variables. Overall, completing a course on Probability and Discrete Probability Distribution should enable students to think probabilistically, understand the probabilistic aspects of data, and apply these concepts to various practical scenarios in their academic and professional pursuits.

UNIT	CONTENT	WEIGHTAGE
1	**PROBABILITY** ➢ Introduction to Probability ➢ Terms Used in Probability Random Experiment Sample Space Event and Definition of Various Events ➢ Mathematical, Statistical and Axiomatic Definitions of Probability ➢ Addition Rule, Multiplication Rule and Sub Rules of the Probability (Without Proof) ➢ Conditional Probability ➢ Bayes' theorem (without proof) and its application up to three events ➢ Simple numerical examples based on the above concepts	**25%**
2	**MATHEMATICAL EXPECTATION** **(For Discrete Random Variable)** ➢ Meaning of Discrete Random variable ➢ Meaning of Probability Distribution ➢ Meaning of Mathematical Expectation Properties of Mathematical Expectation (Without Proof) ➢ Variance of a Discrete Random Variable Properties of Variance (without proof) ➢ Mean and Variance of Linear Combination of Two Independent Variables ➢ Examples based on the above Concepts	**25%**
3	**DISCRETE DISTRIBUTIONS -I** ➢ Concept of Probability Mass Function ➢ Introduction to Poisson Distribution Properties and Uses of Poisson Distribution ➢ Introduction to Hypergeometric Distribution Properties and Uses of Hypergeometric Distribution ➢ Examples Related to these Distributions	**25%**
4	**DISCRETE DISTRIBUTIONS -II** ➢ Introduction to Negative Binomial Distribution Properties and Uses of Negative Binomial Distribution	**25%**

	➢ Geometric Distribution Properties and Uses of Geometric Distribution ➢ Examples Related to these Distributions	

MODE OF EVALUATION

Evaluation will be divided in two parts:

- **Semester End Evaluation (SEE):** Semester End Examination will be conducted by the Gujarat University of 50 Marks
- **Continuous and Comprehensive Evaluation (CCE):** Continuous and Comprehensive Evaluation of 50 marks will be decided by the colleges / Institutes/ University departments as per the instruction given by the University time to time

FBLD (Flip Blended Learning Design Template)

- Any One Unit from the above syllabus can be discussed by the faculty through online mode.
- Online mode can be SWAYAM MOOC Course or any other suggested by the UGC or Gujarat University.

REFERENCE BOOKS

1. "Introduction to Probability and Mathematical Statistics" by Prasanna Sahoo (published by CRC Press)
2. "Probability and Statistics" by T.K. V. Iyengar (published by S. Chand Publishing)
3. "Fundamentals of Probability, with Stochastic Processes" by Saeed Ghahramani (published by PHI Learning Private Limited)
4. "Probability and Random Processes" by S.V. Prabhu and P.G. Sankaran (published by John Wiley & Sons India Pvt. Ltd.)
5. "A First Course in Probability and Statistics" by B.L.S. Prakasa Rao (published by Universities Press)