24MA212   **STATISTICAL TECHNIQUES - II**

Category: **Multidisciplinary Course – III**   **2L 1T 0P 3P**

*Pre-requisite***: 10+2 Mathematics**

Course Description:

This course equips students with essential statistical tools for business and economics, covering index numbers, time series analysis, probability, random variables, and theoretical distributions. Students will learn to construct index numbers for financial analysis, apply time series methods for forecasting and use probability concepts for decision-making. The course also introduces random variables and key probability distributions like binomial, Poisson, and normal. With a focus on real-world applications, it enhances statistical skills for business analytics, finance, and management, enabling students to analyze data effectively and make informed decisions.

Course Aims and Objectives:

- To introduce students to statistical methods for analyzing real-world data.
- To equip students with the ability to construct index numbers and interpret time series data.
- To develop a strong foundation in probability and probability distributions.
- To enhance problem-solving skills through statistical modeling and analysis.
- To apply statistical techniques to real-life case studies and projects.

Course Outcomes: After completing this course, students will be able to:

CO1: Construct and analyze index numbers for various economic and business applications.[K4]

CO2: Perform time series analysis using different statistical methods.[K4]

CO3: Understand the concept of random variables and probability distributions.[K3]

CO4: Apply probability to solve real-world problems.[K3]

CO5: Use Binomial, Poisson and Normal distributions to model and analyze data.[K3]

UNIT-I: INDEX NUMBERS: (9Hrs)

Introduction - Uses - Types - Problems in the Construction of Index Numbers - Methods of Constructing Index Numbers - Simple and Weighted Index Number (Laspeyre - Paasche, Marshall – Edgeworth)

UNIT-II: TIME SERIES:(9Hrs)

Introduction - Components – Methods-Semi Averages - Moving Averages – Least Square Method – Uses and Limitations of Time Series.

UNIT – III: Random Variables(9Hrs)

Random Variables: Concept of random variable, Definition of discrete random variables, probability mass function, idea of continuous random variable, probability density function, illustrations of random variables and its properties - Simple problems.

UNIT-IV: PROBABILITY: (9Hrs)

Probability – Meaning - Experiment – Event - Mutually Exclusive Events - Collectively Exhaustive Events - Independent Events - Simple and Compound Events - Basics of Set Theory – Permutation – Combination - Approaches to Probability: Classical – Empirical – Subjective - Axiomatic - Theorems of Probability: Addition – Multiplication for two events - Conditional probability.

UNIT-V: THEORETICAL DISTRIBUTIONS: (9Hrs)

Binomial Distribution: Importance – Conditions – Constants - simple problems. Poisson Distribution: – Importance – Conditions – Constants - simple problems. Normal Distribution: – Importance - Characteristics – simple problems (Areas Method Only).

Text Books:

1.   S. C. Gupta (2023) . Fundamentals of Statistics, Himalaya Publications. New Delhi.
2.   Applied Statistics S.C.Gupta, V.K.Kapoor Sultan Chand & Co, New Delhi
3.   Statistics - First Year Telugu academy

References:

1.   Gupta S.P. (2014). Statistical Methods, Sultan Chand & Sons Pvt. Ltd. New Delhi.

2.   Probability and Statistics in Engineering - Hines, Montogomery et al John Wiley sons

3.   Fundamentals of statistics Vol.I, Goon AM, Gupta MK, das Gupta B, World Press, Calcutta.

4.   Levin Richard, L., David Rubin, S., et.al. (2017). Statistics for Management, 8th Edition, Pearson Education.