**DIPLOMA IN STATISTICAL ANALYSIS AND RESEARCH METHODOLOGY**

**SEMESTER II**

**SARM-5: TIME SERIES ANALYSIS AND PROBABILITY DISTRIBUTIONS**

Max. Marks: 100

External: 70

Internal: 30

Pass: 40%

Credits: 6

## Course Outcomes (COs)

After completing this course, students will be able to:

**CO1.** Explain the concepts, importance, and components of time series analysis in understanding economic and business trends.

**CO2.** Apply various methods for measuring trends, including graphic, semi-average, least square, and moving average methods.

**CO3.** Understand the fundamental concepts of probability and apply basic laws such as addition, multiplication, and conditional probability.

**CO4.** Describe and apply different probability distributions, including Binomial, Poisson, and Normal distributions, in data analysis.

**CO5.** Perform interpolation and extrapolation to estimate missing or future data values using statistical techniques.

## Course Specific Outcomes (CSOs)

By the end of the course, students will specifically be able to:

**CSO1.** Analyze time series data to identify long-term and short-term variations in economic or social phenomena.

**CSO2.** Compute and interpret trend values using least square and moving average methods for forecasting.

**CSO3.** Solve real-life problems involving probability by applying addition, multiplication, and conditional probability rules.

**CSO4.** Use Binomial, Poisson, and Normal distributions to model uncertainty and variability in quantitative data.

**CSO5.** Apply interpolation and extrapolation techniques to predict missing observations and future trends accurately.

**INSTRUCTIONS FOR THE PAPER SETTER/ EXAMINER:**

1. The syllabus prescribed should be strictly adhered to.
2. The Question Paper will have 70 Multiple Choice questions (MCQs) and four choices of answers will be there, covering the entire syllabus. Each question will carry 1 mark. All questions will be compulsory; hence candidates will attempt all the questions.
3. Paper-setters/Examiners are requested to distribute the questions from Section A and Section B of the syllabus equally i.e., 35 questions from Section A and 35 questions from Section B.
4. The examiner shall give clear instructions to the candidates to attempt questions.
5. The duration of each paper will be two hours.

**INSTRUCTIONS FOR THE STUDENTS**

The question paper shall consist of 70 Multiple-choice questions. All questions will be compulsory and each question will carry 1 mark. There will be no negative marking. Students are required to answer using OMR (Optimal Mark Recognition) sheets.

**SECTION A**

**Unit 1:** Time series analysis: Introduction, Uses and Importance, Components: Secular trend, short-term variations, Random and irregular trends

**Unit 2:** Measurements of Trend: Graphic, Semi-average, least square and Moving Average, Merits and Demerits

**Unit 3:** Basics of Probability: Addition Law, Conditional probability, Multiplication law

**SECTION B**

**Unit 4:** Probability Distribution: Binomial distribution and Poisson distribution

**Unit 5:** Normal distribution- Meaning, Properties and fitting

**Unit 6:** Interpolation and Extrapolation.

Note: Statistical analysis should also be taught with the help of MS Excel, SPSS, or any other related software tool.

**Suggested Readings**


- A.M Goon, M.K Gupta and B. Dasgupta, fundamental of statistics Vol-I, World press Calcutta
- Anderson, D.R.; Sweeney, D.J. and Williams, T.A., "Statistics for Business and
- Economics", 2nd edition (2011), Thompson, New Delhi.
- Gupta SC: Fundamental of statistics, S. Chand & Company. New Delhi
- Gupta, SP: Statistical Methods, S. Chand & Company. New Delhi
- Kothari, C. R., "Research Methodology", 2nd Edition (2008), New Age International.
- Meyer, P.L. (1990): Introductory Probability and Statistical Applications, Oxford & IBH Pub.
- Monga, GS: Mathematics and Statistics for Economics, Vikas Publishing house, New Delhi.
- Rohatgi, V. K. and Saleh, A.K.M.E. (2010): An Introduction to Probability Theory and Mathematical Statistics, Wiley Eastern.