**Fundamentals of Statistics**

**Assignment Guidelines:**

This task evaluates the fundamental principles of descriptive statistics, probability theory, and random variables in business and economic decision-making. Students are expected to solve real-world quantitative problems, perform data analysis using spreadsheets or statistical software, and interpret mathematical findings to provide meaningful economic insights and manage risk in commercial contexts.

**Submission Format:**

- **Type:** Practical Analytical Report (Data Analysis Project)
- **Font/Spacing:** Times New Roman, Size 12, Double Spaced
- **Word Count:** 1500 – 2500 words (excluding formulas, statistical tables, and computational appendices)
- **Submission Deadline:** To be announced by the respective professors

**Assessment Criteria:**

- Application of statistical concepts, descriptive methods, and probability theory – 20%
- Accuracy of quantitative modelling, data execution, and spreadsheet/software usage – 25%
- Critical interpretation of statistical calculation results in business contexts – 20%
- Strategic insights, risk evaluation under uncertainty, and quality of recommendations – 25%
- Structure, technical reporting clarity, presentation, and APA referencing – 10%

**Mandatory Sections:**

- Title Page
- Table of Contents
- Executive Summary
- Introduction
- Theoretical Framework & Statistical Laws
- Data Analysis & Statistical Calculations
- Discussion & Economic Implications
- Conclusion & Recommendations
- References
- Appendices (Spreadsheet Data & Computational Output)

**Assignment Task – Choose ONE of the following practical projects:**

**Option 1: Descriptive Data Analytics and Comparative Market Performance**

Evaluate corporate financial and operational performance dataset(s) using descriptive statistical methods to support evidence-based management decisions. Your paper should:

- Compile and display the raw data by using frequency distributions, visual graphic displays, and central tendency (mean, median, mode) measures.

- Compute and interpret skewness and measures of dispersion (variance, standard deviation, interquartile range) to analyse operational variability and market risk.
- Analyse real-life business examples such as sales, cost efficiency, or customer trends that use descriptive analytics to shape an understanding of these areas of business activity.
- Provide an executive summary of a descriptive analysis report and strategy recommendations based on a spreadsheet for an executive decision-maker.

**Option 2: Probability Distributions, Risk Assessment, and Decision-Making under Uncertainty**

Investigate probability theory and discrete/continuous random variable models to evaluate risk and forecast operational outcomes in volatile markets. Your paper should:

- Use Binomial, Poisson and Normal distribution models to calculate and compare probabilities for real-life business situations (e.g., arrival of customers, risk of default, quality control).
- Evaluate expected value, variance, and standard deviation of random variables to measure commercial risk premia and operational uncertainty.
- Examine case studies of corporate/financial institutions that prospered or perished by their probabilistic risk model and decision trees.
- Propose a quantitative risk-assessment model for management decisions in the face of market uncertainty.

**Option 3: Joint Probability, Bivariate Data Analysis, and Financial Correlation**

Analyse bivariate data distributions and joint probability frameworks to optimise portfolio performance, marketing response, or operational workflows. Your paper should:

- Construct joint probability tables and compute marginal and conditional probabilities for a pair of interdependent business variables.
- Calculate and understand covariance and correlation coefficients that indicate the strength and direction of relationships among important business measures.
- Explain data-driven practices in modern firms that use bivariate data analysis to model pricing, consumer demand, or operational cross-dependencies.
- Develop a data analysis roadmap and spreadsheet model for resource allocation and risk diversification strategies.