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ISBN 978-93-7837-595-8
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MRP: ₹490/-

An Introduction to Statistics: Theory and Practice

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DR. AAMIR KHAN
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ABSTRACT

Basic Statistics is a comprehensive introductory textbook designed to develop a clear understanding of fundamental statistical concepts, methods, and their applications. The book presents statistical techniques in a systematic manner, progressing from the organization and summarization of data to probability, statistical inference, and quantitative analysis.

The book begins with **Descriptive Statistics**, covering measures of central tendency, dispersion, moments, skewness, and kurtosis. These methods provide the essential tools required to describe, summarize, and interpret numerical data.

The subsequent section, **Correlation and Regression**, introduces techniques for studying relationships between variables. It covers different types of correlation, Pearson's coefficient of correlation, rank correlation, regression analysis, regression equations, regression coefficients, and the relationship between correlation and regression.

The book then develops the concepts of **Probability and Probability Distributions**, including fundamental probability theorems, conditional probability, Bayes' theorem, expectation, variance, and important discrete and continuous probability distributions. Particular attention is given to the Binomial, Poisson, and Normal distributions and their applications.

The section on **Statistical Economics** focuses on the collection, classification, presentation, and interpretation of economic and statistical data. It includes statistical investigation, census and sampling methods, questionnaires and schedules, tabulation, statistical series, and sources of official statistics.

The next section deals with **Time Series and Index Numbers**, emphasizing the analysis of data over time and the measurement of changes in prices and related economic variables. It includes time-series components, additive and multiplicative models, trend fitting through the method of least squares, index-number methods, Consumer Price Index, and selected stock-market indices.

The final section introduces **Hypothesis Testing**, including tests of significance, one-sample and two-sample t-tests, the chi-square test of independence, and the fundamentals of analysis of variance through one-way classification.

Overall, the book aims to bridge the gap between theoretical statistical concepts and their practical application. Its structured presentation makes it suitable for students who are beginning their study of statistics while also providing a foundation for further study in statistical inference, research methodology, operations research, economics, management, and data analysis.