TECHNOCATION FREELANCING TRAINING INSTITUTE & SOFTWARE HOUSE

Professional STATISTICS Course Outline

Module 1: Introduction to Statistics

- What is Statistics? Why is it Important?
- Types of Statistics: Descriptive vs. Inferential
- Data Types: Qualitative vs. Quantitative
- Levels of Measurement: Nominal, Ordinal, Interval, Ratio

Module 2: Data Collection and Sampling Techniques

- Population vs. Sample
- Sampling Methods: Random, Stratified, Systematic, Cluster
- Bias in Data Collection
- Designing Surveys and Experiments

Module 3: Descriptive Statistics

- Measures of Central Tendency: Mean, Median, Mode
- Measures of Dispersion: Range, Variance, Standard Deviation
- Skewness and Kurtosis
- Box Plots and Outlier Detection

Module 4: Data Visualization Techniques

- Histograms and Frequency Distributions
- Bar Charts and Pie Charts
- Scatter Plots and Correlation Analysis
- Heatmaps for Multivariate Data

Module 5: Probability Theory

- Basic Probability Concepts
- Probability Distributions: Discrete vs. Continuous
- Conditional Probability and Bayes' Theorem
- Law of Large Numbers and Central Limit Theorem

Module 6: Probability Distributions

- **Discrete Distributions**:
  - Binomial Distribution
  - Poisson Distribution
- **Continuous Distributions**:
  - Normal Distribution
  - Exponential Distribution
  - Uniform Distribution

Module 7: Inferential Statistics

- Sampling Distributions
- Confidence Intervals and Margin of Error
- Hypothesis Testing: Null and Alternative Hypotheses
- P-values and Significance Levels

Module 8: Hypothesis Testing Techniques

- Z-Test and T-Test (One-Sample and Two-Sample)
- Chi-Square Test for Categorical Data
- ANOVA (Analysis of Variance)
- Non-Parametric Tests (Mann-Whitney U, Kruskal-Wallis)

Module 9: Correlation and Regression Analysis

- Pearson vs. Spearman Correlation
- Simple Linear Regression
- Multiple Linear Regression
- Logistic Regression for Classification

Module 10: Advanced Statistical Methods

- Time Series Analysis and Forecasting
- Bayesian Statistics
- Principal Component Analysis (PCA)

- Machine Learning Applications in Statistics

Final Module: Capstone Project & Certification

- Implementing a Real-World Data Analysis Project
- Statistical Analysis Using Python (Pandas, NumPy, SciPy)
- Presenting Statistical Findings Effectively
- Course Completion Certification