Training Title

ADVANCED DATA ANALYSIS

Training Duration

5 days

Training Date

REF SL025	Advanced Data Analysis	5	16-20 December 2024	$6,500	London, United Kingdom

In any of the 4 or 5 star hotels. The exact venue will be informed once finalized.

Training Fees

- $6,500 **per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Lunch**

Training Certificate

Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.

Language: English

TRAINING OVERVIEW

TRAINING INTRODUCTION

This course focuses on the techniques and applications statistical data analysis. Typically, focuses on understanding the data, empirical model building using observational data for characterization, estimation, inference and prediction. Participants will study the theory, principles and methods for statistical analysis of observational data. Regression analysis, Parameter Estimation, and Testing of Hypotheses will be the primary tools to be discussed. Participants will develop empirical model building skills and be able to employ the models for characterization, estimation and prediction purposes.

While statistical techniques are emphasized throughout, the course has a strong engineering and management orientation. Guidelines are given throughout the course for selecting the proper type of statistical technique to use in a wide variety of product and non-product situations.

TRAINING OBJECTIVES:

On successful completion of the course you will be able to:

- **To give the participants a sound understanding of the principles and the basis for applying the basic principles of modern statistical methods for analyzing the data and make the correct inferences.**
- **To perform data analysis and/or data investigation for what perspective.**

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- **To use data analysis results and turns it in attractive presentations for decision making processes.**
- **To define the key concepts in Statistics and Sampling**
- **To enable the attendees to grasp the advanced information in various aspects of basic data analysis.**
- **To present different techniques of statistical data analysis**
- **To introduce the concept of regression analysis and statistical modeling to participants.**
- **To illustrate study cases for different applications of statistical data analysis**

TRAINING METHODOLOGY

This program will be provided through Classroom lectures , Participative discussions, Case studies , and Role Plays. This program will be delivered through Audio –Visual aids , White Board with Markers, and Flip Charts. One set of printed Course material will be provided to each of the participant.

Lectures, Discussion, Examples, Case Studies and Computer Applications.

SOFTWARE

Minitab ver. 14

MATERIALS

All the required material will be provided by the instructor; such as notes, examples and case studies.

WHO SHOULD ATTEND?

Engineers and Senior Engineers/Specialists working in technical areas (Field and Headquarters) dealing with production or maintenance activities. Planning Engineers with technical background, Reliability Engineers, etc… This course is also intended for engineers in various industrial and service sectors, private and public fields that need a tool to plan for the future of their company. Strategic planning managers, research and development managers, general managers, and can be tailored according to company's specific needs.

DAILY OUTLINE

The following topics will be covered in 3 days:

DAY ONE

INTRODUCTION & BASICS

- **Introduction**
- **Types of Data: Measurement & Categorical Variables**
- **Measurement scales**
- **Variables**

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- Parameters
- Statistics:
    - o Descriptive Statistics
    - o Inferential Statistics
- Accuracy And Precision
- Summation Notation
- Confidence Intervals
- Exercises

UNIVARIATE DATA

- Central Tendency
    - Mean
    - Median
    - Mode
- Spread
    - Range
    - Semi-Interquartile Range
    - Variance
    - Standard Deviation
- Shape
    - Skew
    - Kurtosis
- Graphs
- Exercises

BIVARITE DATA

- Scatter plots
- Pearson's Correlation
- Example Values of r
- Exercises

PROBABILITY

- Simple & Conditional Probability
- Probability of (A and B) and (A or B)
- Binomial Distribution
- Exercises

DAY TWO

NORMAL DISTRIBUTION

- Definition
- Standard Normal Distribution
- Conversion to Percentiles and Back
- Exercises

SAMPLING DISTRIBUTION

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- Definition
- Sampling Distribution of the Mean
- Standard Error
- Central Limit Theorem
- Difference Between Means
- Proportion
- Difference Between Proportions
- Exercises

POINT ESTIMATION

- Overview
- Characteristics of Estimators
- Estimation Variance
- Exercises

CONFIDENCE INTERVALS

- Overview
- Mean, σ Known
- Mean, σ Estimated
- General Formula
- Difference Between Means of Independence Groups: σ Known; σ Estimated
- Linear Combination of means from Independent Groups
- Exercises

DAY THREE

LOGIC OF HYPOTHESIS TESTING

- Ruling Out Changes as an Explanation
- The Null Hypothesis
- Steps in Hypothesis Testing
- The Precise Meaning of the p Value
- At What Level is H0 Really Rejected
- Statistical and Practical Significance
- Type I and II Errors
- One- and Two-Tailed Tests (t-tests)
- Confidence Intervals and Hypothesis Testing
- Exercises

HYPOTHESIS TESTING WITH STANDARD ERRORS

- General Formula
- Tests of μ, σ Known
- Tests of μ, σ Estimated
- μ1 - μ2, Independent Groups, σ Estimated
- μ1 - μ2, Dependent Groups, σ Estimated
- Linear Combination of Means, Linear Combination of Means, Independent Groups

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- Proportions
- Differences Between Proportions
- Exercises

POWER & *P VALUE

- Introduction
- Factors Affecting Power
  - o Introduction
  - o Size of Differences Between Means
  - o Significance Level
  - o Sample Size
  - o Variance
  - o Other Factors
- Estimating Power
- *P Value
- Exercises

ANALYSIS OF VARIANCE (ANOVA)

- Preliminaries
- ANOVA with 1 Between-Subjects Factor
- Tests supplementing ANOVA
- Formal Model
- Expected Mean Squares
- Exercises

PREDICTION

- Introduction
- Standard Error of the Estimate
- Partitioning the Sums of Squares
- Confidence Intervals and Significance Tests for Correlation and Regression
- Simple Linear Regression
- Multiple Linear Regressions
- Exercises

TRAINING OUTCOME

- To give the participants a sound understanding of the principles and the basis for applying the basic principles of modern statistical methods for analyzing the data and make the correct inferences.
- To perform data analysis and/or data investigation for what perspective.
- To use data analysis results and turns it in attractive presentations for decision making processes.
- To define the key concepts in Statistics and Sampling
- To enable the attendees to grasp the advanced information in various aspects of basic data analysis.

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- **To present different techniques of statistical data analysis**
- **To introduce the concept of regression analysis and statistical modeling to participants.**

To illustrate study cases for different applications of statistical data analysis

NOTE:

Pre & Post Tests will be conducted

Case Studies, Group Exercises, Group Discussions, Last Day Review & Assessments will be carried out.

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