PIONEERS
Integrated Solutions
WHERE SCIENCE MEETS INNOVATION
CONSULTING - TRAINING - INSPECTION

Effective Data Analysis Techniques

Course Description

- Data analysis is especially important in every business. Many processes can be enhanced, and many risks can be avoided by simply correctly analyze the available data with the most suitable tool. Analyzing data helps to make meaningful business decisions, improve efficiency and profits. Appropriate interpretation of numerical data will strengthen the ability to make a significant impact in providing, using, or evaluating data for improved business performance.

- This Data Analysis Techniques workshop introduces statistical techniques. It explains and builds upon the fundamentals of statistical analysis, including probability, the normal distribution, and standard deviation. Graphical tools such as the histogram, scatter plot and regression charts are introduced. The workshop also describes important terminology and includes examples which illustrate the use of key tests such as the F and Z tests. Attendance to this course would enable delegates to apply data analysis knowledge and skills to result better understanding of the business situation of their organization.

Course Objective:

- Understand some of the key terminology used in statistical analysis.
- Understand the meaning of variable data, and the difference between common and special causes of variation.
- Explain and give examples of the data validation, grouping and graphing.
- Explain what is meant by dashboards.
- Explain what is meant by qualitative data analysis.
- Understand the KPI concepts.
- Understand the benefits of control charts.
- Summaries the five stages of DMAIC.

WHO Should attend?

- Engineers, technologists, and professionals whose jobs involve the manipulation, representation, interpretation, and analysis of data.
- Professionals who need to use data analysis in their job role, including strategists, business analysts, etc.
- Professionals who wish to gain knowledge of Data Analysis in order to improve their analytical skills and understanding of data.
- Personnel moving into roles where they will need to produce data and/or use data to make decisions.
- All professionals & leaders who need to have in-depth knowledge of data interpretation and finding trends in data.
- Key data officers who are interested in maintaining organization data and enhance the business processes through data analysis.

Course Methods:

- This practical and results-oriented Data Analysis training course is based on adult learning concepts. It incorporates short inspiring lectures with structured lessons from the learning manual; captivating PowerPoint slides with videos to enhance learning; ongoing discussions with action planning; ample time for Q&A; training activities based on Excel and data mining tools to reinforce key concepts within a fun learning environment.

- The Data Analysis Techniques workshop is hands-on. Therefore, participants need to bring their own laptop for practical exercises and are expected to be familiar with Excel ® and working with numerical data on a computer. Software familiarity or previous data analysis experience is not required.

- *Pre & Post course assessments will be used to measure the effectiveness of this training and measure the skill and ability of participants.*

Course outline

Module 1 -Introduction, Overview and Data Preparation

- ***Key Topics*:**
  - **Introduction and overview**
    - Introductions
    - Overview of contents
    - The need and the process of data analysis
  - **How to prepare Data before analysis?**
    - Ensuring that data conforms to quality criteria, e.g. ensuring uniformity of measurement, removal of repeated data, etc.
    - Checklist for ensuring that the data is “clean.”
    - Data Sampling
    - Data sorting and filtering

Course outline

Module 2 - Variance, Standard Deviation and Graphs

- ***Key Topics*:**
  - **Variance and standard deviation manually and using Excel.**
    - How to calculate variance and standard deviation manually
    - How to calculate variance and standard deviation in Excel
    - Other basic and important statistics like mode, median, etc.
  - **Creating and using graphs**
  - This session introduces graphs and explains what they are and what they are used for. There is an explanation of how to construct each graph:
    - Histogram/ Pareto Analysis
    - Scatter plot
    - Normal probability plot
    - Maximum-minimum-average chart

Course outline

Module 3 -Control Charts and Data Representation

- ***Key Topics*:**
  - **Control charts for variable data**
  - This session begins by introducing a number of controls charts and explains what they are and what they are used for. There is an explanation of how to construct each chart:
    - X bar and R
    - X bar and S
    - Individuals and moving range chart.
    - Explanation of the median and range
    - The importance of distinguishing between causes of variation
    - Examples of common cause and special cause variation
  - **Advanced Charts and data visualization**
  - This session begins by introducing the different charts to represent data.
    - X-Y charts
    - Bar and Pie charts
    - Examples of common cause and special cause variation

Course outline

Module 4 – Data Datamining Techniques & Regression Analysis

- ***Key Topics:***
  - **Introduction to Datamining Techniques**
    - The association pattern analysis
    - Clustering
    - Classification
    - Decision Tree analysis
    - KNN method to visually classify new data.
  - **Simple Regression Analysis**
    - What is regression analysis and what is it used for?
    - Regression analysis examples

Course outline

Module 5 -Usage of Tables, Reports and Process Improvements

- ***Key Topics:***
  - **Cross Tables, Pivot Tables, and Chi Test**
    - Pivot Tables and Pivot Charts
    - Chi-test – calculation, and interpretation
    - Dashboards
    - Slicers
    - Timeline
  - **Define, Measure, Analyze, Improve, Control**
    - An introduction to DMAIC
    - Fishbone Diagram (FBD)