

Course Name

Data Analysis Techniques for Engineers & Technologists

Sector Name

Maintenance & Reliability Management

Document Type

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Data Analysis Techniques for Engineers & Technologists

Course Introduction

Corporate ethos, which sees change as a survival necessity, coupled with continual demands to achieve greater production efficiencies and reduced operating/maintenance costs, means that Engineers and Technologists are faced with ever-increasing plant and process performance targets. As a consequence, more and more reliance is being placed upon the accurate and reliable analysis, representation, and interpretation of data.

practical capabilities

This course aims to provide engineers and technologists with the understanding and practical capabilities needed to convert data into information, and then to represent this information in ways that it can be readily exploited. A Working vocabulary of analytical terms that will enable you to converse with people who are experts in the areas of data analysis, statistics, and probability, and to be able to read and comprehend common textbooks and journal articles in this field.

An understanding and practical experience of a range of the more common analytical techniques and data representation methods, which have direct relevance to a wide range of engineering problems. The ability to recognize which types of analysis are best

suited to particular types of problems. A sufficient background and theoretical knowledge to be able to judge when an applied technique will likely lead to incorrect conclusions.

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Target Audience

- ✓ Facilities Engineer
- ✓ Facilities Engineering Manager
- ✓ Facilities Manager
- ✓ Facilities Specialist / Coordinator
- ✓ Health and Safety Engineer
- ✓ Maintenance Group Leader
- ✓ Maintenance Helper / Assistant
- ✓ Maintenance Manager
- ✓ Maintenance Superintendent
- ✓ Maintenance Supervisor
- ✓ Mechanical Reliability Engineer
- ✓ Network Reliability Engineer
- ✓ Operations and Maintenance Specialist
- ✓ Reliability Engineer

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Learning Objectives

- ✓ Provide delegates with a working vocabulary of analytical terms to enable them to converse with people who are experts in the area of data analysis, statistics, and probability, and to be able to read and comprehend common textbooks in this field.
- ✓ Provide delegates with both an understanding and practical experience of a range of the more common analytical techniques and data representation methods, which have direct relevance to a wide range of analytical problems.
- ✓ Give delegates the ability to recognize which types of analysis are best suited to particular problems
- ✓ Give delegates the ability to recognize which types of analysis are best suited to particular types of problems.
- ✓ Provide delegates with an overview of the main data analysis applications within Engineering Systems
- ✓ Give Delegates sufficient background and theoretical knowledge to be able to judge when applied Techniques will likely lead to incorrect conclusions.

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Course Outline

✓ 01 DAY ONE

Module (01) Basics and Fundamentals

- ✓ Sources of Data
- ✓ Data Sampling
- ✓ Data Accuracy
- ✓ Simple Representations
- ✓ Dealing with Practical Issues

Module (02) Fundamental Statistics

- ✓ Mean, Average, Median, Mode & Rank
- ✓ Lies and Statistics
- ✓ Compensations for small sample Sizes
- ✓ Descriptive Statistics
- ✓ Workshop using Production Data from a batch Fermentation process

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Course Outline

✓ 02 DAY TWO

Module (03) Data Mining and Representation

- ✓ Single and Multi-dimensional Data Visualization
- ✓ Trend Analysis
- ✓ Box and Whisker Charts
- ✓ Common Pitfalls and Problems
- ✓ Workshop using Plant Data

Module (04) Probability and Confidence

- ✓ Probability Theory
- ✓ Properties of Distributions
- ✓ Expected Values
- ✓ Weibull Distribution
- ✓ Binomial Distribution
- ✓ Workshop using Statistical Processes

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Course Outline

✓ 03 DAY THREE

Module (05) Histograms & Frequency of Occurrence

- ✓ Histograms
- ✓ Pareto Analysis
- ✓ Cumulative Percentage Analysis
- ✓ Percentile Analysis
- ✓ Workshop using Historical Failure Data

Module (06) Frequency Analysis

- ✓ The Fourier Transform
- ✓ Periodic and Aperiodic Data
- ✓ Inverse Transformation
- ✓ Practical Implications of Sample Rate
- ✓ Dynamic Range
- ✓ Workshop using Vibration Data from the Machine

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Course Outline

✓ 04 DAY FOUR

Module (07) Regression Analysis and Curve Fitting

- ✓ Linear and Non-Linear Regression
- ✓ Min Variance, Max Likelihood
- ✓ Least Squares Fits
- ✓ Curve Fitting Theory
- ✓ Linear, Exponential, and Polynomial Curve Fits
- ✓ Predictive Methods
- ✓ Workshop using Data from Large Equipment

Module (08) Data Comparison

- ✓ Correlation Analysis
- ✓ The Autocorrelation Function
- ✓ Practical Considerations of Data Set Dimensionality
- ✓ Workshop using Diesel Engine Performance and Pollutant Emission Data.

Module (09) The power of Excel and MATLAB

- ✓ Pivot Tables
- ✓ The Analytical Toolbox
- ✓ Internet-based Analysis Tools
- ✓ Dynamic Spreadsheets

- ✓ Sensitivity Analysis
- ✓ Visualization
- ✓ Workshop involving step-by-step Examples

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✓ 05 DAY FIVE

Module (10) Quality Control Applications

- ✓ Terminology
- ✓ Control Charts
- ✓ Statistical Control
- ✓ Estimating the Process Mean and Variation
- ✓ Capability Indexes
- ✓ Workshop on Constructing the X-bar and R Charts

Module (11) Reliability Evaluation Applications

- ✓ Terminology
- ✓ Reliability Definition and Concepts
- ✓ Reliability Functions
- ✓ Reliability Process
- ✓ Workshop on Evaluating the Hazard Rate, Survivor Function, Failure Density, and Cumulative Distribution Function.

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
May 23, 2027	May 27, 2027	5 days	4250.00 \$	KSA , Jeddah
July 19, 2027	July 23, 2027	5 days	2150.00 \$	Virtual , Online
Sept. 28, 2026	Oct. 2, 2026	5 days	4250.00 \$	UAE , Dubai
Dec. 21, 2026	Dec. 25, 2026	5 days	4950.00 \$	Thailand , Bangkok
March 14, 2027	March 18, 2027	5 days	4250.00 \$	KSA , Riyadh

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