Faysal Aziz

Minitab Fundamentals

From Data Handling to DOE & General Linear Models

FA-0322 · one-day

Data & Analytics

Introduction

This one-day Minitab course guides participants through essential elements of statistical data analysis using Minitab software, from basic data preparation and visualization to advanced topics like Design of Experiments (DOE) and General Linear Model (GLM) analysis. Participants will learn not just how to run Minitab functions, but how these techniques apply to real industry problems — improving process quality, understanding factor effects, and extracting insights that drive decisions.

The course emphasizes hands-on skills and interpretation of results, ensuring learners can confidently apply statistical tools to their own datasets using industry-standard best practices rather than purely academic theory.

Instructor Experience: The instructor has over **30 years of industry experience** and will share practical tips, pitfalls, and workflow strategies used by professionals in quality, engineering, R&D, and analytics roles.

Learning outcomes

By the end of the course, learners will be able to:

- **Navigate Minitab**: Import and manage data, create graphs, and perform basic statistics.
- **Analyze data** using descriptive statistics, hypothesis tests, and regression techniques.
- **Design and execute experiments** using DOE tools in Minitab.
- **Fit and interpret General Linear Models** including interactions and categorical factors.
- **Interpret outputs** including ANOVA tables, effect plots, and model diagnostics.
- **Communicate results** effectively in a business or technical context.

Prerequisites

Learners should have:

- Basic understanding of statistics (means, variances, hypothesis testing)
- Familiarity with Excel or similar data tools
- A laptop with Minitab installed (trial version is acceptable)
- Curiosity about how statistical methods inform real decisions

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Training outline

1. 1. Introduction to Minitab

- Minitab interface overview
- Importing and preparing data
- Managing worksheets and project files

2. 2. Data Visualization

- Histograms, boxplots, and scatterplots
- Customizing and exporting graphs
- Checking assumptions visually (e.g., normality, variance)

3. 3. Descriptive Statistics & Basic Analysis

- Summarizing data (mean, median, standard deviation)
- Confidence intervals and hypothesis tests
- Correlation analysis basics

4. 4. Regression & ANOVA Foundations

- Simple linear regression
- Multiple regression overview
- One-way and Two-way ANOVA

5. 5. Design of Experiments (DOE)

Introduction to DOE concepts

- Purpose and structure of designed experiments
- Screening vs modeling designs

Creating DOE in Minitab

- Factorial designs setup
- Setting factor levels and response variables

Running the experiment in Minitab

- Defining designs
- Collecting and entering data

6. 6. Analysis of DOE Results

- Analyzing factorial experiment outputs
- Main effects and interaction plots
- Checking model assumptions and residuals
- Discussion of fractional designs and replication

7. 7. General Linear Models (GLM)

What GLM is and when to use it

- Including interactions, covariates, fixed or random factors

- Fitting GLM in Minitab
- Interpreting GLM ANOVA tables and coefficients
- Comparing GLM to standard ANOVA

8. 8. Post-Model Interpretation & Optimization

- Using stored models
- Prediction and optimization
- Reporting results clearly and concisely

9. 9. Wrap-up and Q&A

- Review of key concepts
- Best practices in Minitab workflows
- Open Q&A with practical problem solving

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