



Measurement Systems Analysis (MSA) with Applications

The purpose of this course is to provide the participant with the tools to perform various MSA applications within their organizations. The course is presented in several, self-contained modules to effectively drive the principles of MSA while enabling the participant to immediately tie the principles to their applications. The course allows for the organization to use their data, through application exercises to incorporate the concepts into actual outcomes. The course will present the methods necessary to analyze outcome data and to make decisions and recommendations based on the data.

Note: As this course is intended to be offered on-site it is essential that any desired work oriented data for review and analysis be provided to the trainer a week prior to the scheduled class

Length: 2-3 days (course can be customized to meet needs) Prerequisites: *Basic Statistical Knowledge*

Module 1: Introduction to Principles of MSA (4 Hours)

This module will provide for an overview of the concepts of MSA. Discussions will relate to the development of MSA Studies and the MSA Plan. Applications exercises will be provided to enhance the understanding of these general concepts.

Topics Covered:

- Determine the data necessary to implement an MSA Study
- Define the elements of an MSA Plan
- Identify and select the tools necessary for conducting various MSA studies.
- Work-Based Projects and Activities

Module 2: Using Minitab and Excel for MSA (4 Hours)

This module will provide the technician and lab personnel with a working knowledge of MINITAB and Excel and its specific tools. The application exercises will allow the participants to determine which tool is appropriate and to be able to make decisions based on their output.

Topics/Tools Covered:

- Basic Statistical Tests
- Regression and Anova
- Measurement Systems Analysis
- Control Charts
- Capability Analysis
- Work-Based Applications

Module 3: Gage R & R (Gage Repeatability and Reproducibility) (4 Hours)

This module will be a review of the principles for conducting a gage analysis study. It will review both the destructive and non-destructive variety of R&R's. It will provide an overview for the calculation and analysis of acceptability of the gages being used for the defined studies.

Topics Covered:

- How to determine format for conducting a Gage R & R
- Calculation of the respective outcomes for Gage R & R
- Interpret the results and how to draw conclusions
- How to make valid decisions based on the statistical results.
- Work-Based Applications

Module 4: ANOVA (Analysis of Variance) (4 Hours)

This work module is an in-depth overview of the principles of analysis of variance. It will review the techniques for sub-dividing the total variation of a set of data into meaningful component parts associated with specific sources of variation for the purpose of testing some hypothesis on the parameters of the model or for estimating variance components.

Topics Covered:

- How to determine when ANOVA should be applied
- How to interpret the results of an ANOVA and draw conclusions
- How to determine F-critical values for One-Way and Two-Way nested designs
- Making valid decisions based on results
- Work-Based Applications

Module 5: Attribute Gage R & R (Optional) (6 Hours)

This module will be an in-depth studies of: Graphical Analysis of range charts, mean charts, run charts, and interaction charts. It will define attribute agreement analysis, Cohen's Kappa, Kendall's coefficient, with MINITAB and Excel. It will discuss analytical methods for attribute studies.

Topics Covered:

- Identification of acceptance criteria
- Selection of instruments
- Development of test methods and the criteria for passing or failing.
- Test methods for performing identified tests
- Confirming the GR&R is close to 100%
- Defining the necessary documentation
- Piloting techniques for running new tests and criteria for performing periodic GR&R's
- Methods for launching new test methods and criteria.
- Work-Based Applications

WHO SHOULD ATTEND

- Laboratory and Quality Personnel

ITEMS TO BRING

- Laptop loaded with Excel (Data Analysis Toolkit)
- Demo or full version of MINITAB 15
- Sample Gage R&R for review

INSTRUCTORS

Plexus Master Trainers. Plexus Master Trainers train and evaluate:

- ISO 9001:2008, ISO/TS 16949:2009, AS9100, ISO 14001:2004 Environmental Management Systems, ISO 22000:2005 Food Safety, ISO 9001:2008 for Healthcare and ISO 13485:2003 for Medical Devices.
- Plexus trains 3rd party auditors and wrote the materials used to certify all of them
- Supplier Auditors