Core Tools

Description: This 24-hour course is designed to cover the major aspects of the Measurement Systems Analysis process as defined in AIAG’s Core Tool Manual and to give the student a thorough working understanding of its concepts.

Target Audience: Design and manufacturing engineering personnel, quality and reliability/test engineers, program managers, and anyone else who needs to understand the concepts of MSA.

Prerequisites: None

Delivery Method: Classroom-style lecture with PowerPoint slides and in-class discussion to encourage questions and participation.

Course Contents:

**APQP – Advanced Product Quality and Control Plan**
1. The PDCA (continuous improvement) cycle
2. Team approach philosophy
3. Importance of management support
4. APQP Inputs
5. The stages of the APQP process
6. Management reviews
7. Team feasibility commitment
8. Control plan development

**MSA – Measurement Systems Analysis**
1. Introduction, Purpose and Terminology
2. The Measurement Process
3. The Effects of Measurement System Variability
5. Measurement Source Development
6. Gage Source Selection Process
7. Measurement Issues
8. Measurement Uncertainty
9. Measurement Problem Analysis
10. General Concepts for Assessing Measurement Systems
11. Selecting/Developing Test Procedures
12. Preparation for a Measurement System Study
13. Analysis of the Results-Acceptability Criteria
15. Example Test Procedures
17. Average and Range Method
18. Attribute Measurement System Study
19. Practices for Complex or Non-Replicable Measurement Systems
20. Stability Studies
21. Variable Studies
22. Recognize the Effect of Excessive Within – Part Variation
23. Average and Range Method
24. Gage Performance Curve
25. Reducing Variation through Multiple Readings
26. Pooled Standard Deviation Approach to GRR

**SPC – Statistical Process Control**
1. History, background of SPC
2. Process Flow Charts
3. Attribute Charts
4. Sampling Techniques
5. Continuing Improvement Strategies

**PFMEA – Potential Failure Mode and Effects Analysis**
1. FMEA history
2. Preventative vs. corrective action approach
3. Team approach philosophy
4. Benefits of FMEA
5. The process flow chart
6. Design and process FMEA methodologies
7. Inputs to the FMEA process
8. Brainstorming potential failure modes
9. Defining the effects
10. Determining causes
11. Developing controls
12. Assigning severity, occurrence, and detection ranks
13. Prioritizing for action
14. The critical characteristics matrix
15. FMEA follow-up

**PPAP – Production Part Approval Process**
1. What is PPAP?
2. When to use PPAP
3. Required documentation
4. Appearance approval
5. Master sample requirements
6. Product submission warrant
7. Submission levels
8. PPAP disposition
9. Record retention requirements

The class will cover each step in the MSA process and the outputs expected from each step. It will emphasize the team approach and commitment of the entire organization.

**Textbook:** None; presentation notebook will be provided