

QualityTrainingPortal Courses														
COURSE TITLE	Course Type Master 1 credit Comprehensive coverage of a broad topic Targeted/Overview ** ½ credit Narrow focus on one small aspect of a broader topic	Estimated Hours	TARGET AUDIENCE							DOMAIN		COURSE COMPONENTS		
			Quality Dept. Personnel	Engineers	Operators	Managers	Supervisors	Support Staff	All Levels	Manufacturing	Non Manufacturing	Units	Tests	PDF Guide
5S's: Workplace Organization	Master Course	5	✓	✓	✓		✓	✓		✓		2	2	Y
8D Problem-Solving*	Master Course	5	✓	✓	✓	✓	✓	✓	✓	✓	✓	1	1	Y
Advanced Control Charts	Targeted Training	3	✓	✓			✓			✓		1	1	Y
Advanced Process Capability	Targeted Training	3	✓	✓			✓			✓		1	1	Y
Advanced SPC	Master Course	6	✓	✓			✓			✓		2	2	Y
Basic SPC	Master Course	6	✓	✓	✓		✓			✓		3	3	Y
Basic SPC for Business Processes	Master Course	5					✓				✓	3	3	Y
Basics of DMAIC	Master Course	5	✓	✓	✓	✓	✓	✓	✓	✓	✓	1	1	Y
Control Chart Basics	Targeted Training	2.5	✓		✓					✓		1	1	Y
Cost of Quality	Master Course	4	✓	✓		✓	✓	✓		✓	✓	1	1	Y
Control Plan Basics	Targeted Training	2	✓	✓						✓		1	1	Y
Design FMEA Basics	Master Course	5	✓	✓		✓	✓			✓		1	1	Y
DOE: Screening Experiments	Master Course	8	✓	✓			✓			✓		3	3	Y
Error-Proofing Business Processes	Master Course	5				✓		✓			✓	2	2	Y
Five Whys	Targeted Training	1.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	1	1	Y
FMEA Training	Master Course	8	✓	✓	✓	✓	✓			✓		3	3	Y
FMEA Training for Business Processes	Master Course	6						✓			✓	2	2	Y
Fundamentals of APQP	Master Course	6	✓	✓			✓			✓		1	1	Y
Gage Training	Master Course	9	✓		✓					✓		3	3	Y
Internal Auditing	Master Course	4	✓	✓		✓	✓	✓		✓	✓	1	1	Y
Introduction to Cost of Quality	Overview Course	1			✓	✓	✓	✓		✓	✓	1	1	Y
Introduction to FMEAs	Overview Course	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	1	1	Y
Introduction to Lean Six Sigma	Targeted Training	1.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	1	1	Y
Introduction to Mistake-Proofing	Overview Course	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	1	1	Y
Introduction to the 5S's	Targeted Training	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	1	1	Y
Lean for Business Processes	Master Course	6						✓			✓	1	1	Y
Lean for Job Shops	Master Course	7	✓	✓		✓	✓			✓		2	2	Y
Lean Implementation	Targeted Training	1.5		✓		✓	✓			✓		1	1	Y
Lean Manufacturing	Master Course	15	✓	✓	✓	✓	✓	✓	✓	✓		3	3	Y
Lean Mindset	Targeted Training	1.5	✓	✓	✓	✓	✓			✓		1	1	Y
Lean Process Layouts	Targeted Training	2.5		✓			✓			✓		1	1	Y
Lean Support Processes	Targeted Training	2						✓			✓	1	1	Y
Mapping Office Workflows	Targeted Training	2						✓			✓	1	1	Y
Measurement System Analysis	Master Course	7	✓	✓			✓			✓		2	2	Y
Mistake-Proofing Training	Master Course	8	✓	✓	✓		✓			✓		4	3	Y
Overview of APQP	Overview Course	1.5				✓	✓			✓		1	1	Y

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Overview of Lean	Overview Course	1.5				✓				✓	✓		1	1	Y
Overview of Root Cause Analysis	Overview Course	2	✓	✓	✓	✓	✓			✓			1	1	Y
Process Capability Basics	Targeted Training	1	✓		✓					✓			1	1	Y
Process FMEA Basics	Master Course	5	✓	✓	✓	✓	✓			✓			1	1	Y
PPAP Training	Targeted Training	2	✓	✓		✓	✓			✓			1	1	Y
Quality Improvement Fundamentals	Targeted Training	2	✓	✓	✓	✓	✓	✓	✓	✓	✓		1	1	Y
Role of a Champion	Targeted Training	3				✓	✓			✓	✓		1	1	Y
Root Cause Analysis	Master Course	5	✓	✓			✓	✓		✓	✓		2	2	Y
Set-Up Reduction Basics	Targeted Training	1.5		✓	✓	✓	✓			✓			1	1	Y
TPM Basics	Targeted Training	1.5		✓	✓	✓	✓			✓			1	1	Y
Understanding Variation	Targeted Training	2	✓		✓					✓			1	1	Y
Value Stream Mapping	Targeted Training	2	✓	✓			✓			✓			1	1	Y
Visual Workplace Basics	Targeted Training	1.5	✓	✓	✓	✓	✓	✓	✓	✓	✓		1	1	Y

*Also available in Spanish and Portuguese.
**Not all Targeted/Overview Training Courses are available to individual learners –however, all TTC's are available to workgroup and corporate subscribers.

All Courses Feature
<ul style="list-style-type: none"> ➤ Student test scores and bookmarks are tracked. Documentation for ISO 9000, QS-9000 and TS-16949 records. ➤ With our web-based training you can manage learners for an entire corporation through one web-based account OR with a Corporate Subscription, we can link directly to your LMS for a seamless login. ➤ Media-rich presentation including full audio and graphics. Exercises throughout to help reinforce learning. ➤ Solid technical content presented in an interesting and informative way. ➤ Complete learner control to navigate through the program in a way that best meets learners' needs. ➤ Certificates are awarded upon successful completion of courses providing documentation of Continuing Education Units that can be used for various professional certifications.

5S's: Workplace Organization Course Outline:

Unit 1 - 5S's Step-by-Step

Lesson 1: What is 5S All About?

- An overview of the 5S's is presented.
- The benefits and operational impact of implementing the 5S's are discussed.

Lesson 2: Sort: Clearing the Work Area

- How to organize the work area for efficiency & effectiveness and use the "48-Hour Rule."
- A stepwise approach to clear the work area is presented.

Lesson 3: Set in Order: Designated Locations

- How to designate "a place for everything & ensure everything is in its place."
- Considerations for establishing locations for storing items including: storage rational, storage options, location-specific tips, storage don'ts, using signs & labels, & documenting the plan are all covered.

Lesson 4: Shine: Cleanliness & Workplace Appearance

- The three aspects of Shine (getting the workplace clean, maintaining its appearance, and using preventive measures to keep it clean) are explored.

Lesson 5: Standardize: Everyone Doing Things the Same Way

- How to design systems that help ensure that everyone does thing the same way.

Lesson 6: Sustain: Ingrain It in the Culture

- Sustain is perhaps the toughest of the 5S's. Techniques to prevent backsliding are presented.

Challenge: An assessment of the learner's progress in this unit.

Unit 2 - 5S Implementation

Lesson 1: An Organization-Wide 5S Effort

- How to plan and implement a 5S initiative.
- An 8-point roadmap for the 5S's: 1: Leadership Team; 2: Infrastructure, 3: Communications; 4: Training; 5: 5S Pilots; 6: Best Practices; 7: Full Roll-Out Plan; 8: Evaluate & Adjust.

Lesson 2: Tackling 5S's on Your Own

- How to implement the 5S's in a work area if an organization-wide initiative is not supported.

Lesson 3: Success Stories: Sorts

- Examples of "Sort Successes" showing both the before state and the after state with the impact (savings) explained.
- Checklist to help achieve successful Sorts.

Lesson 4: Success Stories: Set in Order

- Examples of "Set in Order Successes" showing both the before state and the after state complete with the impact on the organization.
- Set in Order Checklists.

Lesson 5: Success Stories: Shine, Standardize, & Sustain

- Examples of successful approaches for the Shine, Standardize, & Sustain phases of a 5S program.

Challenge: An assessment of the learner's progress in this unit.

8D Problem-Solving Course Outline:

Lesson 1 | Discipline 1: Use a Team Approach

- Form an effective project team.
- Define roles of the team members.
- Set boundaries of freedom for the team.
- Help get the team started up.

Lesson 2 | Discipline 2: Describe the Problem

- Understand the scope and magnitude of the problem.
- Develop a Problem Statement.
- Recognize that the task is to investigate the problem, not jump to solutions.

Lesson 3 | Discipline D3: Interim Containment

- Determine if Interim Containment is needed.
- Design and put temporary measures into place to "buy time" until a permanent solution can be developed and implemented.
- Verify that interim containment measures are working.

Lesson 4 | Discipline D4: Define the Root Cause

- Use process mapping techniques to clarify the bounds of the process.
- Identify relationships between causes and the resulting effect using Cause and Effect Diagrams.
- Collect data and then use data display tools to visually analyze that data.
- Use Investigative Tools to uncover more clues to the root cause.
- Conduct confirmation runs to verify that the root cause has been found.

Lesson 5 | Discipline D5: Develop Solutions

- Identify potential solutions that address the root cause.
- Consider solution candidates that will prevent the root cause from recurring as well as detection approaches that warn if the problem may recur.
- Remove candidates that are not practical, feasible or cost-effective from consideration.
- Use decision matrices to select the most balanced solution.

Lesson 6 | Discipline D6: Implement the Solution

- Understand how to develop Action Plans using either Simple or Complex Action Plans formats.
- Learn how to use Project Management tools such as Activity Plans, PERT Charts and Gantt Charts to develop Action Plans to manage and track implementation of the solution.
- Recognize that the solution has been not fully implemented until related documentation is updated and communication has been completed with all involved parties.

Lesson 7 | Discipline D7: Prevent Recurrence

- Use techniques to ensure the problem does not recur.
- Know which associated documents and systems to update.
- Remove Interim Containment measures.
- Recognize how powerful it can be to share Lessons Learned.

Lesson 8 | Discipline D8: Congratulate the Team

- Encourage the organization to recognize the problem-solving team for a job well done.
- Ensure the problem-solving team recognizes those that have assisted them.
-

Challenge: An assessment of the learner's progress in this unit.

Advanced SPC Course Outline:

Unit 1 - Advanced Control Charting

Lesson 1: Setting Up Variable Control Charts

- Five steps for setting up baseline variable control charts.
- Interpreting the control chart.
- Taking action to improve the process.

Lesson 2: Setting Up Attribute Control Charts

- Setting up p, np, c, and u charts.
- Interpreting the control chart.
- Taking action to improve the process.

Lesson 3: More Patterns of Instability

- The 4 common Western Electric tests of instability.
- The 14 "Other (Western Electric) Unnatural Patterns of Variation."
- Comparisons of Western Electric, AIAG, Nelson, & Boeing rules of instability

Lesson 4: Setting Up Individuals & Moving Range Control Charts

- Calculating control limits and establishing a baseline chart for IX & MR Charts.

Lesson 5: Special Control Charts & Applications

- Variations on the standard variable data control charts.
- Four variations of the R Chart.
- Five variations of the x-bar Chart.
- Twelve common control chart formats.

Challenge: An assessment of the learner's progress in this unit.

Unit 2 - Advanced Process Capability

Lesson 1: Conducting a Process Capability Study

- How-to conduct a process capability study.

Lesson 2: Taking Action to Improve the Process

- What to do if the process is not capable.

Lesson 3: More Capability Indices

Pp & Ppk.

- Differences between Ppk & Cpk.
- Cpm & Ppm.

Lesson 4: Process Capability Study Complications

- Using individuals instead of subgroups.
- Compensating for tool wear.
- Skewed Distribution.
- One-sided specs.
- Short Run processes.

Lesson 5: Six Sigma Capability

- Explanation of Six Sigma quality.
- How to use Z-values.

Challenge: An assessment of the learner's progress in this unit.

Basic SPC (and Basic SPC for Business Processes) Course Outline:

Unit 1 - Statistics Primer

Lesson 1: Introduction to Variation

- What variation is and why it is a problem in any process.

Lesson 2: Measuring Variation

- Using a histogram to show the variation in a process.

Lesson 3: Patterns of Variation

- Types of patterns of variation, what they tell you, and what to do about them.

Lesson 4: Measures of Variation

- Statistical measures of variation: mean, range, and standard deviation.

Lesson 5: Normal Curve

- Properties of the normal curve and the 68-95-99.7 Rule.

Lesson 6: Stability

- The importance of a stable process.

Challenge: An assessment of the learner's progress in this unit.

Unit 2 - Control Chart Basics

Lesson 1: What are Control Charts?

- What control charts are and why they are used.

Lesson 2: What a Control Chart Looks Like

- Common elements of all control charts.

Lesson 3: Interpreting Control Charts & Taking Action

- Out-of-control patterns and what to do when they occur.

Lesson 4: Types of Control Charts

- Variable and attribute control charts: Which do you use when?

Lesson 5: Using Variable Control Charts

- Calculating and plotting data and interpreting variable-data charts.

Lesson 6: Using Attribute Control Charts

- Calculating and plotting data and interpreting attribute-data charts.

Challenge: An assessment of the learner's progress in this unit.

Unit 3 - Process Capability Basics

Lesson 1: What is Process Capability?

- What process capability means and why it is important.

Lesson 2: Measuring Process Capability

- The capability ratio, process capability index, and Cpk.
- Process performance indices, Ppk and Pp.

Challenge: An assessment of the learner's progress in this unit.

Basics of DMAIC Course Outline:

Unit 1 – The Basics of DMAIC

Lesson 1: Introduction

- To introduce learners to the concepts of the DMAIC process.
- To show how the DMAIC process relates to other problem solving processes.

Lesson 2: Define

- Establish a project (problem-solving) team and get the team started up.
- Develop the Problem Statement.

Lesson 3: Measure

- Set up measurement systems so that the appropriate data needed to determine the root cause of the problem can be collected.
- Assess measurement systems to make sure they are reliable.

Lesson 4: Analyze

- Use a systematic approach to collect, display, and analyze data to identify the root cause(s).
- Verify that the cause(s) identified is truly the root cause.
- Identify a solution to attack the root cause and correct the problem.

Lesson 5: Improve

- Execute the problem solution.
- Develop simple and complex action plans.
- Use Gantt Charts to plan the implementation and monitor progress.

Lesson 6: Control

- Ensure the solution is robust and well entrenched so that problem does not come back.
- Provide training and start audit practices to complete transfer of the solution to the process owners.

Challenge: An assessment of the learner's progress in this unit.

Cost of Quality Course Outline:

Lesson 1 | Why Measure COQ?

- Understand the value of measuring and tracking Cost of Quality.
- Acknowledge and recognize "hidden" Costs of Quality.
- Understand the PAF Model for measuring COQ.
- Realize the significance Prevention activities play when striving to reduce COQ.

Lesson 2 | Calculating Cost of Quality

- Recognize the importance of gaining commitment for a COQ effort from Process Owners.
- Realize the value of involving the Financial Department right at the start.
- Understand the sources of data for COQ measures.
- Be able to group COQ data into appropriate PAF categories.

Lesson 3 | Using Approximation Values

- Know how to use "Approximation Values" for COQ inputs.
- Be able to calculate Cost of Quality for each of the PAF categories and convert those inputs into COQ %.
- Understand how to develop a COQ Reporting and Tracking System.

Lesson 4 | Reducing COQ

- Understand how to effectively track COQ performance.
- Be aware of the need to use data to prioritize improvement targets.
- Realize the importance of addressing the root cause or source of problems.
- Be able to apply the PDCA cycle to COQ efforts.

Lesson 5 | COQ Tips

- Be aware of tips that can help improve and sustain a COQ initiative.

Challenge: An assessment of the learner's progress in this Course.

Design FMEA Basics Course Outline:

Lesson 1: What is an FMEA?

- Know what an FMEA is and why an FMEA is used.
- Understand how an FMEA is conducted works on a conceptual basis.

Lesson 2: Purpose of an FMEA

- An explanation of how an FMEA helps identify risks, prioritizes the risks relative to one another, and focuses efforts on an action plan to reduce the risks.

Lesson 3: Assembling an FMEA Team

- Apply criteria to assemble an effective FMEA team.
- Understand the role of a Subject Matter Expert when conducting an FMEA study.

Lesson 4: DFMEA Start-Up

- How to define the scope of a DFMEA.
- How to break the study into two or more DFMEAs if the scope is too large.
- How to use a DFMEA Scope Worksheet to clarify and communicate the scope of the study.

Lesson 5: 10 Steps to Conduct a DFMEA

- Step-by-step directions on conducting a DFMEA.
- Guidance on the use of the FMEA Analysis Worksheet.
- Techniques for customizing the Severity, Occurrence, and Detection Ranking Scales for a DFMEA.

Lesson 6: Getting More Out of Your DFMEA.

- Tips on the best times in a product's life cycle to conduct a DFMEA.
- Tips on how to use the results of an FMEA to trigger continuous improvement.

Lesson 7: DFMEA Example.

- An example of the application of a DFMEA, working through all 10 steps.

Challenge: An assessment of the learner's progress in this Course.

DOE: Screening Experiments Course Outline:

Unit 1 Background for DOE

Lesson 1: Why DOE?

- Limitations of OATs (one-at-a-time) experimentation.
- How designed experiments overcome the limitations of OATs and are a more effective and efficient way to characterize and improve processes and products.

Lesson 2: DOE Terminology

- An explanation of the key terms used in designed experiments.

Lesson 3: Types of Designed Experiments

- Full Factorials.
- Fractional Factorials.
- Screening Experiments.
- Response Surface Analysis.
- EVOP.
- Mixture Experiments.

Lesson 4: Tests of Significance

- Alpha and Beta Risks.
- Degrees of Freedom.
- Hypothesis Tests.
- t-Tests.
- F-Tests.

Lesson 5: Setting Up a Designed Experiment

- Design & Communicate the Objective.
- Define the Process.
- Select a Response and Measurement System.
- Select Factors to be Studied.
- Select the Experimental Design.
- Set Factor Levels.
- Final Design Considerations.

Challenge: An assessment of the learner's progress in this unit.

Unit 2 - Plackett–Burman Experiments

Lesson 1: Plackett–Burman Matrices

- The derivation of Plackett–Burman designs.
- Types of Plackett–Burman matrices.
- Ways to determine the experimental error.
- Techniques for analyzing experimental results.

Lesson 2: Calculating Statistical Significance

- Multiple techniques for testing the statistical significance of factor effects.
- Using graphical techniques to analyze responses and interactions.

Lesson 3: Calculating a Prediction Equation

- Developing a prediction equation using factor effects.
- Using the prediction equation to optimize the process or product.

Lesson 4: Analyzing for the Effect on Variation

- How to analyze variation as a response.
- Creating a scree diagram to graphically analyze factor effects on variation.

Lesson 5: When Bad Things Happen to Good Experiments

- The need for good planning to prevent problems.
- Some techniques for salvaging an experiment if data are lost or suspect.

Challenge: An assessment of the learner's progress in this unit.

Unit 3 - Taguchi Techniques

Lesson 1: Taguchi Concepts

- The concept of robustness.
- The Taguchi Loss Function.
- Signal to noise ratios.

Lesson 2: Taguchi Matrices

- Taguchi designs for two-level experiments.
- Use of Taguchi Interaction Tables.

Lesson 3: Taguchi Experimental Analysis

- Multiple techniques for testing the statistical significance of factor effects.
- Using graphical techniques to analyze responses and interactions.

Lesson 4: Determining Where to Set Factors

- Developing a prediction equation.
- Use the mean, signal to noise ratio, and variation effects to determine where to set factors.

Lesson 5: When Bad Things Happen to Good Experiments

- The need for good planning to prevent problems.
- Some techniques for salvaging an experiment if data are lost or suspect.

Challenge: An assessment of the learner's progress in this unit.

Error-Proofing Business Processes Course Outline:

Unit 1 - Error-Proofing Primer

Lesson 1: The Error-Proofing Mindset

- Understand the error-proofing mindset.
- Recognize that to error-proof a process or system the root cause of errors must be found and addressed.

Lesson 2: Error-Proofing in Everyday Life

- Be aware of examples of common error-proofing in action in everyday life.
- Understand that error-proofing does not require elaborate efforts or complex systems.

Lesson 3: Why Errors Are Made

- Realize that errors are usually due to process problems, not people problems.
- Become familiar with the transactional model of process and some of the complexities.

Lesson 4: How Transactions (Can) Go Wrong

- Understand some of the reasons transactional processes tend to be so complex.
- View errors by service providers into the categories of tasks, treatment and detractors/attractors and by customers into groupings of preparation, encounter and resolution.

Lesson 5: How Error-Proofing Works

- Become familiar with error-proofing effects, outcomes and solutions.
- Understand how error-proofing solutions are best developed in a team environment using a structured, data-driven problem-solving approach.

Challenge: An assessment of the learner's progress in this unit.

Unit 2 - Error-Proofing Techniques

Lesson 1: Forms of Error-Proofing Solutions

- Know that error-proofing solutions are a combination of effects and outcomes.
- Be aware of common techniques to achieve each of the four types of effects.

Lesson 2: Developing Error-Proofing Solutions

- See how error-proofing solutions are best developed using a team problem-solving process.
- Be familiar with establishing team roles and responsibilities and how to clarify the problem.
- Understand how to focus on the root cause.
- Know how to formulate an error-proofing solution and develop an action plan to implement it.

Lesson 3: Evaluating Solutions

- Learn how to evaluate whether solution candidates are practical, feasible and cost-effective.
- Be able to evaluate the robustness of solution candidates.

Lesson 4: Error-Proofing and the Seven Wastes

- Recognize the Seven Wastes as chronic, hidden form of errors.
- Recognize the Seven Waste in terms of the Transactional Process Model with both server-side and customer-side causes.

Lesson 5: Complementary Error-Proofing Tools

- Learn how to apply the Five-Whys, Comparative Analysis, Timeline Analysis and Cause & Effect Diagrams as error-proofing investigative tools.
- Become familiar with how additive data picture tools help paint a picture of the problem.

Challenge: An assessment of the learner's progress in this Course.

FMEA (and FMEA for Business Processes) Training Course Outline:

Unit 1: FMEA Overview

Lesson 1: Introduction.

- An overview of what an FMEA is; how the FMEA process works; and why an FMEA is used.

Lesson 2: Purpose of an FMEA.

- An explanation of how an FMEA helps identify risks, prioritizes the risks relative to one another, and focuses efforts on an action plan to reduce the risks.

Lesson 3: Tie to Quality Standards.

- An overview of the links between FMEAs and Quality Standards such as ISO 9000, QS-9000, & TS 16949.

Lesson 4: DFMEA or PFMEA?

- An explanation of the differences between a Design-FMEA and a Process-FMEA.

Lesson 5: The FMEA Process.

- A preview of the 10 steps used to conduct an FMEA. The same basic steps apply to both a DFMEA and a PFMEA.

Lesson 6: Assembling an FMEA Team.

- Helpful hints on assembling an effective FMEA team.

Challenge: An assessment of the learner's progress in this unit.

Unit 2: Design-FMEAs

(not included in FMEA for Business Processes training)

Lesson 1: Design-FMEA Scope.

- How to clarify the scope for a DFMEA.
- Details on how to use the DFMEA Scope Worksheet.

Lesson 2: 10 Steps to Conduct a DFMEA.

- Step-by-step directions on conducting a DFMEA.
- Guidance on the use of the FMEA Analysis Worksheet.
- Techniques for customizing the Severity, Occurrence, and Detection Ranking Scales for a DFMEA.

Lesson 3: DFMEAs & Control Plans.

- Using the DFMEA Analysis to develop input for a Process Control Plan.

Lesson 4: Getting More Out of Your DFMEA.

- Tips on the best times in a product's life cycle to conduct a DFMEA.
- Tips on how to use the results of an FMEA to trigger continuous improvement.

Lesson 5: DFMEA Example.

- An example of the application of a DFMEA, working through all 10 steps.

Challenge: An assessment of the learner's progress in this unit.

Unit 3: Process-FMEAs

Lesson 1: Process-FMEA Scope.

- How to clarify the scope for a PFMEA.
- Details on how to use the PFMEA Scope Worksheet.

Lesson 2: 10 Steps to Conduct a PFMEA.

- Step-by-step directions on conducting a PFMEA.
- Guidance on the use of the FMEA Analysis Worksheet.
- Techniques for customizing the Severity, Occurrence, and Detection Ranking Scales for a PFMEA.

Lesson 3: PFMEAs & Control Plans.

- Using the PFMEA Analysis to develop a proactive Control Plan.

Lesson 4: Getting More Out of Your PFMEA.

- Tips on the best times and places to conduct a PFMEA.
- Tips on how to use the results of an FMEA to trigger continuous improvement.

Lesson 5: PFMEA Example.

- An example of the application of a PFMEA, working through all 10 steps.

Challenge: An assessment of the learner's progress in this unit.

Fundamentals of APQP:

Lesson 0: Overview of APQP

- Explain the purpose of the APQP process.
- Describe the five phases of the APQP process.
- List the steps necessary to prepare for an APQP.

Lesson 1: Phase 1 – Plan and Define

- Describe the purpose and objectives of Phase 1.
- Understand how Phase 1 inputs set the stage for Phase 1 outputs.
- Explain how the outputs for one phase become the inputs for the next phase.
- Become familiar with the breadth and depth of Phase 1 outputs.

Lesson 2: Phase 2 – Product Design

- Describe the purpose and objectives of Phase 2.
- Understand how Phase 2 inputs set the stage for Phase 2 outputs.
- Become familiar with the breadth and depth of Phase 2 outputs.

Lesson 3: Phase 3 – Process Design and Development

- Describe the purpose and objectives of Phase 3.
- Understand how Phase 3 inputs set the stage for Phase 3 outputs.
- Become familiar with the breadth and depth of Phase 3 outputs.

Lesson 4: Phase 4 – Product and Process Validation

- Describe the purpose and objectives of Phase 4.
- Understand how Phase 4 inputs set the stage for Phase 4 outputs.
- Become familiar with the breadth and depth of Phase 4 outputs.

Lesson 5: Phase 5 – Feedback Assessment & Corrective Action

- Describe the purpose and objectives of Phase 5.
- Understand how Phase 5 inputs set the stage for Phase 5 outputs.
- Become familiar with the breadth and depth of Phase 5 outputs.

Lesson 6: Control Plans

- Explain the role of a control plan in the APQP process.
- Describe the key sections of a control plan.
- Distinguish between reaction plan triggers and root cause analysis.

Challenge: An assessment of the learner's progress in this unit.

Gage Training Course Outline:

Unit 1 - Gage Primer

Lesson 1: Why Measure?

- The importance of measuring in today's manufacturing world.
- The 5 critical aspects of measuring.

Lesson 2: Language of Measurement

- Key terms you need to know in order to speak the language of dimensional metrology.

Lesson 3: Measurement Standards

- The role of standards.
- Types of standards related to dimensional metrology including units of measure, dimensioning & tolerancing practices, laboratory practices, calibration standards, and documentation.

Lesson 4: Precision & Accuracy

- Key measurement concepts that serve as the foundation of a good measurement system.
- The 5 components of any measurement system.
- How variation in any component can lead to measurement error.

Lesson 5: Datums

- How measurements are referenced by design and manufacturing engineers on drawings.
- Datums, datum feature symbols, datum features, simulated datums, and target datums.
- The use of primary, secondary, and tertiary datums.

Lesson 6: Introduction to GD&T

- Comparison of coordinate tolerancing and GD&T techniques.
- How to read drawing symbols used with GD&T.
- The 14 GD&T geometric characteristics.
- The use of modifiers.

Lesson 7: Surface Finishes

- An overview of measurements used to characterize the finish of a surface.
- How to interpret lay and surface symbols.

Lesson 8: Math for Measuring

- A basic review of simple mathematical concepts such as converting fractions and working with decimals.
- Basic geometry concepts.

Challenge: An assessment of the learner's progress in this unit.

Unit 2 - Using Gages

Lesson 1: Types of Gages

- A review of universal dimensional measurement techniques.
- An introduction of the gages to be explored in this Unit.
- A brief overview of specialty measurement devices.

Lesson 2: Calipers

- How to use and read vernier scales.
- How to use a caliper.
- The pros and cons of vernier scale, dial, and digital calipers.

Lesson 3: Micrometers

- The size vs. range of a micrometer.
- How to read micrometer scales.
- How to use outside and inside micrometers.
- Discrimination vs. accuracy of digital micrometers.

Lesson 4: Height & Depth Gages

- How to use a height gage for direct and comparative height measurements.
- How gage blocks and height masters are used with height gages.
- Potential problems with height gages.
- How to use depth gages.
- Potential problems with depth gages.

Lesson 5: Fixed Gages

- Explanations of the different types of fixed limit and GO/NOGO gages.
- Advantages and disadvantages of fixed gages and variable gages.
- Hints for using each type of fixed gage covered.

Lesson 6: Test Indicators & Dial Indicator

- The differences between the features and capabilities of test indicators and dial indicators.
- How to use test indicators with adjustable arm test sets for comparative length measurements.
- How to use dial indicators with comparator stands for comparative length measurements.
- Potential problems with indicators.

Lesson 7: Gage Blocks & Surface Plates

- Gage block and surface plate standards and grades.
- The use of gage blocks and surface plates.
- How to wring gage blocks.
- How to calculate combination stacks of gage blocks.
- Basic care points for gage blocks and surface plates.

Challenge: An assessment of the learner's progress in this unit.

Gage Training Course Outline (Continued):

Unit 3 - Gaging Applications

Lesson 1: Application Overview.

- An overview of the dimensional measuring applications covered.

Lesson 2: Linear Measurements

- An exploration of which linear gage to use for a wide spectrum of specific measuring applications.
- Exercises looking at which gages are acceptable (and unacceptable) to use for measuring part features such as OD, ID, slot width, slot depth, differential height, and hole position.

Lesson 3: Roundness & Circularity

- How to take out-of-roundness measurements.
- Problems with measuring roundness and the OD with two-point contact gages.
- How to gage the effective diameter.
- How to select and use three-point contact devices for roundness and OD measurements.
- How to measure cylindricity.

Lesson 4: Common Misapplications

- 12 common measuring mistakes and misapplications.
- What to look out for and how to prevent these mistakes from happening.

Lesson 5: Measuring Complications

- 10 systemic problems that can lead to measuring complications.
- An exploration of why each complication may occur with suggested remedies to combat it and make the measurement system more robust.

Lesson 6: Care of Gages

- Universal care points that apply to all gages and instruments.
- Specific hints to ensure the proper care of specific gage families including surface plates, gage blocks, micrometers, calipers, height and depth gages, fixed gages, and indicators..

Challenge: An assessment of the learner's progress in this unit.

Internal Auditing Course Outline:

Lesson 1

- The Audit Process
- Understand the purpose, objectives and benefits of Internal Audits.
- Preview six steps for conducting Internal Audits.

Lesson 2

- Preparation and Planning
- Recognize that the bounds of the audit scope must be tightly defined and that staying within these bounds improves results.
- Understand how to prepare for an effective audit.
- Be aware of how important it is for all audit participants to remain objective.

Lesson 3

- The Opening Meeting
- Appreciate the importance of a comprehensive Opening Meeting.
- Know what agenda topics should be covered during the Opening Meeting.

Lesson 4

- Collect Evidence
- Recognize viable sources of evidence.
- Sort through the evidence to hone in on meaningful data that leads to valid conclusions.
- Realize when there is enough data gathered.

Lesson 5

- Evaluate the Evidence
- Consolidate evidence gathered.
- Generate a composite picture of how well the organization's performance conforms to Standards and documented procedures.
- Separate and itemize nonconformities.
- Rate nonconformities against a simple, relative priority scale.
- Provide substantiated evidence of each nonconformity found.

Lesson 6

- The Closing Meeting
- Appreciate the purpose and importance of the Closing Meeting.
- Understand how to prepare the Audit Report.
- Know how to prepare for and lead the Closing Meeting.

Lesson 7

- Audit Follow-Up
- Recognize the need to confirm that changes made (at least for Critical and Major Nonconformities) have actually been made.
- Be aware of the need to verify that the changes made are the right changes.
- Know what to look for to ensure changes made are sustainable.

Lesson 8

- Auditing Tips
- Be aware of tips and techniques that can lead to more effective audits and efficient outcomes..

Lean for Business Processes Course Outline:

Lesson 1: Tackling Waste

- Identify the seven wastes.
- Explain value-adding versus non-value adding.
- Define value from customer's perspectives.
- Briefly describe how each of the seven wastes detracts value from a process.

Lesson 2: Process Mapping

- Define the bounds of a workflow.
- Use a variety of process (workflow) mapping techniques.
- Identify hand-offs, disconnects, incomplete communication and rework loops as non-value-adding components (or waste.)
- Plan improvements to workflows.
- Consider a move from batch processing to continuous (or one-piece) flow.

Lesson 3: Streamline the Process

- Know what Takt Time means.
- Identify process bottlenecks.
- Calculate Process Cycle Efficiency.
- Understand how to balance workloads within a process workflow.
- Calculate First Pass Yield.
- Be familiar with workflow and work station layout considerations.

Lesson 4: 5S's in the Office

- Identify each of the 5S's.
- Know how to clear clutter from a work area.
- Explain the rationale for selecting effective designated storage locations.
- Understand how to maintain the work area's appearance and use preventive measures to keep it clean.
- Describe what it means to standardize and why standardization is important.
- Know how to use audits to sustain workplace organization and to prevent backsliding.

Lesson 5: Error-Proofing Overview

- Understand the error-proofing mindset.
- Be aware of common error-proofing techniques.
- Comprehend the Transaction Model (consisting of the server-side and customer-side.)
- Know how to use basic root cause analysis tools.

Lesson 6: TPM for Business Processes

- Be aware of TPM's impact on the Seven Wastes.
- Recognize TPM's influence on reliability and uptime of business process support systems.
- Begin measuring Overall Equipment Effectiveness.

Lesson 7: Lean Business Process Measures

- Measure Lean efforts by tracking Process Cycle Efficiency trends.
- Create a Balanced Scorecard to track waste reduction.
- Audit 5S activities to maintain workplace organization momentum.
- Monitor uptime, throughput rates and yields using Overall Equipment Effectiveness.
- Develop two-dimensional surveys to gather meaningful customer feedback.

Challenge: An assessment of the learner's progress in this unit.

Lean for Job Shops Course Outline:

Unit 1 – Adapting Lean to Job Shops

Lesson 1: Does Lean Really Apply?

- Appreciate the Realities that Job Shops must contend with.
- Be aware of the consequences of those Realities.
- Realize that Lean approaches can be modified and adapted to deal with Job Shop Realities.

Lesson 2: Lean Job Shop Terminology

- Define key Lean manufacturing terms.
- Describe vital Lean tools.
- Be familiar with additive Lean techniques.

Lesson 3: Wastes in Job Shop Terms

- Identify the seven wastes.
- Explain value-adding versus non-value adding.
- Define value from the customer's perspective.
- Briefly describe how each of the seven wastes detracts from the value of a process' output.

Lesson 4: Linking Realities to Wastes

- Associate Job Shop Realities with the Seven Wastes.
- Uncover patterns of how the effects of Job Shop Realities lead to Waste.
- Discover common themes of the effects and the corresponding impact on Waste.
- Recognize potential root causes of the common themes.

Lesson 5: Preview of the Means

- Understand that Lean practices can be adapted to a Job Shop environment by developing a compelling Message, building Momentum and making structural changes (the Means.)
- Become aware that the Means can be a combination of the 5S's, Set-up Reduction, Workflow/Layout adjustments, TPM and Visual Workplace practices.

Challenge: An assessment of the learner's progress in this unit.

Unit 2 – Lean Job Shop Practices

Lesson 1: Message. Momentum and Means

- Become familiar with how a three-phased approach (Message, Momentum and Means) can be used to adapt Lean practices to a Job Shop environment.
- Understand how the "Means" represent a series of interdependent action plans creating a robust approach to Lean.

Lesson 2: Embrace the 5S's

- Identify what each of the 5S's stands for and how it helps an organization reduce waste.
- Understand the tactics/techniques to "sort" by determining what belongs and what does not belong in a work area.
- Explain the rationale for effective storage locations.
- Describe what it means to standardize and why standardization is important.
- Identify strategies to sustain workplace organization and to prevent backsliding.

Lesson 3: Reduce Set-Up Time

- Describe the purpose and benefits of reducing set-up time.
- Explain the difference between internal and external set-up time.
- Identify the key components of set-up reduction and explain the role each plays in reducing set-up time.

Lesson 4: Adjust Workflows & Layouts

- Explain the linkage between layouts and workflows.
- Describe why identification of Product Families is an important step for improving layouts and subsequent workflows.
- Understand types of data needed to design effective layouts and workflows.
- Identify major issues for selecting layout and corresponding Macro-Workflow from various options.
- Understand factors to be considered to refine Micro-Workflows.

Lesson 5: TPM Basics

- Explain how TPM aids Lean efforts and addresses wastes.
- Know the difference between Corrective Maintenance, Preventive Maintenance (PM) and Predictive Maintenance (PdM).
- Understand how the three sequential Phases of TPM build on each other.
- Realize how PdM techniques can further traditional PM practices.

Lesson 6: The Visual Workplace

- Describe what is meant by the Visual Workplace.
- Understand the meaning of Visual Controls, Prompts and Displays.
- Appreciate how powerful visual aids, supports and alerts can be to make it easier to do things the right way and reduce waste.

Lesson 7: Track and Improve

- Understand why it is important to measure the progress of action plans.
- Be familiar with potential measures for Lean Job Shop action plans.

Challenge: An assessment of the learner's progress in this unit.

Lean Manufacturing Course Outline:

Unit 1 - Lean Concepts

Lesson 1: Why Lean?

- Be customer focused: Be on-time, responsive, flexible, and fast.
- Simplify and standardize workflows: Mimic continuous flow, minimize WIP, use visible measures.
- Manage capacity: Increase process uptime, reduce set-up times, find "lost" capacity.
- Eliminate waste: Identify non-value adding activities, then modify, combine, or eliminate those tasks.
- JIT: Not too early and never late; not just-in-case inventory but just-in time production and delivery; products must always be made right the first time; equipment must always work when needed.

Lesson 2: Lean Terminology

- Terms
- Tools
- Techniques

Lesson 3: Eliminate Waste with Lean

- Match lot sizes to customer demands: Use kanbans; end WIP.
- Use pull scheduling instead of push scheduling.
- Schedule to the rate-determining step (the bottleneck), then debottleneck process lines.
- Facilitate fast feedback: Arrange sequential operations next to each other ensures fast feedback from internal customer operation to internal supplier operation if something in-process is not right.

Lesson 4: Components of Lean

- Overview of the 8 Components of Lean: Value Stream Mapping, Workplace Organization, Predictability & Consistency, Set-up Reduction, TPM, Visual Factory, Support Processes, & Continuous Improvement.

Lesson 5: Value Stream Analysis

- Mapping the process from incoming order to outgoing product: Define process goals, create the current state map, & establish process metrics.
- Using the current state map to identify potential improvements, conceive the future state.

Lesson 6: Lean Thinking

- Eliminating waste is not limited to manufacturing; the same techniques apply to the office, sales, finance, maintenance, and even R&D processes and procedures.
- Lean & Six Sigma are complementary.

Challenge: An assessment of the learner's progress in this unit.

Unit 2 - Lean Practices

Lesson 1: Value Stream Mapping.

- Identify process goals.
- Collect & analyze process data.
- Create a macro-facility workflow to determine how to minimize high volume travel distances.
- Conduct a micro-process workflow to apply cellular concepts, identify and remove bottlenecks, & move to pull manufacturing with kanbans.

Lesson 2: Workplace Organization

- Apply the 5S's: Sort (clearing the work area), Set in Order (designating locations), Shine (cleanliness and workplace appearance), Standardize (everyone doing things the same way), & Sustain (ingraining it in the culture).

Lesson 3: Predictability & Consistency.

- Use DFA/DFM to design quality in.
- Conduct GR&Rs to ensure reliable measurement systems are in place.
- Employ SPC to help ensure processes are predictable & stable.
- Reduce variation, & improve process capability with DOE.
- Eliminate the root cause of defects using problem-solving and mistake-proofing.
- Move to Six Sigma quality.

Lesson 4: Set-up Reduction

- Apply SMED concepts.
- Separate external tasks (external to the process) from internal tasks.

Lesson 5: TPM

- TPM versus PM.
- Develop operator involvement in the equipment and begin predictive maintenance practices.

Lesson 6: Visual Factory

- Use status display of performance for dashboard or balanced measures/COQ results.
- Visual controls such as sensory alerts indicate if something is out of place.
- Marking on the floor, kanbans, andons, & panel-alarms all help build a visual control infrastructure.

Lesson 7: Support Processes

- Lean techniques require changes in Purchasing, Scheduling, Warehousing/Shipping, & Accounting practices.

Lesson 8: Continuous Improvement

- Fight NIH (not-invented-here) attitudes and leveraging successes.
- Use kaizen events for rapid, targeted improvements to achieve the future state.
- Use a standardized Problem-Solving Model (e.g. DMAIC or 8-D).
- Begin an employee idea system.

Challenge: An assessment of the learner's progress in this unit.

Lean Manufacturing Course Outline (Continued):

Unit 3 – Lean Implementation

Lesson 1: Lean Starts with People

- Communicate the why, what, how, & who.
- Provide education in the concepts.
- Train employees in tools & techniques as needed to achieve a flexible workforce.

Lesson 2: Data Drives Lean

- Focus efforts on projects that lead to tangible saving.
- Calculation techniques to generate data include: Time studies, equipment loading, TAKT time, staffing requirements, process yields, & COQ.
- Sample Worksheets covered include: Lean Project Summary; Cell Target Worksheet; Data Collection Form for Basic Equipment and Utility Parameters; Value-adding Analysis Worksheet; Process Change-Over/Setup Worksheet; Set-Up Reduction Worksheet; Cubic Feet Analysis Worksheet; & Lot Size Worksheet.

Lesson 3: Layout Options

- Improved layout are about moving cubic feet (not numbers of items), eliminating crossover points, arranging the process in the natural flow order; linking processes to minimize time and distance; moving equipment together to simulate a continuous process flow; & putting internal customers and suppliers next to each other.
- Be careful to identify anchors or monuments; do not move them.
- Typical layout options are explored.

Lesson 4: Lean Inventory Practices

- Minimize trips to and from the warehouse by designing the warehouse to work for you.
- Use ABC inventory categories to prioritize inventory needs and storage locations.

Lesson 5: Roadmap for Lean

- Start with the people issues.
- Focus on workplace organization (the 5S's), then, use value stream analysis and process workflow analysis to establish effective layouts.
- Where to focus next depends on specific needs.
- Use targeted Kaizen events to speed changes.
- Do not overlook the need to modify support processes (especially scheduling and purchasing).

Lesson 6: Pitfalls with Lean

- Not documenting the financial impact/savings.
- Lack of commitment from leadership.
- Using traditional purchasing practices.
- Not changing scheduling techniques.
- Failure to address workforce issues.
- Not really mistake-proofing the root cause.
- Thinking Lean is just for manufacturing.
- Not using beneficial technology.
- Not leveraging successes.
- Getting too lean.
- Failing to hold the gains.

Challenge: An assessment of the learner's progress in this unit.

Measurement System Analysis (MSA) Course Outline:

Unit 1 - Analyzing Measurement System Variation

Lesson 1: Variation in Measurement Systems.

- A review of sources of measurement system variation.
- An explanation of Type A and Type B evaluations of measurement uncertainty.
- Exploration of the effects of too much variation on measurements.

Lesson 2: Measurement System Linearity.

- How to measure gage/instrument linearity (both graphically and mathematically) to determine if a gage (or instrument) has linearity problems.
- Taking action to deal with linearity problems.

Lesson 3: Measurement System Stability.

- How to evaluate gage/instrument stability using a control chart.
- Taking action to deal with stability problems.

Lesson 4: Repeatability & Reproducibility.

- How to conduct a GR&R study.
- R&R analysis for non-destructive measurements.
- Use of ANOVA for GR&Rs.
- R&R analysis for destructive measurements.
- R&R analysis for attribute measurements.
- Graphical techniques to analyze R&R.

Lesson 5: Improving Measurement Systems.

- Using a problem-solving approach to find the root causes of repeatability and reproducibility problems.
- Using the GR&R data to help direct the problem-solving effort.
- A description of some basic causes to investigate if gage/instrument repeatability is high.
- A description of some basic causes to investigate if appraiser reproducibility is high.

Lesson 6: MSA Software Considerations.

- Suggested selection criteria for features of software programs for analyzing GR&R studies.
- An overview of some of the advanced measurement system analysis tools that a GR&R software package may have.

Challenge: An assessment of the learner's progress in this unit.

Unit 2 - Managing Measurement Systems

Lesson 1: Formal Instruments Management.

- Why a gage/instrument calibration program is so important and makes good business sense.
- Why a gage/instrument may not be accurate.
- The components of a gage/instrument management system.

Lesson 2: Sources of Measurement Error.

- Measurement errors due to gage/instrument calibration deficiencies.
- Measurement error related to gage/instrument usage or damage.
- Errors of judgment resulting in measurement errors.
- GR&R issues and measurement error.

Lesson 3: Calibration Practices.

- A discussion of common calibration practices.
- Key elements of a calibration system as defined by ISO 10012-1.
- Gage/instrument identification techniques.
- Sources for calibration procedures and independent calibration laboratories.
- Methods for determining intervals of calibration.

Lesson 4: Calibration Standards & Tools.

- Traceability of calibration standards from primary national standards to working standards.
- The role of transfer standards and working standards.
- Measurement uncertainty and the calibration system.

Lesson 5: Calibration Pitfalls.

- Common instrument management system pitfalls.
- Proactive techniques to steer your organization clear of these pitfalls.

Lesson 6: Records & Audits.

- Different types of records needed for a comprehensive instrument management system.
- The role of audits to ensure your instrument management system is working.

Lesson 7: Calibration Software Considerations.

- Benefits of using instrument management software.
- Suggested selection criteria of software features for an instrument management software program.

Challenge: An assessment of the learner's progress in this unit.

Mistake-Proofing Training Course Outline:

Unit 1 - Mistake-Proofing Primer

Lesson 1: What is Mistake-Proofing?

- Rewriting Murphy's Laws.
- Exploring the source of mistakes.
- The mindset necessary for mistake-proofing.

Lesson 2: Mistake-Proofing in Everyday Life.

- Common examples of mistake-proofing all around us.
- Using these examples to trigger ideas at work.

Lesson 3: Why Errors Are Made.

- How process inputs create process outputs.
- Why the root causes of errors must be identified.

Lesson 4: Inspecting vs. Mistake-Proofing.

- The limitations of inspection.
- Why prevention is always more powerful than detection.

Lesson 5: How Mistake-Proofing Works.

- The language of mistake-proofing.
- The role of teams in mistake-proofing efforts.

Challenge: An assessment of the learner's progress in this unit.

Unit 2 - Effects of Mistake-Proofing

Lesson 1: Approaches to Mistake-Proofing.

- Exploring the 8 forms of mistake-proofing solutions.
- Guidelines for selecting a mistake-proofing approach.

Lesson 2: Forced Control Devices.

- Delving into the four families of devices and methods used to achieve a forced control effect.

Lesson 3: Shutdown Devices & Warning Alarms.

- Examining 10 common families of sensors used to achieve a shutdown effect.
- Investigating 4 families of audible alarms and 4 families of visual alarms used to achieve a warning effect.

Lesson 4: Sensory Alert Devices.

- A look at the use of color-coding, missing-in-action clues, and other aids to achieve a sensory alert effect.

Challenge: An assessment of the learner's progress in this unit.

Unit 3 - Implementing Mistake-Proofing Solutions

Lesson 1: Integrating Mistake-Proofing & Problem Solving.

- How to incorporate mistake-proofing solutions into common problem-solving processes.

Lesson 2: Practical, Feasible, & Cost Effective Solutions.

- Assessment techniques for determining the practicality, feasibility, and cost-effectiveness of your mistake-proofing solutions.

Lesson 3: How to Keep Solutions from Being Overridden.

- Tips for keeping your mistake-proofing solution from being ignored or disabled.

Lesson 4: How Robust is Your Solution?

- Assessment techniques for determining how robust your mistake-proofing solutions are.

Lesson 5: Complementary Tools.

- How to use ten continuous improvement tools to complement mistake-proofing efforts.

Challenge: An assessment of the learner's progress in this unit.

Unit 4 - Mistake-Proofing in Action

(Eight real-life examples in a variety of settings.)

Lesson 1: Mistake-Proofing in High Volume Manufacturing.

- Nowhere are the benefits of mistake-proofing more evident than in high volume operations.

Lesson 2: Mistake-Proofing in Assembly Operations.

- Mistake-proofing is a perfect tool to prevent assembly errors.

Lesson 3: Mistake-Proofing in a Job Shop Environment.

- Mistake-proofing in short-run job shops can make the difference between profitability and bankruptcy.

Lesson 4: Mistake-Proofing in Process Industries

- Mistake-proofing is at the core of complex chemical operations.

Lesson 5: Mistake-Proofing in Equipment Set-up.

- Mistake-proofing is an important element of set-up reduction.

Lesson 6: Mistake-Proofing in the Office.

- Mistake-proofing is not just for plant operations.

Process FMEA Basics Course Outline:

Lesson 1: What is an FMEA?

- Know what an FMEA is and why an FMEA is used.
- Understand how an FMEA is conducted works on a conceptual basis.

Lesson 2: Purpose of an FMEA

- An explanation of how an FMEA helps identify risks, prioritizes the risks relative to one another, and focuses efforts on an action plan to reduce the risks.

Lesson 3: Assembling an FMEA Team

- Apply criteria to assemble an effective FMEA team.
- Understand the role of a Subject Matter Expert when conducting an FMEA study.

Lesson 4: PFMEA Start-Up

- How to define the scope of a PFMEA.
- How to break the study into two or more PFMEAs if the scope is too large.
- How to use a DFMEA Scope Worksheet to clarify and communicate the scope of the study.

Lesson 5: 10 Steps to Conduct a PFMEA

- Step-by-step directions on conducting a PFMEA.
- Guidance on the use of the FMEA Analysis Worksheet.
- Techniques for customizing the Severity, Occurrence, and Detection Ranking Scales for a PFMEA.

Lesson 6: Getting More Out of Your PFMEA.

- Tips on the best times in a product's life cycle to conduct a PFMEA.
- Tips on how to use the results of an FMEA to trigger continuous improvement.

Lesson 7: PFMEA Example.

- An example of the application of a DFMEA, working through all 10 steps.

Challenge: An assessment of the learner's progress in this Course.

Root Cause Analysis with Corrective Action Course Outline:

Introduction Lesson: Root Cause Analysis Overview

- Overview of Root Cause Analysis
- Preview of Lessons 1 through 4.

Lesson 1: Form & Focus the Team

- Form a team: Not every problem needs to be solved by a team; individuals working alone can get to the bottom of many problems. However, sometimes problems involve so many people, are so critical, are so complex or have been around for so long that it makes sense to have a cross-functional team tackle them.
- Focus the team: A (formal) Problem Statement communicates the scope of the problem to be tackled and helps focus the root cause analysis effort.
- Understand the problem: Understanding the process and how it works (or flows) is important to understand the problem.

Lesson 2: Find the Root Cause

- Create a cause & effect diagram: Listing causes of the apparent problems and their resulting effects starts the path toward finding the root cause; grouping causes using a cause and effect diagram creates structure on the path to the root cause.
- Explore chains of causes: When one cause results in another, a chain of causes is started. When chains of causes are evident, it means the causes are related in some way. Chains of causes can be identified using the familiar Five-Whys technique. A chain of causes may lead right to the root cause.
- Study interrelationships: An Interrelationship Diagram can be used to show the relationships and natural links between different symptoms or causes of a complex problem to provide clues on which causes are the primary drivers of the problem.
- Use data analysis & investigative tools: To draw conclusions, data must be collected and analyzed. Visual displays of data often provide the most helpful clues. Investigative tools are used when conventional data display and data analysis tools have not yet pointed to the root cause. Investigative tools should provide a deeper understanding of how the process works.
- Identify root causes: When the root cause is found, always ask the root cause question: "Does this cause (or causes) explain all that we know about what the problem is, as well as all we know about what the problem isn't?"

Lesson 3: Fix the Root Cause

- Propose potential solutions.
- Select the "best" solution: Develop a criteria and an approach to be used to evaluate solution candidates against that criteria; use of Decision Matrices can aid decision-making.
- Conduct a reality test: Is the solution practical, feasible and cost-effective?
- Develop and implement the Action Plan.
- Verify that the solution works as designed and does not create new problems.

Lesson 4: Finalize the Solution

- Validate the solution: Check to make sure the desired outcomes have been realized.
- Update documentation: Update Quality Systems, Control Plans, related FMEAs and Operating Procedures.
- Train: If the solution has led to changes in procedures or systems have changed, those using the systems will need training on how to work with the changes
- Start audits: Audits help hold the gains.
- Transfer knowledge: Leverage successes by sharing and publicizing solutions.

Lesson 5: Overcoming Barriers

10 barriers to Root Causes Analysis with potential remedies:

1. The problem is poorly or incorrectly defined
2. A systematic approach is not used
3. Investigations are stopped prematurely
4. Decisions are based on guesses, hunches or assumptions
5. An inadequate level of detail is employed
6. Interim containment fixes are sometimes allowed to become "permanent"
7. The skills, knowledge and experience needed to uncover the root cause are not available
8. A lack of organizational will to tackle the "bigger" issues
9. Fear of being blamed
10. "I don't have the time"

Challenge: An assessment of the learner's progress in this unit.

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Advanced Control Charts

Course Objectives

- Understand the mistake-proofing mindset and the goal of mistake-proofing.
- Recognize why errors are made.
- Learn the language of mistake-proofing.
- Recognize mistake-proofing solutions in everyday life and use these solutions as triggers for ideas to mistake-proof your processes.
- See the value of improving processes so that mistakes are prevented instead of relying on inspection to find mistakes.
- Be familiar with the 4 mistake-proofing effects, 2 forms of outcomes and 8 types of mistake-proofing solutions.
- Identify the five process input elements that exist in any process.
- Be acquainted with basic root cause analysis tools needed for mistake-proofing solutions.
- Be aware of how to assess potential solutions to determine if they are practical, feasible, cost-effective, robust and sustainable.

Advanced Process Capability

Course Objectives

- Understand the mistake-proofing mindset and the goal of mistake-proofing.
- Recognize why errors are made.
- Learn the language of mistake-proofing.
- Recognize mistake-proofing solutions in everyday life and use these solutions as triggers for ideas to mistake-proof your processes.
- See the value of improving processes so that mistakes are prevented instead of relying on inspection to find mistakes.
- Be familiar with the 4 mistake-proofing effects, 2 forms of outcomes and 8 types of mistake-proofing solutions.
- Identify the five process input elements that exist in any process.
- Be acquainted with basic root cause analysis tools needed for mistake-proofing solutions.
- Be aware of how to assess potential solutions to determine if they are practical, feasible, cost-effective, robust and sustainable.

Control Chart Basics

Course Objectives

- Understand the mistake-proofing mindset and the goal of mistake-proofing.
- Recognize why errors are made.
- Learn the language of mistake-proofing.
- Recognize mistake-proofing solutions in everyday life and use these solutions as triggers for ideas to mistake-proof your processes.
- See the value of improving processes so that mistakes are prevented instead of relying on inspection to find mistakes.
- Be familiar with the 4 mistake-proofing effects, 2 forms of outcomes and 8 types of mistake-proofing solutions.
- Identify the five process input elements that exist in any process.
- Be acquainted with basic root cause analysis tools needed for mistake-proofing solutions.
- Be aware of how to assess potential solutions to determine if they are practical, feasible, cost-effective, robust and sustainable.

Control Plan Basics

Course Objectives

- What are control plans.
- What control plans are not.
- Control plans apply throughout the life cycle of a product.
- The five key sections of a control plan.
- Identifiers
- Descriptors
- Characteristics
- Methods
- Reaction Plan
- How to make a Control Plan a living document.

Five-Whys

Course Objectives

- Understand what the Five-Why technique is.
- Learn that the Five-Whys can help identify the root cause of a problem.
- Understand which type of "why" questions are effective and which are not.
- Recognize how mistake-proofing helps address a root causes by creating lasting solution.
- Be exposed to several Five-Why studies.
- Identify common threads for successful investigations using the Five-Whys.
- Understand how sustainable solutions can be constructed.
- Understand that there are common pitfalls that need to be avoided when using the Five-Why approach.
- Be familiar with ways to avoid common pitfalls.

Introduction to COQ

Course Objectives:

- Understand why an effort to measure and quantify COQ is important.
- Be aware of the structure needed to implement a successful COQ Program.

Introduction to FMEAs

Course Objectives

- Describe what an FMEA is and why an FMEA is used.
- Explain the differences between a Design-FMEA and a Process-FMEA.
- Explain how the systematic FMEA approach getting us to dig into the details of the product or process under study to identify potential risks.
- Define how an FMEA helps identify risks, prioritizes the risks relative to one another, and focuses efforts on an action plan to reduce the risks.
- Apply criteria to assemble and effective FMEA team.
- Describe the role of a Subject Matter Expert when conducting an FMEA study.
- List the 10 steps used to conduct an FMEA.
- Explain how the standard FMEA Analysis Worksheet is used to organize data and present the findings of an FMEA study.

Introduction to Lean Six Sigma

Course Objectives:

- Understand the scope and breadth of a Lean Six Sigma initiative.
- Gain an understanding of what waste is and how to identify it so that it can be reduced.
- Become aware of variation and techniques to reduce it.
- Become familiar with the DMAIC team project model.
- Be aware of the infrastructure needed to support a Lean Six Sigma effort.

Introduction to Mistake-Proofing

Course Objectives:

- Understand the mistake-proofing mindset and the goal of mistake-proofing.
- Recognize why errors are made.
- Learn the language of mistake-proofing.
- Recognize mistake-proofing solutions in everyday life and use these solutions as triggers for ideas to mistake-proof your processes.
- See the value of improving processes so that mistakes are prevented instead of relying on inspection to find mistakes.
- Be familiar with the 4 mistake-proofing effects, 2 forms of outcomes and 8 types of mistake-proofing solutions.
- Identify the five process input elements that exist in any process.
- Be acquainted with basic root cause analysis tools needed for mistake-proofing solutions.
- Be aware of how to assess potential solutions to determine if they are practical, feasible, cost-effective, robust and sustainable.

Introduction to the 5S's

Course Objectives:

- Identify what each of the 5S's stands for and put them into the correct order.
- Explain the rationale for effective storage locations.
- Describe what it means to standardize and why standardization is important.
- Be familiar with strategies to sustain workplace organization and to prevent backsliding.
- Understand the 8 steps to start up an organization-wide 5S effort.

Lean Implementation

Course Objectives

- Understand the reasons for implementing Lean in an organization.
- Briefly describe the lean start-up steps.
- Explain the importance of a pilot in getting a lean effort off to a solid start.
- Describe what "cross-functional and interdependent departments" means.
- Define customer-focused and flexible, adaptable, and resourceful and explain what they mean to a lean environment.
- Identify the 12 most common reasons a lean initiative fails.

Lean Mindset

Course Objectives

- Explain why it is important that lean not just be used in manufacturing, but throughout the organization.
- Describe the benefits of lean in the office, maintenance, R&D, and Sales.
- Define key lean terms and know how to apply lean terminology.
- Understand the purpose of streamlining the value stream.
- Describe the steps to streamline a workflow.
- Identify the key characteristics of a lean value stream.
- Compare and contrast the difference between a macro and micro workflow.
- Describe the impact of a bottleneck on a process.
- Explain what "If it's not broke, fix it anyway." means.
- Identify activities that can help you learn from others outside of your organization.
- Describe the benefits of cross-training.

Lean Process Layouts

Course Objectives

- Describe the purpose of setting up work cells based on product families.
- Explain the purpose of a macro workflow and why it should be developed before micro workflows are determined.
- Identify major issues to consider when laying out a macro workflow.
- List factors that must be considered when establishing a micro workflow.

Lean Support Processes

Course Objectives

- Describe the role that support departments play in Lean Manufacturing.
- Define what "lower cost of ownership" means.
- Explain how bottlenecks are handled when scheduling in a lean operation.
- Explain why lean manufacturing requires skilled workers and effective leaders.
- Describe what "cross-functional and interdependent departments" means.
- Define customer-focused and flexible, adaptable, and resourceful and explain what they mean to a lean environment.

Mapping Office Workflows

Course Objectives:

- Define the bounds of a workflow.
- Use a variety of process (workflow) mapping techniques.
- Identify hand-offs, disconnects, incomplete communication and rework loops as non-value-adding components (or waste.)
- Plan improvements to workflows.
- Consider a move from batch processing to continuous (or one-piece) flow.

Overview of APQP

Course Objectives:

- Explain the purpose of the APQP process.
- Describe the five phases of the APQP process.
- List the steps necessary to prepare for an APQP.

Overview of Lean

Course Objectives:

- Describe the key concepts of lean manufacturing.
- Name and describe the seven wastes.
- Briefly describe how each of the seven wastes add costs to a process.
- Define value-adding and non-value adding.
- List the eight components of lean and define each.

Overview of Root Cause Analysis

Course Objectives:

- Understand the importance of getting to the root cause of a problem to assure that it is eliminated for good.
- Recognize common barriers to root cause analysis and apply techniques to overcome those barriers.

PPAP Training

Course Objectives:

- Understand what PPAP is, why it should be used and when it should be used.
- Know how to complete PPAP documentation requirements.
- Interpret when specific PPAP requirements apply and when they don't.

Process Capability Basics

Course Objectives:

- Describe what is meant by a capable process.
- Contrast the difference between an "in-spec" process and a "capable process."
- Identify and explain the three main measures of process capability.

Quality Improvement Fundamentals

Course Objectives

- Understand and respect the need for data to make decisions.
- Realize how the use of a Problem Statement helps to focus an improvement effort.
- Recognize that all processes have inputs, value-added and outputs as well as variation in each aspect.
- Appreciate how data display tools transform information into a graphical display of patterns that are clues to learning more about a process.
- Learn how to use common data collection and display tools such as Cause and Effect Diagrams, Tally Sheets, Histograms, Trend Charts, Scatter Diagrams, Concentration Diagrams, Pareto Charts and Process Maps.
- Know how to combine tools to generate a different perspective of the process under study.
- Be familiar with how patterns (from data) can be used to develop a working theory.
- Understand that identifying the root cause is a significant event.
- Be familiar with verifying and validating the solution to a problem.

Role of a (Lean Six Sigma) Champion

Course Objectives

- Successfully support your staff's lean six sigma efforts.
- Overcome challenges to successful lean six sigma implementation.
- Monitor and nurture lean six sigma projects.

Set-Up Reduction Basics

Course Objectives

- Describe the purpose and benefits of reducing set-up time.
- Show the relationship between the Seven Wastes and Set-Up Reduction.
- Identify the key components of set-up reduction and explain the role each plays in reducing set-up time.
- Explain the difference between internal and external set-up time.
- Identify opportunities to:
 - Convert internal set-up tasks to external ones.
 - Combine or eliminate set-up activities.
 - Reduce travel and motion.
 - Use portable set-up carts.
 - Minimize the use of tools and optimize the use of fasteners.
 - Monitor and subsequently improve performance.

TPM Basics

Course Objectives

- Explain how TPM aids Lean efforts and addresses wastes.
- Know the difference between Corrective Maintenance, Preventive Maintenance (PM) and Predictive Maintenance (PdM).
- Understand how the three sequential Phases of TPM build on each other.
- Realize how PdM techniques can further traditional PM practices.

Understanding Variation

Course Objectives

- Explain what variation in a work process is and why variation is a problem.
- Describe key techniques for measuring variation – visual display and mathematical.
- Identify key patterns of variation and explain what causes them.

Value Stream Mapping

Course Objectives

- Describe the purpose of a Value Stream Map.
- Identify the key components of a Value Stream Map.
- Explain the key steps in developing the Future State Map.
- Understand the purpose of streamlining the value stream.
- Describe the steps to streamline a workflow.
- Identify the key characteristics of a lean value stream.
- Compare and contrast the difference between a macro and micro workflow.
- Describe the impact of a bottleneck on a process.

Visual Workplace Basics

Course Objectives

- Describe what is meant by the Visual Workplace.
- List the underlying tenets of Visual Workplace.
- Understand the meaning of Visual Controls, Prompts and Displays.
- Identify candidates for the use of Visual Workplace techniques.
- Explain how visual aids, supports and alerts can make it easier to do things the right way and reduce waste.
- List specific examples of Visual Controls, Visual Prompts and Visual Displays.