



Course Outline

Basic Integrated Quality

Recommended Text & Materials:

- *The Lean Six Sigma Pocket Tool Book, 2005* – Michael L. George, David Rowlands, Mark Price, John Maxey – McGraw Hill
- Course PowerPoint lectures and handouts

Course Description:

This is a basic-level course introducing quality concepts and tools to audiences new to quality. Attendees learn about both the principles and practical applications of quality and a better understanding of how the automotive manufacturing industry Core Tools (e.g. APQP/Control Plan, FMEA, MSA, SPC and PPAP) work together to assure quality; to develop and launch new products; and promote continuous improvement. The course also highlights key problem solving techniques and data analysis. A combination of lecture sessions with practical examples and case studies tie the content to the workplace.

Course Objectives:

Upon completion of this course, the student will be:

- Familiar with Quality Definitions, the impact of Shewhart, Juran and Deming on today's quality improvement processes
- Familiar with Total Quality Management Concepts and able to discuss the role of the Quality Professional
- Able to differentiate between stakeholders and customers and identify recognize customers who may have differing needs and requirements
- Able to define Quality Criteria and Driven Parameters such as "in spec" and "out of spec"
- Familiar with importance of VOC and tools to Collect VOC: Interviews, Point-of-Use Observation, Focus Groups, Surveys, Kano Analysis, Critical-to-Quality Requirements
- Able to discuss the importance of quality assurance
- Able to discuss benchmarking and how it is utilized to assure product quality
- Able to demonstrate an understanding of "external" and "internal" customers and the importance of each
- Able to List and Discuss the 7 Basic Quality Tools
- Familiar with the Normal Theory



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- Familiar with Advanced Product and Quality Planning and Control Plan (Inputs and Outputs expected for each APQP phase) and how Core Quality Tools applies to Product and Process Launch, Launch Readiness, Safe Launch Approaches and Mass Production
- Familiar with the definition of Corrective Action, Preventive Action, Containment Action and Layered Process Audits and Continuous Process Improvements.
- Aware of ISO/TS16949, Technical Specifications and Key Standard Quality Certifications and How it Applies to Industry and able to differentiate between Industry Particular Requirements or Customer Specific Requirements
- Able to discuss the 8 ISO principles: Customer focus, Leadership, Involvement of people, Process approach, Systems approach, Continual Improvement Process, Factual approach to decision making, Mutually beneficial supplier relationships
- Able to basic discussions on use and interpretation of data analysis tools (Dotplots / Histograms / Normal Plots, Time Series, Individual Control Charts, Pareto Diagrams, Box Plots, Scattered Plots)
- Familiar with Problem Solving Techniques and different work frame (6 Sigma, Red X, Small Multiples) and Common Industry Reports (Process Cartooning, Fishbone, 5 Why's, 8D)
- Able to define six sigma, and its impact on industry
- Familiar with Process Flow Chart, Special Product and Process Characteristics, Product Assurance Plan, FMEA, Control Plan, Gages/Testing Equipment Requirements, Inspection Sheet, Work Instructions
- Able to discuss Product/Process Quality Systems, MSA, Capability Studies, PPAP and SOP
- Introduced to SPC, Variation and Continuous Improvement, Read Across Learned Lessons and Best Practices
- Able to demonstrate basic understanding of SPC "charting" including trends, UCL, LCL and predictive analysis
- Able to discuss how software can assist in project quality management
- Able to discuss how quality principles impact company stability, product cost, safety, employee morale and sustainability



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Session	Session Topics
1	Class Introduction. Define Quality. The History of Quality in the United States and discuss Deming and Juran. Total Quality Management Broad Concept. Basic Overview of Cost of Quality. The role of the Quality Professional
2	Case Study: Who – Segmentation – Data Input – Collecting VOC – Defining CTQ's Define Quality Criteria. Discuss Stakeholder and Customer, Importance and Tools to collect the VOC
3	Quiz Session 1-2 In Spec - Out of Spec (Concept Introduction); Basic Quality Control Tools (Brief Overview 7 Basic Tools); Pareto Charts; Histogram (Introduction); Characteristics Matrix; Process Flow; Check Sheet; Dimensional / Performance Report; Ishikawa & Fishbone Diagram Procedure; 5 Why's; Benchmarking; TIP: Pay attention to Data!
4	Current Events Quick review on 7 Basic Quality Control Tools; Normal Theory; Overview (APQP, PPAP, FMEA, SPC, Gage R&R, MSA); 8D Problem Solving - Define Corrective Action, Preventive Action, Containment Action and Layered Process Audits. Discuss Continuous Process Improvements.
5	Quiz Session 3-4 (open book) Case Study (Simulation Using sample valve part and drawing made for class purposes): Prepare Characteristics Matrix, Define CTQ's, Prepare Process Flow and Check Sheet, Investigate Problem with sample part and prepare Ishikawa Diagram
6	Case Study: Explain ISO/TS16949, VDA, AIAG, Technical Specifications, Customer Requirements, Industry Requirements and Certifications
7	Quiz Session 5-6 Introduction to Advanced Product and Quality Planning and Control Plan (Inputs and Outputs expected for each APQP phase); Overview (APQP, PPAP, FMEA, SPC, Gage R&R, MSA, Process Flow) Explain How Core Quality Tools applies to Product and Process Launch, Launch Readiness, Safe Launch Approaches and Mass Production.
8	Current Events FMEA, Control Plan and SPC. Introduction of CP, CPK, PP and PPK. Review of APQP and Readiness for New Launches
9	Quiz Session 7-8 Capability Study; MSA, Gage RR and Calibration ; How to study process and measurement system variations (Dotplots / Histograms / Normal Plots, Time Series, Individual Control Charts, Pareto Diagrams, Box Plots, Scattered Plots, Youden Plot)
10	Current Events Introduction to Problem Solving Techniques and different work frame (6 Sigma, Red X, Small Multiples, Pareto Analysis) and Common Industry Reports (Process Cartooning, Fishbone, 5 Why's, 8D)
11	Quiz Session 9-10 Review of Basic Statistics: Ways of describing data; Introduce concepts of Shape, Center and Spread of distributions; Learn about the Normal distribution





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12	Current Events Introduction to SPC: Control Chart Methods; discuss different types of variation. Introduce various Control Charts Types; Discuss the interpretation of Control Charts; Introduce software supporting quality systems (Mini Tab, Gage Track, QC-Calc)
13	Quiz Session 11-12 GRR, Process Capability Study and Implementation of SPC Case Study: perform GRR Study and Capability Study
14	Current Events Case Study - Problem Solving (Simulate customer complaint / recall issue - Review of Customer Performance/Score Cards and Communication Portals) / Discuss Escalation Process, Warning Limits and Intervention Requirements.
15	Overall Review and Class Activities / Discussions Preparing for Final Exam
	Final Exam (Paper Basketball Project – Individual)

Grading Scale:

90 - 100% = A	The final grade is made up of: - 60% of the average from quizzes, class exercises, and case study grades; - 20% of attendance, raising and discussing current events relevant to class lectures and overall participation of class/lecture discussions; - 20% of the final exam.
80 - 89% = B	
70 - 79% = C	
60 - 69% = D	
0 - 59% = E	

Quizzes:

Each quiz has 10 questions and each question is equivalent to 10 points being the total 100 points per quiz. The questions are intended to cover the content of lectures, concepts and discussions of the previous week class sessions.

The intent of the quizzes is to engage students in the learning process and class participation, and its main purpose is to allow the students the chance for a better grasp of the material. In the event a student doesn't reach 100 points in the first attempt, each student will still be granted a chance to score 100 points on the quizzes if he or she review the mistakes and send a complement amendment report with proper answers based on an established delivery due date informed by the instructor. Late amendment reports will not be acceptable and the original student grade for the quiz will remain.

The quizzes are timed and will last 30 minutes each or as per instruction discretion and are applied on the beginning of the class. Students that are more than 5 minutes late will not be allowed to take the quiz and will have ZERO points as quiz grade for the missed quiz.





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Current Events:

The students are expected to bring to class current world events that relate to class lectures and promote brief discussions with classmates. In order to gain points for current events, the student must share a brief introduction and the source of the current event (example: webpage link, newspaper clips, etc) prior of the start time of the class for when current events are required.

Attendance:

Attendance is a key factor in grading. If you are more than 20 minutes late, you will be considered absent. Each absence is equal to 5% of your grade. More than four absences will constitute missing over two weeks of class and will result in failing the course.

Final Exam:

The Final Exam is expected to cover the entire course material. An application of a Project, Case Study or Team Presentation might be an alternative for a formal final exam. The final evaluation format (whether a formal written final exam or a project, case study, team presentation, etc) is determined upon the instructor discretion.

Other Rules:

- Cell phones **MUST** be turned OFF or in silent mode class sessions.
- There will be no make-up of tests except for extenuating circumstances and only when prior notification is given. Any make-up is left to the discretion of the instructor and **MUST** be made up the following class session. All missing grades will be averaged as zeros.
- Do not take anything for granted. If you have any questions regarding grading policy or course objectives – **ASK QUESTIONS FOR CLARIFICATION!**





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