

MFE634: Quality Engineering.

General Information:

Course: Productivity and Quality Engineering (MFE634)

Instructor: Jorge Luis Romeu, Research Professor. Department of Mech. & Aerospace Eng.

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Required Textbook: Juran's Quality Planning & Analysis for Enterprise Quality (5th Ed.), by Frank Gryna, Richard Chua, Joseph DeFeo; McGrawHill, 2007. In addition, there is a list of suggested extra materials:

Probability and Statistics for Engineers and Scientists, (Walpole, Myers et al.). "Readings" of the ECS526 course. ASQ Certified Quality and Reliability Engineer Manuals. RIAC Quality and ReliabilityToolboxes.

Classes: Thursdays 6:30 to 9:10 PM; Link Rm. 105. *Office Hours:* Right after each class.

The Instructor reserves the right to reschedule a class, if necessary.

Course Objectives:

This course presents quality assurance methods, used by service and manufacturing organizations, to improve organization-wide effectiveness. Emphasis is placed on procedures that foster continuous quality improvement. Hard and soft quality and productivity improvement tools, and Statistical Process Control, Acceptance Sampling, Reliability Analysis, FMEA, FTA and other problem-solving approaches will be discussed. Prerequisites (*): Probability and Statistics (MAT521, ECS526, or equivalent). For reasons to request a comprehensive statistics level see: <http://www.asq.org/certification/quality-engineer/bok.html>

Course Requirements:

Students are required to have an SU computer account for email communication with the Instructor, and among Teams, and to access Blackboard. Students will use Minitab © statistical SW to solve problems and HW. Finally, students will work in Groups, to prepare and present PPTs in class, as collective assignments. A detailed explanation of the required Group HW PPT Presentations is appended to this Syllabus.

Zero Tolerance: no type of student dishonesty, or of improper or illegal behavior, will be tolerated.

Weekly Class Outline

Week	Topic	Chapter(s)
1	Intro; Juran, Basic Concepts; Company-wide Q; COPQ	1, 2, RIAC
2	Quality Assessments & Audits; ISO/Baldrige/Standards	2, 16
3	Quality improvements: Gurus, Quality Tools & Process Capability	3, RIAC
4	Six Sigma (DMAIC) improvement; More on Process Capability	20, 3, ASQ
5	Design for Quality (DFSS); Matrix Tools: QFD	4, 11
6	Design of Experiments (DOE) in Quality improvement	18, EcoSim
7	Fractional Factorial Design of Experiments	ASQ, RIAC
8	Midterm: Quality Assessment, Improvement, Lean, Inspections	All Above
9	Spring Break; no classes	
10	Lean Manufacturing/VSM/5Ss; Supply Chains; Outsourcing	12, 13
11	Inspections, Testing and Metrology: MSA/Gage R&R	15; ASQ
12	Acceptance Sampling; OC function;	15, START
13	Statistical Process Control/SPC; Charts	20, START
14	Reliability models: Q in Time; data analysis	5, 19, ASQ
15	Reliability Tools: FMEAs, Fault Trees; Cases	19, START

(*) Topics in Chapters 17 and 18 are part of MFE634 statistics pre-requisite (MFE526). Hence they are not covered in MFE634. All course material taught after Spring Break, is extensively statistically-based.

Grade Determination:

The course final grade will be based upon the following four components:

1. Midterm Exam	30%
2. Average of weekly quizzes	20%
3. Final, comprehensive exam	30%
4. HW Presentations (10%) & Final Portfolio (10%)	20%

Teams, Quizzes and Final Portfolio

Engineers use statistics to solve problems and to take decisions under uncertainty. In addition, engineers often work in multidisciplinary Groups/Teams, and must be able to present their work to peers and non-technical personnel. Toward these goals, MFE634 student study Groups/Teams will be formed the first day of class. Team members will meet periodically and interact via email, to study, solve problems, and prepare class presentations and other course assignments.

There will be a Team Leader assigned to each group the first day, and an elected one will replace it. Team presentations and HW will be discussed and critiqued by their peers, and then graded (10% grade). Power point presentations are revised and constitute part of the Final Portfolio.

There will be biweekly quizzes. A quiz with the lowest grade (or absence) will be dropped. The quiz average will contribute 20% of the final grade.

At the end of the semester, every Team will hand in a complete (hard and computerized) copy of their work (Portfolio) to the Course Instructor (not returned), and will provide copies for each team member, as part of the course documentation (10% grade). There will be a different topic for each Team (see note *). Consultation is fine. However, each team will work individually.

Teams are assigned a Topic from the list below, during the first week of the course. Each Team will use such topic to develop applications for the material they are learning. Then, they will prepare HW PPT presentations based on such applications. Group HW presentation grade depend (i) on quality and correctness of procedures implemented, (ii) on the number of applicable elements developed, (III) PPT presentation's scheduled time (15 minutes) and (IV) response to four or five pertinent orally posed questions regarding the topic developed.

(*) There are Eight different team Quality Engineering topics to choose from:

1. A failed industrial operation (e.g. coal mine or oil spill accident)
2. An industrial manufacturer (e.g. Lockheed, Boeing, General Motors)
3. An International Banking organization (e.g. IMF, World Bank)
4. A Health Insurance organization (e.g. Humana, Blue Cross)
5. A Health Care organization (e.g. University Hospital, Crouse Hinds)
6. A School System organization (e.g. New York City, LA, Syracuse Districts)
7. A Charitable/Service Organization (e.g. American Red Cross, Rescue Mission).
8. A Government Organization (e.g. Federal Reserve, FAA, NSF, NIH,

At the time of giving a PPT presentation, Teams will use their assigned topics to provide specific examples of the application of the different methods being discussed in the current class.

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