COURSE SYLLABUS

EIN 5226 Total Quality Management for Engineers
Spring 2017 (U01,RXAX)

GENERAL INFORMATION

PROFESSOR INFORMATION

Instructor:	Prof. Karen Schmahl	**Office Hours:**	Wednesday 2:30 PM – 5:30 PM Friday 2:30 PM - 5:30 PM
Office:	EC 3143	**Email:**	Please use Blackboard course messages
Phone:	(305) 348-6912		

COURSE DESCRIPTION AND PURPOSE

Study and application of quality management concepts and statistical quality techniques within the framework of the six sigma quality improvement methodology.

COURSE OBJECTIVES

The students will demonstrate an understanding of modern quality concepts and can apply statistically based quality control methodologies in business contexts using the six sigma approach. This will be accomplished when students can

- Understand and describe the background, concepts and phases of the six sigma approach to improving processes.
- Explain of the nature of variation inherent in the design and manufacture of products and apply statistically based and graphical methods to characterize and evaluate opportunities to reduce this variation.
- Understand and apply fundamental quality tools including flow diagrams, brainstorming, check sheets, Pareto charts, affinity diagrams, cause and effect diagrams, and scatter diagrams and describe use of other common techniques such as tree diagrams, prioritization matrices and process decision program charts.
- Describe the use of, apply and interpret probability distributions (normal, lognormal, binomial, hypergeometric and Poisson)
- Select and apply the appropriate control chart and process capability analysis methodologies to examine quality related issues in manufacturing or business situations.
- Apply and interpret concepts of inferential statistics (confidence intervals and hypothesis testing, power) including tests for means, variances, and proportions.
- Explain the concepts of measurement systems analysis and use repeatability and reproducibility analysis to analyze measurement capability for a variables measurement system
- Understand the application of Quality Management Principles in the Context of ISO9001 and interpret the ISO 9001 requirements.

Understanding, application and analysis/interpretation of topics is demonstrated on exams with further use of quantitative methods demonstrated in worksheets and Minitab exercises. The ability of the student to evaluate a realistic scenario utilizing applicable tools from the above topics is demonstrated with a comprehensive case.

TEACHING METHODOLOGY

This is a classroom based course. Students in class are expected to actively participate. Blackboard will be used to provide course PowerPoint handouts and other instructional materials. Minitab 16/17 will be utilized for homework assignments and cases.

ACCESSIBILITY AND ACCOMMODATION

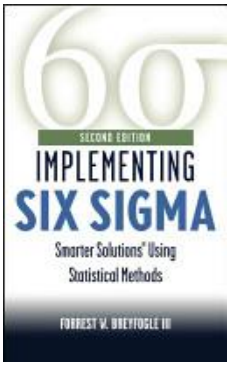
The Disability Resource Center collaborates with students, faculty, staff, and community members to create diverse learning environments that are usable, equitable, inclusive and sustainable. The DRC provides FIU students with disabilities the necessary support to successfully complete their education and participate in activities available to all students. If you have a diagnosed disability and plan to utilize academic accommodations, please contact the Center at 305-348-3532 or visit them at the Graham Center GC 190.

COURSE PREREQUISITES

There are no prerequisites for this course. However, while the course material does not assume prior knowledge of statistics, a previous course in statistics is recommended.

TEXTBOOK

Implementing Six Sigma (Recommended)
Forrest W. Breyfogle
John Wiley & Sons Incorporated, 04/07/2003
ISBN-10: 0471265721
ISBN-13: 9780471265726



You may purchase this textbook online at the FIU Bookstore.

This text is recommended with suggested readings associated with lectures. It is not required.

ISO 9000:2015 and ISO 9001:2015 are required documents that will be made available to students for academic use. Instructions on how to access these documents will be provided in the course.

Students may also find any basic statistics textbook helpful where additional examples of problems can be found.

SOFTWARE

This course utilizes the following software: ***Minitab 17.*** Students will learn to use the software through exercises and tutorials throughout the course.

University Technology Services provides access to Minitab 17 within the UTS Open Computer Labs as well as remotely on eLabs.fiu.edu. The Engineering Information Center Labs also have Minitab 17.

COURSE COMMUNICATION

Communication in this course will take place during class and, if necessary outside of class, via Blackboard Announcements and Messages.

Please use messages rather than email to contact the Professor. Users must log on to Blackboard to send, receive, or read messages. The Messages tool is located on the Course Menu, on the left side of the course webpage. It is recommended that students check their messages routinely to ensure up-to-date communication.

EXAMS

Midterm and final exams are scheduled for this course.

ASSIGNMENTS

Assignment/Quiz Expectations and Requirements:

- Graded assignments/quizzes are listed in the grading section of this syllabus and are in bold with due dates listed on the course calendar.
- There will be a one day grace period on assignments and blackboard quizzes to allow for technical issues (Blackboard down, scanner problems, flat tires, etc.) Assignment worksheets will not be accepted after the one day grace period unless the instructor is notified of extenuating circumstances within two days of the due date.
- Assignments on the course calendar that are not graded are provided for you to practice the problems or further understand concepts. Solutions to non-graded assignments are provided in Blackboard.
- Assignment/Quiz worksheet files can be found in the associated module in Blackboard with further details.
- Graded worksheet assignments must be submitted through the Assignment Dropbox in Blackboard. Submissions are required to be in pdf format in a single file per assignment. Submissions not in required format or in multiple files will be assessed a 20% penalty.
- Collaboration on assignments is acceptable, but each student must take any quizzes, or do submitted assignment write-ups without collaboration with other students.

Notes on the Minitab Exercise Blackboard (BB) Quizzes 3, CTL, Control Charts, and 7

- Each quiz will be provided online under the Assessments tab.
- These quizzes consist of multiple-choice questions based on the associated Minitab exercise and related theory.
- Two attempts are allowed
- Students will be allowed approximately 20 minutes to complete each.
- The student will be provided with a score and an indication of each question answered incorrectly.

Notes on the Minitab Exercise Quizzes 9 and 10

- "Practice" quiz will be provided online under the Assessments tab.
- "Real" quiz will be given in class on the date noted. Students that miss a class quiz will have their final exam score adjusted proportionately to make up for the missing assessment. (If both quiz 9 and 10 are missed, documentation of excused absence is required.) For students taking both class quizzes, if the final exam score is proportionally higher than one of the scores, the lower score will be dropped and the exam will count more.

CASE

The case utilizes the quality tools and statistics learned in the course in evaluation of a realistic scenario. The case will be performed in teams of 3 or 4 students. Students will be assigned to teams by the professor. Grades for individual team members may vary based on Team Evaluation information.

Opportunity is provided for early submission of the case. The early submission is graded with feedback provided to student teams to allow improvement prior to final submission. If the early submission option is elected the grade for the case will be the 60% initial and 40% final. Applicable dates are as noted on the syllabus. (There is no grace period on case submission dates. Late submissions will be assessed a 10% per day grade reduction.)

GRADING

Course Requirements	Number of Items	Points for Each	Total Points Available	Weight
Assignments				
Minitab 1 - Pareto (Submit worksheet)	1	20		
Deming Funnel Experiment (Worksheet and Posting)	1	10		
Case Initial Gant Chart (Team)	1	5		
Case final Gantt Chart (Team)	1	5		
Team member evaluation form for case	1	5		
Minitab Quizzes				
Minitab Quiz 3 - Normal, lognormal (BB)	1	10	135	20%
CTL Quiz	1	10		
Minitab Quiz - Control Chart (BB)	1	10		
Minitab Quiz 7 - CI tests, 1 samples means (BB)	1	10		
Minitab Quiz 9 - Sampling with t (practice quiz, BB)	1	5		
Minitab Quiz 9 - Sampling with t (in class)	1	20		
Minitab Quiz 10 - Variance (practice quiz, BB)	1	5		
Minitab Quiz 10 - Variance (in class)	1	20		
Case	1	100	100	25%
Midterm Exam	1	100	100	25%
Final Exam	1	100	100	30%
				100%

Your final grade will be calculated as follows:

+ assignment points*(100/135)*0.20
+ case points *0.25
+ exam 1 points *0.25
+ final exam points *0.30

Final Grade for letter determination

Letter	Range	Letter	Range	Letter	Range	Letter	Range
A	92+	B+	88-89	C+	77-79	D	60-69
A-	90-91	B	83-87	C	70-76		
		B-	80-82			F	<60

Academic Honesty Policy

All students are expected to adhere to the Florida International University Student Code of Conduct and the Student Code of Academic Integrity.

Any instance of objective evidence of academic misconduct will result in filing of a complaint with the Graduate College per the Graduate Academic Misconduct Definitions and Procedures. A copy of this document can be found in the course Blackboard site. In addition to filing the complaint the following consequences will be imposed:

- Cheating on an exam will result in an F in the class.
- Academic misconduct on the case will result in a grade of 0 on the case for team members who have been identified as cheating or plagiarizing and the Procedure will be followed for these individuals. For other members of the team, a ten-point reduction in the final case grade will be imposed as this is a group effort and all team members should be cognizant of the work that is submitted. If no team members accept responsibility, all team members will have a 25 point deduction on the final case score. (Any use of prior student work is unauthorized and is thus cheating.)
- Any other academic misconduct instances will incur a minimum penalty of a plus/minus grade reduction in the course and grade of zero on the affected assignment.

WEEKLY SCHEDULE

Week/ Class date	Module/ Lecture	Suggested Chapter / Sections	Assignments (Practice problems/exercises are not submitted. Answers are provided.)	Due Dates
1 1/11	Module 1 The Six Sigma Process Six sigma overview	1 / all 2 / all	On-line lecture: Voice of the customer	
	Module 2 Measurements Measurements I	3 / 1-8	Minitab Intro	
2 1/18	Module 2 Measurements (Cont.) Measurements II	3 / 9-19	Practice: Ch 3 Problems 3, 23, 24	
	Module 3 Quality Tools Process Flowcharting Basic Tools I	4 / all 5 / 1-9, 11, 12	**Minitab 1 Pareto (Drop box)** Minitab 2 Describing Variation	**1/25**
3 1/25	Module 3 Quality Tools (cont.) Basic Tools II	5 / 10, 13-22		
	Module 4 – Probability and Probability Distributions Probability	6 / all	Probability Worksheet Practice: Ch 6 Problems 2,6	
4 2/1	Module 4 – Probability and Probability Distributions (cont.) Normal Distribution, Lognormal Binomial, Hypergeometric	7 / 1, 2, 3, 14 7 / 4-7	**Minitab 3 – Normal, lognormal QUIZ (BB)** Practice: Chapter 7 Problems 3, 4 Minitab 4 - binomial Practice: Chapter 7 Problems 21, 23	**2/8**
5 2/8	Module 4 – Probability and Probability Distributions (Cont) Other distributions Probability Plotting	7 / 9-13, 21 8 / 1-6	Minitab 5 - Poisson Practice: Chapter 7 Problems 18, 22 Practice: Chapter 8 Problems 2, 6	
	Module 5 Midterm review and exam		Distributions Review (on line)	
6 2/15	Module 5 Midterm review and exam		**Midterm exam (in class)**	

Week/ Class date	Module/ Lecture	Suggested Chapter / Sections	Assignments (Practice problems not submitted. Answers are provided.)	Due Dates
7 2/22	Module 6 Control Charts			
	Control Chart Introduction	10/1-8 & 16/2	Central Limit Theorem Worksheet	
			CTL and Control Chart Intro Quiz	**3/1**
	Variable Control Charts	10/1-8 & 16/2		
8 3/1	Module 6 Control Charts (cont)			
	Process Capability	10 / 9-14	**Control charts Minitab Exercise- QUIZ (BB)**	**3/8**
	Module 9 – Case		**Initial Gantt Chart**	**3/13**
	(Portions of case can be begun. Some steps cannot be completed until after module 7, 8)		**Optional: Early submission of case to enable feedback** (no grace period)	**4/10**
			Final Case, Gantt, and team/member evaluation forms (no grace period)	**4/28**
9 3/8	Module 7 – Statistics for Decision Making			
	Confidence Intervals and Hypothesis tests	16 / 1-2 & 17 / 2-5	Minitab 6 - Conference intervals	
	Inference - Continuous response	16 / 3-4 & 17 / 2-5	**Minitab 7 - CI tests, 1 sample means QUIZ (BB)**	**3/22**
10	Spring Break			
11 3/22	Module 7 – Statistics for Decision Making (cont.)			
	Errors, Power, Sample Size	16 / 3 & 17 / 3	Minitab 8 - Sampling with Z	
	Comparison tests - continuous, means	19 / 1-2, 4-5, 8-11	**Minitab 9 - Sampling with t QUIZ (BB & in next class)**	**3/29 (BB)**
12 3/29	Module 7 – Statistics for Decision Making (cont.)		(in class quiz Minitab 9, 15 minutes)	
	Comparison tests - variances	17 / 7-8 & 19 / 6-7	**Minitab 10 – Variance QUIZ (BB & in next class)**	**4/5 (BB)**
	Inferences - Attribute Data	18 / all	Minitab 11 - Proportions	
	Comparisons – Attribute	20 / all	Minitab 12 - Chi Squared	
13 4/5	Module 8 – Measurement Systems Analysis		(in class quiz Minitab 10, 15 minutes)	
	Measurement Systems Analysis	12	Minitab 14 - MSA	

Week/ Class date	Module/ Lecture	Suggested Chapter / Sections	Assignments (Practice problems not submitted. Answers are provided.)	Due Dates
14 4/12	Module 12 – Correlation and Regression Correlation Regression	23/all	Minitab - Regression	
	Module 10 – Management Initiatives Management Initiatives	Ch 55	**Deming Funnel Experiment (drop box and Discussion board)**	**4/19**
15 4/19	Module 13 – Lean Intro Lean Introduction (on-line)	44/1-8,12-13		
	Module 11 – ISO 9001 ISO 9001 Introduction and auditing ISO 9001 – Overview and Management Principles		(Bring ISO standards to class) Required reading: ISO 9000 Section 2	
16 4/26	Module 12 Review and Final Exam I – Hypothesis Testing Review (optional on-line lecture) II – Control Charts and Capability Review (optional on-line lecture) Final Exam Study Questions (Final case due 4/28)			
	Final Exam			