

IME 328 QUALITY ASSURANCE AND CONTROL

Winter 2001

TR 5:30 p.m. – 6:45 p.m.

Catalog Description: Techniques of controlling quality in manufacturing systems. Topics include organization of quality, methods of measurement, and basic statistical tools. NOT FOR ENGINEERING CREDIT. Prerequisite: MATH 216 or MATH 260 or MATH 366.

Textbook:

1. Mitra, Amitava, Fundamentals of Quality Control and Improvement, (Upper Saddle River: Prentice Hall, Second Edition, 1998).
2. Crosby, Philip, Quality is Free.

References:

1. Besterfield, Dale H., Quality Control, (Upper Saddle River: Prentice Hall, Fifth Edition, 1998) [WMU call no. TS156.B47 1998]

Instructor:

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Office Hours: MW 10:15 – 11:00 a.m., F 9:00 – 11:00 a.m.

Coordinator: Dr. David M. Lyth, Professor.

Prerequisite by topic:

1. Basic electronic communication skills; word processing, electronic spreadsheet, internet access, email
2. Working knowledge of descriptive statistics, mean, variance, graphical display methods, probability (MTH216, 260, or 366)
3. Working knowledge of inferential statistics; estimation, hypothesis testing, regression (MTH216, 260, or 366)

Course objectives:

1. Understand the fundamentals of quality and the methods used to control quality (a,b)
2. Be able to select and apply fundamental quality improvement tools including flowcharting, cause & effect diagrams, and Pareto analysis (a,b,f).
3. Comprehend the concept of statistical process control and be able to set up and interpret both variable and attribute control charts (a,b,f).
4. Be able to understand and apply lot-by-lot sampling (a,b,f).
5. Understand the concept of reliability and be able to calculate the reliability of a system of components (a,b,f).
6. Comprehend the concept of quality costs, be able to categorize costs and analyze results (a,b,f).
7. Be cognizant of ISO-9000 and the various quality standards in existence. (a,b,f,k)
8. Realize the importance of quality in current society and its role in manufacturing and service operations (j).

Note: letters in parentheses at the end of each objective refer to the Tac of ABET 2001 criteria.

Computer Usage:

Students will be required to use electronic spreadsheet software (EXCEL) to plot and analyze data. In addition, a research report using the internet will be required. You will be expected to use the computer to conduct research on the topic and then word processing software to prepare the report.

Course Schedule:

<u>DATE</u>	<u>TOPIC</u>	<u>CHAPTER</u>
1- 2	Introduction to Quality Control	1
1- 4	Total Quality Systems	1
1- 9	Impact of Some Philosophies on Quality	2
1-11	Impact of Some Philosophies on Quality	2
1-16	Quality Management: Practice, Tools, and Standards	3
1-18	Quality Management: Practice, Tools, and Standards	3
1-23	Fundamentals of Statistical Concepts and Techniques	4
1-25	EXAMINATION #1	1-3
1-30	Fundamentals of Statistical Concepts and Techniques	4
2- 1	Fundamentals of Statistical Concepts and Techniques	4
2- 6	Graphical Methods for Quality Improvement	5
2- 8	Graphical Methods for Quality Improvement	5
	Statistical Process Control Using Control Charts	6
2-13	Statistical Process Control Using Control Charts	6
2-15	Statistical Process Control Using Control Charts	6
2-20	Control Charts for Variables	7
2-22	EXAMINATION #2	4-6
2-26 to 3-2	SPRING BREAK (No classes)	
3- 6	Control Charts for Variables	7
3- 8	Control Charts for Variables	7
3-13	Control Charts for Attributes	8
3-15	Control Charts for Attributes	8
3-20	Process Capability Analysis	9
3-22	Process Capability Analysis	9
3-27	Acceptance Sampling Plans	10
3-29	EXAMINATION #3	7-9
4- 3	Acceptance Sampling Plans	10
4- 5	Acceptance Sampling Plans	10
	Reliability	11

<u>DATE</u>	<u>TOPIC</u>	<u>CHAPTER</u>
4-10	Reliability	11
4-12	Quality Control in the Service Sector	13
4-17(Tue)	COMPREHENSIVE FINAL EXAMINATION #4 (5:00 – 7:00 p.m.)	

Library Usage:

There are several books on the subject of Quality Control in Waldo Library containing numerous solved problems. One of these books has been identified under References [with the call numbers]. It is strongly recommended that the student use at least this book to study the solved examples. This will greatly enhance his/her ability to analyze problems and determine the approach to be taken for solving any given problem.

Home Work Problems:

There are numerous problems at the end of each chapter. You should solve these problems as the appropriate topics are covered in class. The answers to these problems are given in the Instructor's Manual for your text book. This manual will be kept on reserve behind the circulation desk in the Waldo Library and can be checked out for use in the Waldo Library for a limited time only. The only way you can understand the subject material and do well in this course is by actually solving problems. Hence, it is recommended that you solve as many of the problems as possible. If you encounter difficulty in solving any of the problems, you can either raise the question in class or see the instructor in his office.

Computer Assignments:

Several computer assignments will be made during the semester to help you understand the concepts of statistics and statistical process control. These assignments must be completed and submitted by the due date. The assignments will be graded. It is mandatory to submit all the computer assignments

Evaluation Distribution:

1. Examination # 1	20%
2. Examination # 2	20%
3. Examination # 3	20%
4. Examination # 4	25%
5. Assignments	15%
TOTAL	100%

Grading Scale:

The following grading scale will be used in my class:

A (91 – 100), **BA** (88 – 90), **B** (81 – 87), **CB** (78 – 80), **C** (71 – 77), **DC** (68 – 70), **D** (60 – 67), **E** (below 60).

All examinations and assignments will be graded on a numerical scale. At the end of the semester, the grades will be added up for all the items (with the appropriate weights) and then converted to a letter scale to determine the final course grade. No make-up exams or assignments will be given.

Performance Criteria²:

- Objective 1. Become well versed with the fundamentals of quality and how to control it [1,4, 5].
- Objective 2. Know how to apply fundamental tools to improve quality [1, 2, 4, 5].
- Objective 3. Set up and interpret variable and attribute control charts [2, 3, 4, 5].
- Objective 4. Apply lot-by-lot sampling for acceptance of material [4].
- Objective 5. Calculate the reliability of a system of components [4].
- Objective 6. Become familiar with the application of the ISO-9000 standards [1, 4, 5].
- Objective 7. Understand the importance of quality in manufacturing and service operations [1, 4].

²Numbers in brackets refer to the method of evaluation as listed in the previous section.

