



Department of Industrial Engineering

IENG 303 Quality Assurance and Reliability

Instructor: Dr. Efthymia Staiou

E-mail: effi.staiou@yasar.edu.tr

Office: U-214

Extension: 5665

Office Hours: Wednesday 16 :00 -16 :50 (G. II) and Thursday 17 :00 – 17 :50 (G. I)
or by e-mail appointment

TA:

E-mail:

Office:

Extension:

Office Hours:

Class meetings:

Group I:

Tuesdays 9:00 – 10:50 at Y-324

Wednesdays 13:00 – 14:50 at Y-324

Group II:

Tuesdays 14:00 – 15:50 at Y-325

Thursdays 15:00 – 16:50 at Y-325

COURSE DESCRIPTION

Introduction to modern quality management and improvement; statistical methods for quality control and improvement; design and analysis of statistical process control systems; control charts; process and measurement systems capability; capability analysis; reliability; life-cycle curve and probability distributions in modeling reliability; system reliability; life testing plans.

PREREQUISITES

Basic knowledge about probabilistic analysis and statistical modeling as well as some computer background.

COURSE WEB SITE

lectures.yasar.edu.tr : **IENG303EK**

Web page: <http://estaiou.yasar.edu.tr/courses/>

TEXT

- Montgomery, D.C., Statistical Quality Control, A Modern Introduction, 6/7th edition, John Wiley & Sons, Inc., 2009/2012

REFERENCES

- Juran, J. M. (co-editor-in-chief), Godfrey, A. B. (co-editor-in-chief), Juran's quality handbook, New York : McGraw-Hill, 1999
- Mitra, Amitava, Fundamentals of quality control and improvement, Upper Saddle River, N.J. : Prentice Hall, 1998.

OBJECTIVES

This course will provide a sound understanding of the principles of modern statistical methods for quality control and improvement and the basis for applying them in a variety of situations. It will give a solid foundation in statistical quality control (SQC) and show how it fits in the Industrial Engineering “tool bag”. Total Quality Management will also be presented to provide context for SQC and to illustrate its importance to business and industry.

After completing IENG 303, students will be able to:

- Emphasize on the philosophy and the concepts of Total Quality Management.
- Identify and construct all pieces of a control chart
- Create and interpret an appropriate control chart for a process
- Determine process and measurement systems capability
- Write a technical report about a process and how to monitor it through quality control techniques
- Understand the concepts of reliability and apply methods for its computation.
- Measure component reliability and how to model the reliability structure of a complex system as a function of the constituent component reliabilities.

EXAMS

- There will be a midterm exam during the midterm examination week. The exam will contain material covered prior to the exam.
- Final exam will be given during the examination week and will be a comprehensive exam.
- Both exams are closed-book-notes exams.
- Each student is allowed to prepare 1 page (front and back) cheat sheet for the midterm exam and an additional page for the final exam.
- The exams will be graded by the Instructor.

QUIZES

- Quizzes may be given in class during the practice sessions. They will be announced at least one lecture before the quiz is given.
- There are no make-up quizzes.
- Quizzes are closed-book-notes examinations.
- Quizzes will be graded by the Teaching Assistant assigned to the course.

HOMEWORK

- Homework (HW) will be regularly assigned approximately every other week except the first, the last and the midterm exam week which amounts to tentatively 4 to 6 homework sets of problems during the semester.
- Completed HW assignments should be turned in by the beginning of class on the due date in class. Unless specified otherwise, you must work on your HW individually.
- No late HW will be accepted unless there is a valid reason. In that case, the HW has to be turned in next class period.
- Instructions for the format of the HW will be given separately.
- Homework will not be graded and the solutions will be presented in practice sessions by the Teaching Assistant assigned to the course.

PROJECT

- A term project will be assigned to groups of students.
- You must work on the project as a team.
- Instructions for the project will be given separately.

TENTATIVE GRADING

- A student's course grade will be based on total points accumulated. The grade weight is as follows:

Midterm Exam	25
Final Exam	40
Project	15
Homework	10
Quizes	10
Total	100

Attendance/participation 5% (bonus)

- The Instructor reserves the right to make minor changes in the above table.
- The letter grade will be assigned based on the statistical distribution (curve fitting) of the class.

ATTENDANCE POLICY

- The attendance will be recorded once at the beginning of the class and once after the break. According to rules and regulations, anyone who attends less than 70% of classes will get R as a final grade.

ACADEMIC DISHONESTY

- Cheating is a **very serious offense**. Cheating consists of the use of any unauthorized material on an examination. Unauthorized material includes notes, book, and information stored in your calculator/cellular phone, or copying from another student. Cheating also consist of copying HW assignments, projects or other assignments.
- A penalty for cheating is an automatic F in the course.
- Act of cheating will also be reported to the Yasar University authorities.

CLASS DISTURBANCE POLICY

- A class disturbance is anything that may detract from your fellow classmate's learning experience or in teacher's ability to conduct a class. **Electronic devices such as cellular phones, pagers, and media players must be off while the student is in the classroom.** Please respect your peers by not being disruptive in the class.

IMPORTANT DATES

- First day of classes September 23, 2013
- Deadline for add/drop courses October 4, 2013
- Kurban Bayrami holiday October 15–18, 2013
- Republic day October 29, 2013
- Midterm exams week November 18 – 22, 2013
- New Year January 1, 2014
- Last day of classes January 10, 2014
- Final exams weeks January 13 -24, 2014

TENTATIVE COURSE OUTLINE

1. Introduction to Quality (Chapter 1-2) Week 1-2
 - a) Definitions of Quality
 - b) Evolution of Quality Control and Improvement
 - c) Management Aspects of Quality
 - d) The DMAIC Problem Solving Process
2. Statistical Methods for Quality Control (Chapter 3-4) Week 3-4
 - a) Important probability distributions
 - b) Probability Plots
 - c) Useful Approximations
 - d) Statistics and Sampling distributions
 - e) Statistical Inference for a single sample
 - f) Statistical Inference for a two or more samples
3. Basic Methods of Statistical Process Control (Chapter 5-6-7) Week 5-9

- a) Introduction to SPC
 - b) Shewhart Control Charts for Variables
 - c) Shewhart Control Charts for Attributes
4. Process and Measurement Systems Capability (Chapter 8) Week 10-11
- a) Process Capability Analysis
 - b) Gauge and Measurement System Capability Studies
5. Reliability Week 12-14
- a) Component Reliability
 - b) Life-cycle curve and probability distributions in modeling reliability
 - c) System Reliability
 - d) Operating Characteristic Curves
 - e) Life testing plans

DISCLAIMER

The instructor reserves the right, when necessary, to alter the grading policy, change examination dates, and modify the syllabus and course content and time plan. Modifications will be announced in class and/or course webpage. Students are responsible for announced changes.