



ÇANKAYA UNIVERSITY  
Faculty of Engineering  
Department of Industrial Engineering

Faculty Member:  
Alp ERTEM  
Office: L-319, Tel: +90 312 233 1367  
e-mail: [alpertem@cankaya.edu.tr](mailto:alpertem@cankaya.edu.tr)

**IE 326 – Quality Engineering (3 2 4) ECTS: 6  
Spring 2018**

**Course objectives**

- To introduce the concepts and statistical methods employed in the assurance of product conformance to specification limits.
- To introduce different statistical process control techniques.
- To enlighten students on the importance of reduction in variability in process.
- To introduce acceptance sampling techniques.
- To teach how to conduct and use design of experiments to improve quality of products and processes.

**Teaching Assistant**

Hale Akkocaoğlu, e-mail: [hale@cankaya.edu.tr](mailto:hale@cankaya.edu.tr)

**Course website**

<http://webonline.cankaya.edu.tr/>, students will be automatically enrolled to IE326 course. Check the website frequently for announcements.

**Text**

Montgomery D.C. (2013), *Statistical Quality Control: A Modern Introduction*, 7<sup>th</sup> ed., Wiley

**Lectures & Recitations**

Lectures and recitations will be held at the time and place indicated in the following table. MS Powerpoint slides as well as on-the-board problem solving techniques will be used during the lectures. Recitations will cover the problems for the associated week. Bring your calculators to class.

Section	Lecture	Recitation
01	Wednesday 11:20 – 13:10 L-A14	Friday 13:20-15:10 LA14
	Thursday 15:20 – 16:10 L-A14	
02	Wednesday 15:20 – 17:10 L-A14	Friday 15:20-17:10 LA14
	Thursday 16:20 – 17:10 L-A14	

**Attendance:**

- Minimum required attendance to lectures is 45%. However, it is strongly recommended to attend all the lecture and recitation hours.
- Attendance will be taken every lecture and recitation hour.

**Conditions that may lead to the letter grade “NA”:**

- Not attending the Midterm Exam and the Final Exam.
- Having less than 45% attendance to lectures and recitations.
- Not presenting in the Term Paper presentations.

**Homework**

There will be three homework assignments related to the recitation problems. Use of either Minitab or statistical functions in MS Excel might be required for homework assignments. Homework assignments are due **on Sunday of the submission week at 23:55** and should be uploaded to the course website (**not** to the teaching assistant).

Homework assignments will be submitted as a group of at most 2 to 3 students. In case of **plagiarism (copying)**, students will get a zero from the homework assignment and university **discipline** regulations will be applied.

### **Term Project and Oral Presentation**

There will be a term project for the application of statistical concepts in this course. The term project will be done with project teams of **four or five students**. The use of **real** company data is required for the project work. Use of either Minitab or statistical functions in MS Excel is required for the project assignments. Guidelines for the term project is provided at the course website. A term project report is **NOT** required, instead there will be **an oral presentation** of the term project. All members of the team are required to be present some work during the team presentation. Last two weeks of recitation hours are dedicated to oral presentations. Each section will present their term project in their corresponding recitation hours.

**At week 6**, students should form their groups and inform course assistant by e-mail. The deadline of group formation is **Friday of week 6 at 23:55**. Groups will include **four or five students**. Those who do not/cannot form a group will be grouped by the instructor. These groups will be valid only for the project and presentation. Detailed information about the content of the project will be announced later.

### **Tentative Course Schedule**

Every student should check course web site regularly; and is responsible for the material of the week, and announcements made at the course web site.

<b>Week</b>	<b>Lecture (Topic)</b>	<b>To-Do</b>
1	Introduction to Quality and Quality Improvement Concept	Read Chapter 1
2	DMAIC Process	Read Chapter 2
3	Review of fundamental statistical concepts	Read Chapter 3 and 4
4	Graphical tools for quality improvement	Read Chapter 5, Upload <b>homework 1</b>
5	Statistical Process Control methods and techniques	Read Chapter 5,
6	Control Charts for Variables: X-R	Read Chapter 6 <b>E-mail project groups</b>
7	Control Charts for Variables: X-S	Read Chapter 6
8	Control Charts for Attributes	Read Chapter 7, Upload <b>homework 2</b>
9	Process Capability Analysis	Read Chapter 8
10	Acceptance Sampling for Attributes	Read Chapter 15
11	Acceptance Sampling for Variables	Read Chapter 16
12	Designed Experiments: 2 <sup>k</sup> Factorial Design	Read Chapter 13
13	Two Level Fractional Factorial Designs	Upload <b>homework 3</b>
14	Quality Management System Standards	<b>Oral presentations</b>

### **Tentative Grading (\*)**

<b>Assessment Tool</b>	<b>Quantity</b>	<b>Percentage</b>
Midterm Exam	1	30
Oral Presentation	1	15
Homework	3	15
Final Exam	1	40

(\*) Instructor reserves the right to change the grading policy

### **Exams & Make-Ups**

Exams will include questions related to short description of main concepts and quantitative problems. Most exam questions will be similar to recitation and homework questions. All exams will be closed book and closed notes. Students are allowed to **bring one A4 size formula sheet** that can be used during exams. Make sure that you **only** write formula to the sheet. **If you have solved problems and/or verbal explanations in your sheet, it will be collected in the exam.** If a student misses an exam with a valid excuse, then he/she will get a make-up exam according to the rules in university by-laws. A make-up exam might contain different type of questions than the regular exam.