INDUSTRIAL ENGINEERING DEPARTMENT
IE 423
Quality Engineering
Fall 2023

Type:	Required
Credits/ECTS:	3 Credits / 6 ECTS
Class/Laboratory/PS schedule:	Tuesday 15:00-15:50 (VYKM 3) – Regular Class
	Tuesday 16:00-16:50 (VYKM 3) – Problem Session
	Thursday 9:00-10:50 (VYKM 3) – Regular Class
Instructor:	Mustafa Gökçe Baydoğan
	Office: M4082 (mustafa.baydogan@boun.edu.tr)
	Office Hours: Thursday 11:00-12:00
Teaching assistant:	İlayda Çelenk (ilayda.celenk@boun.edu.tr)
Prerequisite(s):	IE 256 (Statistics for Industrial Engineers)
	or equivalents.

Course Description:

This course covers the fundamental methods of quality engineering. The major emphasis is on the statistical tools of quality engineering systems. In addition, quality excellence models, cost models, quality audit programs, quality information systems will be discussed. Actual case studies from industry will supplement the lectures.

Textbook(s) / other required material:

Montgomery, Douglas C., *Statistical Quality Control: A Modern Introduction,* John Wiley & Sons, Inc, Seventh Edition, 2014.

Lecture notes and other course related materials will be posted on the course web page (https://moodle.boun.edu.tr)

Course objectives (and program outcomes):

This course aims to equip students with the necessary statistical methods and problem solving techniques to improve product and service quality. By the completion of the course, the students will be able to:

- Understand the key notions of quality and the voice of the customer to improve product and service quality continuously
- Use the statistical process control methodology, specifically Shewhart Control Charts and the other tools for monitoring and improving the production and service processes
- Carry out process capability and measurement system capability studies
- Conduct offline quality control studies, namely understand how to design and analyze engineering experiments
- Understand how to design and use acceptance sampling plans.

Considering these objectives, this course mainly addresses the following student outcomes of the industrial engineering undergraduate program;

- *Student Outcome (a):* An ability to apply knowledge of mathematics, science, and engineering
- *Student Outcome (b):* An ability to design and conduct experiments, as well as to analyze and interpret data
- *Student Outcome (e):* An ability to identify, model, formulate and solve industrial engineering problems
- *Student Outcome (k):* An ability to use the techniques, skills, and modern engineering tools necessary for industrial engineering practice.

Topics covered:
1. General Introduction to Quality Improvement
2. Probability Distributions and Statistical Inference
3. Statistical Process Control: Basic Principles and Techniques
4. Control Charts for Variables
5. Control Charts for Attributes
6. CUSUM and EWMA Charts
7. Capability Analysis
8. Statistical Process Control for Short Production Runs
9. Multivariate Statistical Process Control
10. Experimental Design
    a. Basic Concepts
    b. Two-Level Factorial Designs
11. Acceptance Sampling Techniques

Grading:

Quiz 1:	7%
Project Part 1:	5%
Midterm:	25%
Project Part 2:	8%
Quiz 2:	7%
Project Part 3:	13%
Final:	35%

Prepared by, and date of preparation: Mustafa Gökçe Baydoğan, September 2023