ÇANKAYA UNIVERSITY
DEPARTMENT OF INDUSTRIAL ENGINEERING

IE 326– QUALITY ENGINEERING
(4 0 4) (ECTS:7)
(Prerequisite: IE228)
Spring 2026

Instructor

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Course Schedule

(Will be announced later)

Office Hours

(Will be announced later)

Textbook

Montgomery, D.C. (2019). *Introduction to Statistical Quality Control* (8th Edition). Wiley.

This textbook provides a foundational understanding of statistical quality control concepts and methodologies, including DMAIC processes, control charts, process capability analysis, and design of experiments. It will serve as the primary reference for lectures, assignments, and problem-solving exercises.

Lectures

Teaching will be conducted face-to-face. Microsoft PowerPoint slides, along with on-the-board problem-solving techniques, will be utilized during the lectures to enhance understanding. In class, it will focus on solving problems related to the topics covered in the associated week. Students are advised to keep their calculators and computers readily available during classes.

Course Description

This course provides a comprehensive introduction to the principles and practices of quality and quality improvement. It covers fundamental concepts and methodologies essential for understanding and implementing quality improvement processes in engineering and manufacturing environments.

Key topics include the DMAIC process, statistical tools for quality analysis, and advanced methods such as control charts, process capability analysis, acceptance sampling, and design of experiments. Students will learn to use tools like value stream mapping and visual aids to identify areas for improvement, manage processes, and maintain quality standards.

The course also explores the application of engineering standards and quality management systems, preparing students to analyze and design effective quality systems in professional practice. Practical case studies and hands-on exercises reinforce theoretical knowledge, ensuring students are well-prepared to address real-world quality challenges.

Course Objectives

The main aim of this course is:
- ✓ 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 reducing process variability.
- ✓ to introduce acceptance sampling techniques.
- ✓ to teach how to conduct and use the design of experiments to improve the quality of products and processes.

Course Learning Outcomes

On successful completion of this course, all students will have developed:
- ✓ knowledge of statistical and other problem-solving methods like DMAIC in quality applications.
- ✓ skill in constructing and interpreting appropriate control charts.
- ✓ skill in collecting and analyzing data related to the quality of products/services, using acceptance sampling techniques, and evaluating process capability.
- ✓ skill in the use of statistical packages for quality analysis.
- ✓ skill in conducting experimental design for quality improvements, analyzing and interpreting the results.

On successful completion of this course, all students will have improved:
- ✓ skill in oral presentation.

On successful completion of this course, all students will be:
- ✓ involved in teamwork.
- ✓ aware of ethical issues and engineering standards.

Tentative Course Topics

A tentative outline of the topics is provided below. Please note that the instructors reserve the right to make changes to the topics and schedule as necessary:

Week	Topic
1	Introduction to Quality and Quality Improvement Concept
2	DMAIC Process
3	Review of fundamental statistical concepts
4	Value Stream Mapping and other visual tools for quality improvement
5	Statistical Process Control methods and techniques
6	Control Charts for Variables: X-R
7	Control Charts for Variables: X-S
8	Control Charts for Attributes
9	Process Capability Analysis
10	Acceptance Sampling for Attributes
11	Acceptance Sampling for Variables
12	Designed Experiments: 2^k Factorial Design
13	Two Level Fractional Factorial Designs
14	Quality Management Systems and Engineering Standards

Course Web Page

A course web page will be available at https://webonline.cankaya.edu.tr. Students should regularly access this page for updates on class announcements, lecture notes, and assignments. Lecture slides may not cover all in-class discussions and problem solutions, so students are encouraged to attend classes and take detailed notes.

Grading

Midterm and final exams will be held according to the university policies. Please follow the university web page for any updates/changes on how exams will be held.

Method	Number	Contribution (%)
Midterm	1	35%
Final Exam	1	40%
Project	1	15%
Assignments	2	10%

Details

During the semester, there will be two assignments, **each contributing 5%** to the overall course grade.

Assignments may include homework and/or a quiz

- **Homework:** Teamwork is essential for the homework and project, and students will be responsible for collaborating on problem-solving and report writing. Assignments will be completed in groups of at least 3 and at most 5 students. Group formation is the students' responsibility. Those who do not form a group will be assigned by the instructor. Further details and submission deadlines will be announced during the semester.
- **Quiz:** The quiz will assess students' understanding of the topics covered up to that point in the course. The format and date of the quiz will be announced in advance.

Project

A term project will be assigned to apply and research statistical concepts covered in this course. The project will be conducted in teams. Detailed guidelines for the term project will be provided on the course website. The final project report must be submitted by the end of Week 14.

By **Week 7**, students must form their project groups and inform the instructor via email. The deadline for group formation is **Friday of Week 6 at 23:55**. Each group must consist of **four or five students**. Students who do not or cannot form a group will be assigned to one by the instructor. Further details regarding the project content will be announced later.

Make-up Policy:

A make-up examination for the midterm or final exam will only be given under exceptional circumstances (such as serious health problems). The student must contact the instructor as early as possible and provide proper documentation (e.g., a **medical report certified** by Çankaya University's Health Center). A make-up exam might contain different types of questions than the regular exam.

Attendance Requirement and Examination Policy

Attendance will be recorded manually at the start of each class session. Students are required to sign the attendance sheet to confirm their presence. Failure to sign the sheet will result in the student being marked absent for that session.

By the decision of the University Senate, a **minimum 60% attendance** is **mandatory** for the course.

In accordance with Article 24 of the Çankaya University Associate and Undergraduate Education and Examination Regulations, the following rules apply:

(4) For courses with a final examination, the examination procedure is as follows:

c) Students who fail to meet the attendance requirement are **not permitted** to **take the final exam**. If such a student takes the exam, the exam will be considered invalid.

(9) Medical reports and make-up examinations:

d) Days covered by **medical reports** are **counted** as **absences**.

Conditions that Lead to an "NA" Grade

Any of the following may lead to receiving the letter grade **NA (Not Attended)**:

- If a student fails to attend at least **60%** of the lectures, they will not be allowed to take the final exam and will receive a grade of **NA**.
- If a student fails to take the **midterm exam** or the **final exam** without valid documentation, they will receive the letter grade **NA**.

Classroom Policy

Students are expected to maintain a professional and respectful environment in class. Disruptive behavior, including the use of mobile devices for non-course-related purposes, will not be tolerated. Participation in discussions and problem-solving exercises is highly encouraged to enhance learning.

You are responsible for all announcements made in class and on the class web page, as well as printing the lecture notes and other cited materials from the class web page and other sources.

Audio or video recording, or taking photographs, during class is not permitted without the instructor's explicit permission.

Unauthorized recording or sharing of any class content, including lectures, slides, discussions, or images of the instructor or students, is strictly prohibited due to privacy and data protection considerations.

Any violation of this policy may result in the recording being deleted and the activity being treated as misconduct.

Use of Artificial Intelligence (AI) Tools

During exams, the use of electronic devices (mobile phones, tablets, smartwatches, or any internet-enabled devices) is strictly prohibited. Therefore, the use of AI tools is automatically not permitted during examinations.

For homework and the project, limited use of AI tools (e.g., ChatGPT or similar systems) is permitted only for support purposes such as brainstorming, language editing, or conceptual clarification. AI tools must not be used to generate solutions, answers, reports, or any content that is submitted as the student's own work.

Any AI assistance must be clearly disclosed. Undisclosed or excessive AI-generated work will be treated as academic dishonesty.

If unauthorized AI use is detected, the assignment or project will be considered invalid, receive **a grade of zero**, and may be subject to disciplinary action.

Honesty Policy

Academic integrity is expected of students of Cankaya University at all times, whether in the presence or absence of the faculty. All students should declare their understanding and belief in the Honor Code for the examinations and assignments. This statement is a reminder of your obligation as a student to uphold honesty in all work submitted and exams taken in this course and all others.

If you conduct any dishonest act during an examination or for the completion of an assignment (i.e., cheating on an exam, using any extra material that you are not allowed to use during an exam, copying material off of someone else's homework or assignment, using solution keys from previous years, copying material from published and electronic sources without paraphrasing and/or citing appropriately), you will get a credit of zero on that particular exam or assignment. Necessary disciplinary action, as required by the University's rules, will also be taken.

Honor Code Agreement and Submission

All students must acknowledge and agree to the course rules and academic integrity policy by submitting a signed Honor Code form.

Students are required to:

1. Handwrite the Honor Code statement
2. Sign it using a blue-ink pen
3. Upload the file to WebOnline by the end of the Add–Drop week

Failure to submit the signed form may result in being considered non-compliant with course requirements.

Students involved in any dishonest act will receive a grade of zero for the relevant exam or assignment

Naming of Honor Code file: IE326_HonorCodeStatement_NameSurname_StudentID_2026

Changes to the Syllabus

The instructor reserves the right to make changes to the syllabus as necessary. Any changes will be announced on the course website.