



# STA 413 Statistical Techniques for Quality Control

Summer 2023

**Course Credits:** 4

**Contact Hours:** 55 hours

**Instructor:** TBA

**Email:** TBA

## **COURSE OBJECTIVES**

This particular course will provide an in-depth understanding of the statistical techniques that are commonly used in modern quality control. Throughout the course, you will cover a range of topics, including Six Sigma, statistical and graphical data summaries, basic tools, control charts for variables and attributes data, proper and effective use of control charts, capability studies, experimental design, and acceptance sampling. By the end of the course, students will have a comprehensive understanding of these techniques and how they can be used to improve quality control..

Upon Completion of this Course, students will be able to:

1. Understand the basic principles of modern quality control and its importance in various industries
2. Apply statistical methods to analyze and improve quality control processes
3. Understand and apply the Six Sigma methodology to improve quality control
4. Analyze and interpret statistical data using graphical and numerical summaries
5. Construct and interpret control charts for variables and attributes data
6. Conduct capability studies and understand process capability
7. Design experiments to improve quality control processes
8. Understand the principles and applications of acceptance sampling

## **PREREQUISITES**

N/A

## **GRADING**

Grades will be determined by accumulating points, with 100 points being the



maximum, as follows:

ITEM	POINTS
Quizzes	20 Points
Midterm 1	20 Points
Midterm 2	20 Points
Final Exam	40 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F.$$

We reserve the right to make adjustments to the overall grading policy.

## COURSE MATERIALS

### **Required Texts:**

Montgomery, D. C. (2013). *Introduction to statistical quality control* (7th ed.). John Wiley & Sons.

### **Recommended (Optional) Texts or Other Materials:**

None

## COURSE TOPICS

MODULE	TASKS
Module 1	<b>Topics:</b> Topic 1: Historical Development of Quality Control Topic 2: Types of Quality Control Topic 3: Six Sigma Topic 4: DMAIC (Define, Measure, Analyze, Improve, Control) Process <b>Assessments:</b> Quiz#1



Module 2	<b>Topics:</b> Topic 5: Key Six Sigma tools, Defects per Million Opportunities (DPMO) calculation Topic 6: Statistical and Graphical Data Summaries Topic 7: Measures of Central Tendency and Dispersion Topic 8: Histograms and Boxplots, Scatterplots and Correlation <b>Assessments:</b> Quiz#2
Module 3	<b>Topics:</b> Topic 9: Basic Tools for Quality Control Topic 10: Check Sheets, Pareto Charts, and Cause-and-Effect Diagrams Topic 11: Process Flowcharts and Control Plans Topic 12: Failure Mode and Effects Analysis (FMEA) <b>Assessments:</b> Midterm#1
Module 4	<b>Topics:</b> Topic 13: Methods and Philosophy of Statistical Process Control Topic 14: Control Charts for Variables Data Topic 15: Control charts for Attributes Data Topic 16: Capability Studies <b>Assessments:</b> Midterm#2
Module 5	<b>Topics:</b> Topic 17: Process and Measurement System Capability Analysis Topic 18: Experimental Design, Full and Fractional Factorial Designs Topic 19: Acceptance Sampling, Single and Double Sampling Plans Topic 20: Lot-by-lot Acceptance Sampling for Attributes <b>Assessments:</b> Final Exam

## ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.



2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

### **LEARNING REQUIREMENTS**

- 1) Late assignments are not acceptable and are subjected to grade deductions.
- 2) Assignments submitted in the wrong format will be counted as not submitted.
- 3) Failure to submit or fulfill any required course component results in failure of the class.
- 4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
- 5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

### **TECHNOLOGY POLICY**

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

### **ACADEMIC INTEGRITY POLICY**

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

### **DISABILITY ACCOMMODATION**



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Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.