



ISE 426 STATISTICAL QUALITY CONTROL Spring 2019

Instructor: Prof. Q. Sean Huang
Epstein Department of Industrial & Systems Engineering

Office: GER 241
Office hours: TTh: 4:40-5:40am
Other time by appointment

Tel: (213) 740-2433

Class Schedule:
Lecture: TTh 11:00-12:20pm, VKC102
Website: blackboard.usc.edu
Smart Phone App: Bb MobileLearn
E-mail: qiang.huang@usc.edu
Huanglab.usc.edu

TA and TA office hour: TBD

PREREQUISITE: ISE 225 Engineering Statistics I (or equivalent)

REQUIRED TEXT:

TEXT *Introduction to Statistical Quality Control*, 7th Edition by Douglas C. Montgomery, 2013, John Wiley & Sons, Inc., New York. ISBN : 978-1-118-14681-1

References

Engineering Statistics by Douglas C. Montgomery, George C. Runger, and Norma F. Hubele, John Wiley & Sons, Inc., New York.
Applied Statistics and Probability for Engineers Second Edition by Douglas C. Montgomery and George C. Runger, 1999, John Wiley & Sons, Inc., New York.

COURSE OBJECTIVES

This course will present the theory and methods of quality monitoring including process capability, control charts, acceptance sampling, quality engineering, and quality design. The objectives include

- To understand the basic concepts of quality monitoring.
- To understand the statistical underpinnings of quality monitoring.
- To learn various available statistical tools of quality monitoring.
- To learn the statistical and economical design issues associated with the monitoring tools.
- To demonstrate the ability to design and implement these tools.

SEMESTER CALENDAR

January 7, first day of class
January 21, MLK Day
February 18, President's Day
Thursday, February 28, Midterm Exam (Week 8)
Thursday, March 8, Project Proposal and Presentation
March 10-17, Spring Break (Week 10)
April 23&25, Final Project Report and Presentation
April 26, last day of class
Tuesday, May 7, Final Exam, 11:00am-1:00pm

1. TENTATIVE COURSE SCHEDULE

Week	Date	Topics
1	Lecture	Introduction to the course / Chapter 1: Quality Improvement in the Modern Business Environment
		Chapter 2: DMAIC Process
2,3	Lecture	Chapter 3: Modeling Process Quality
		Chapter 4: Inferences about Process Quality
3	Lecture	Chapter 5: Methods and Philosophy of Statistical Process Control
		Control
4	Lecture	Chapter 6: Control Charts for Variables
5,6	Lecture	Chapters 6
	Lab	<i>Use Excel to plot control charts in Ch6</i>
7,8,9	Lecture	Chapter 7: Control Charts for Attributes
	Lab	<i>Use Excel to plot control charts in Ch7</i>
11,12	Lecture	Chapter 8: Process and Measurement System Capability Analysis
	Lab	<i>Use Excel to Process Capability in Ch8</i>
13,14	Lecture	Chapter 9: Cumulative Sum and Exponentially Weighted Moving Average Control Charts
	Lab	<i>Use Excel to plot control charts in Ch9</i>
15	Lecture	Chapters 15: Acceptance Sampling for Attributes
	Lab	<i>Use Excel to solve problem in sampling</i>
16	Lecture	Chapter 15 <i>Final Exam Review and Q&A</i> Final project presentation

2. COURSE GRADING

Homework sets	= 30%
5 Quizzes	= 10%
Exams	= 50% (Midterm Exam: 25%, Final Exam: 25%)
Project	= 10% (Due on Thursday, April 25th)
Total	= 100%

Quiz: You can work in a group of 3 or 4 students during each quiz. Attendance counts for 50% of the quiz credit.

Grading scale:

A: [95, 100];	A-: [90, 95);	B+: [85, 90);	B: [80, 85);	B-: [75, 80);
C+: [70, 75];	C: [65, 70);	C-: [60, 65);	D: [50, 60);	F: <50

3. POLICY ON BONUS POINTS

You can earn bonus points if you correct all wrong solutions for midterm exam questions. Bonus points will not be directly added to your final grade. It will be only used when your letter grade is close to the next (higher) level.

4. CLASS PROJECT

Please form a team of three or four. In the final project report, all team members should sign and state that they contribute to their project roughly equally. Every member will receive the same grade on the project.

All reports should be typewritten and printed out for handing in. The report should not exceed 8 pages. (12 point, double space, Appendix does not count to 8 pages.) The report must have a professional appearance. Clarity and thoroughness of the analysis, and good use of the English language, including grammar, spelling and punctuation, are considered in grading the project.

Final project report includes project objective, problem statement, solutions, conclusions, and appendix if needed. The report should describe the background, any assumptions made, the analysis used to analyze the data, and the appropriate results. Explanation, interpretation, and justifications are required. Computer output should be included in an appendix and the description of the outcome/results included in the text of the report.

Sample Class Projects:

Example 1: *iPod Nano Nike Plus System Capability Analysis:* The team used iPod Nano to measure the distance and time of runs and analyze the capability (repeatability and reproducibility) of the device's pedometer.

Example 2: *Heart Failure Discharge Rate Analysis for Medicare Patients:* The team collected data on the discharge rate of Medicare patients with heart failure in US. They aim to test the hypothesis whether there is a statistically significant decrease in discharge rate and which states does this have the impact on.

Example 3: *Monitoring energy use:* The team aims to monitor and analyze the energy usage for an industrial pump at a Pulp and Paper plant. By monitoring baseline energy usage, the team will determine whether the pump is within nameplate specifications and then decide if energy-saving component is needed.

Example 4: This project's goal is to improve the helpfulness of online food reviews through an analysis of existing reviews on Amazon's website. We analyzed the data to identify what makes a review "helpful" or "unhelpful" to try and devise a strategy to influence reviewers to leave better comments.

5. CLASS POLICIES

- Grading is purely based on the merit of your work. Request of credit or higher grade for other reasons will NOT be considered.
- Assigned homework will be collected **in class**. Homework is due one week after it is assigned. ***No late homework will be accepted.***
- ***Cellphones are not allowed during exams.***
- ***Exams can be taken on or before the scheduled exam dates with justifiable reasons.***
- Exams will be closed book, closed notes. One 8 ½ x 11 formula sheet can be used. Be sure to bring your calculator. There will be ABSOLUTELY NO SHARING among students of books, formula sheets, or calculators.
- If you believe there was an error in the grading of an exam or homework, then you can submit the entire exam to the TA requesting a regrade. This must be done ***within one week***

from the date the exam was returned. The entire exam will be regraded, so that you may gain, or lose, points by resubmitting.

- Students are responsible for all information conveyed during class and on Blackboard. It is the student's responsibility to make sure they are receiving their official USC email.
- Always bring your textbook to class! Also bring your calculator, notebook, pencils/pens, eraser, and course syllabus.

6. COURSE WEBSITE

The course will use Blackboard: blackboard.usc.edu. You can also use smartphone app Bb MobileLearn to access Blackboard.

7. SOFTWARE USAGE:

Software is required for control charting in homework and project (not in exams). You can use Excel templates provided in the class to do homework and project.

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, "Behavior Violating University Standards" policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Support Systems:

Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.
engemannshc.usc.edu/counseling

National Suicide Prevention Lifeline – 1 (800) 273-8255

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. www.suicidepreventionlifeline.org

Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. engemannshc.usc.edu/rsvp

Sexual Assault Resource Center

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: sarc.usc.edu

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086

Works with faculty, staff, visitors, applicants, and students around issues of protected class.
equity.usc.edu

Bias Assessment Response and Support

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. studentaffairs.usc.edu/bias-assessment-response-support

The Office of Disability Services and Programs

Provides certification for students with disabilities and helps arrange relevant accommodations. dsp.usc.edu

Student Support and Advocacy – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. studentaffairs.usc.edu/ssa

Diversity at USC

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. diversity.usc.edu

USC Emergency Information

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. emergency.usc.edu

USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.

Provides overall safety to USC community. dps.usc.edu