

The University of Texas at El Paso
Statistical Quality and Data Analytics – IE 5390
Spring 2023 – Course Syllabus

Professor: Dr. Ana C. Cram
e-mail: accram@utep.edu

Class meets: Microsoft Teams, Mondays 6:00 pm.

Office hours: E-201L or Microsoft Teams, Tuesdays, and Thursdays 11:00 am – 12:00 pm, and by appointment

Course web page:

<https://blackboard.utep.edu/>

Course Description:

The objective of this course is to teach students statistical methods for quality control and data analysis. Topics included in the course are: an introduction of quality concepts, basic probability concepts, control charts for variables, control charts for attributes, process capability studies, and sampling procedures. New topics and recent trends in quality engineering are introduced including SPC for Short Production Runs, EWMA chart and Six Sigma and data analysis.

Course objectives:

1. Understand the importance of quality and the prevailing quality philosophy in use today.
2. Learn the importance of “statistical thinking” in industry.
3. Understand the difference between the concepts of common and special cause random variation and learn how reducing source of variation is important in quality control
4. Apply different sampling techniques for assessing quality control analysis to different products and processes
5. Understand and apply the different types of Shewhart control charts.
6. Apply novel data analysis techniques for quality control

Required textbook:

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

Other references:

1. Besterfield D. H. (2009). Quality Control. 8th Edition. Ed. PrenticeHall.
2. Krishnamoorthi K. S. (2006). A First Course in Quality Engineering. 1st Edition. Ed. Prentice Hall.
3. Devor R. E., Chang T-H. and Sutherland J. W. (2006). Statistical Quality Design and Control. 2 nd Edition. Ed. PrenticeHall.
4. Elsayed E. A. (2012). Reliability Engineering, 2nd Edition, Ed. Wiley
5. Nachlas J. A. (2005). Reliability Engineering: Probabilistic models and maintenance methods, 1 st Edition, CRC Press
6. Leemis L. M. (2009). Reliability: Probabilistic Models and Statistical Methods, 2nd Edition, Prentice Hall.

Summary of Course Structure

Content is provided in 6 modules that are released every two or three weeks. Each module will have instructions to identify discussion board postings and/or individual and group activities to be completed on Blackboard's course shell. The first module provides course overview and objectives

Module	Module Name
1	Quality control philosophies and statistical tools
2	Probability distributions
3	Hypothesis testing
4	Control Charts
5	Moving average Control Charts
6	Data analysis

Grading Criteria

The following scale is used for assigning letter grades.

A	90 and above
B	80-89
C	70-79
D	60-69
F	<60

Note that there will not be "rounding up" automatically. The instructor does reserve the right to lower the grade scale if it is deemed appropriate.

Point Distribution

Activities	Module 1	Module 2	Module 3	Module 4	Module 5	Module 6	Total
Reading & Lecture	20	20	20	20	20	20	120
Discussion	20		20		20		60
Homework & Labs	50	50	50	50	50	50	300
Exams		100		100		100	300
Total	90	170	90	170	90	170	780

CALENDAR	
Module 1 Introduction, Quality philosophy, statistical tools	Week 1
	Week 2
Module 2 Probability distributions	Week 3
	Week 4
	Week 5
Module 3 Hypothesis testing	Week 6
	Week 7
Module 4 Control charts and capability analysis	Week 8
	Week 9
	Week 10
Module 5 Moving average control Charts and Multi variable process	Week 11
	Week 12
Module 6 Data analysis	Week 13
	Week 14

Student Precipitation

The course is designed to be an enjoyable learning experience for everyone, with support for every participant. This course will immerse students into a community of practice so that students can develop skills and knowledge that facilitate their professional development. Students are expected to complete all weekly content and to participate actively and respectfully on discussion boards, chats, and blogs. Furthermore, students should finish quizzes and deliver complete quality assignments and projects on time.

The following policies will be enforced:

1. Students must complete all discussion boards assigned for each week to receive a weekly participation grade.
2. Students who miss two major assignments will be dropped from the course.
3. Students who have little or no activity in the course will be dropped.

Assignments

This course uses several different methods to assess student learning. A description of each method follows:

- **Self-Reflection/Self-Evaluation:** Reflection and self-evaluation develop metacognitive thinking. By engaging in self-review, students can carry their learning into other parts of their lives and take more responsibility for their own learning. Although not all students take self-evaluation seriously, those who do will benefit greatly from it.
- **Group Problem Solving:** When students work together to solve a problem or complete a project, they learn from each other and expand learning for all. Student-to-student interaction is increased, which in turn increases student learning and assignment completion. The group problem includes group-member evaluation so that students can peer-evaluate each other's work. Also in place are a team/group charter and procedures for when disagreements happen within the group; these ground rules make for a much smoother and more effective group experience for all. For this class, consider the following example:
- **Homework:** At the end of each week a set of problems related with the topics covered in the module will be assigned
- **Exams:** At the end of each module the student will be tested using an exam

Course Rule policies

- **Remember your place:** A Web-based classroom is still a classroom, and comments that would be inappropriate in a regular classroom are likely to be inappropriate in a Web-based course as well.
- **This is permanent:** Think carefully about the content of your message before contributing it. Once sent to the group, there is no taking it back. Members of the class and the instructor will be reading any postings.
- **Respect your fellow students and instructor.** Respect and courtesy must be provided to classmates and to instructor at all times. Do not use inappropriate language, all capital letters, or language short cuts. No harassment, flaming, or inappropriate postings will be tolerated.
- **Giving feedback professionally:** Write constructive feedback by addressing the idea, not the person. People may have different points, positions and believes in the aspects being discussed. The discussion must be limited to the aspects/ideas only. Personal attacks are not tolerated. When reacting to someone else's message, address the ideas, not the person. Post only what anyone would comfortably state in a face to face situation.
- **Be forgiving:** If someone states something that you find offensive, mention this directly to the instructor. Remember that the person contributing to the discussion is also new to this form of communication. What you find offensive may quite possibly have been unintended and can best be cleared up by the instructor.
- **Language:** Given the absence of face-to-face clues, written text can easily be misinterpreted. Avoid the use of strong or offensive language and the excessive use of exclamation points. If you feel particularly strongly about a point, it may be best to write it first as a draft and then to review it, before posting it, in order to remove any strong language.
- **Test for clarity:** Messages may often appear perfectly clear to you as you compose them, but turn out to be perfectly obtuse to your reader. One way to test for clarity is to read your message aloud to see if it flows smoothly. If you can read it to another person before posting it, even better.

- **Submit quality work.** Online entries should be written in Standard Writing English with edited spelling, grammar, and punctuation. Although the grammar and spelling of a message typically are not graded, they do reflect on you, and your audience might not be able to decode misspelled words or poorly constructed sentences. It is a good practice to compose and check your comments in a word-processor before posting them.
- **Follow the parameters / Stick to the point:** Follow the posting requirements and parameters set up by your professor. Contributions to a discussion should have a clear subject header, and you need to stick to the subject. Don't waste others' time by going off on irrelevant tangents.
- **Read first, Write later:** Don't add your comments to a discussion before reading the comments of other students unless the assignment specifically asks you to. Ignoring your fellow students is rude. Avoid repetition of what someone else has already said. Add something new to the discussion. Comments related to the content of previous messages should be posted under them to keep related topics organized, and you should specify the person and the particular point you are following up on.
- **Quality posts get credit:** There is no credit for yes/no answers. Posts should justify positions and provide specific examples. Students must demonstrate that they have read the assignment and their classmates' comments carefully and thoughtfully.
- **Meet the deadline:** Be sure to post in a timely fashion to receive credit for attendance and for the discussion.

Academic Dishonesty

Academic dishonesty is prohibited and is considered a violation of the *UTEP Handbook of Operating Procedures*. It includes, but is not limited to, cheating, plagiarism, collusion, and fabrication.

1. Cheating can involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports.
2. Plagiarism occurs when someone intentionally or knowingly represents another person's words or ideas as his or her own.
3. Collusion involves unauthorized collaboration with another person or group to commit any academically dishonest act.
4. Fabrication occurs when false information is included on a works-cited page.

Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. Violations will be taken seriously and will be referred to the Office of Student Conduct and Conflict Resolution for possible disciplinary action. Students may be suspended or expelled from UTEP for such actions. You can find more information in the UTEP Handbook of Operating Procedures, under the heading “” and in the Regents' Rules and Regulations.

UTEP Handbook of Operating Procedures @

<http://admin.utep.edu/Default.aspx?alias=admin.utep.edu/hoop>

UTEP Office of Student Life @ <http://sa.utep.edu/studentlife/#student-conduct>

Software requirements

You will need the following software on your computers to efficiently work in this course. In some cases, your computer may already have some of these programs installed.

1. Adobe Acrobat Reader. You can get the program by going to <http://www.adobe.com/>
2. Adobe Flash Player. You can get the player by going to <http://www.adobe.com/> and then clicking on 'Get Adobe Flash Player?'. Follow instructions to install the player.
3. Microsoft Office. I recommend buying this if you do not have any word processing software or presentation software.
4. Minitab. It is a statistical software available for UTEP students at my.apps.utep.edu
5. Email tool with file attachment capability. Please use your UTEP email account.

Equipment Requirements

You *need a personal computer* with administrative privileges so that you may take the quizzes at the end of the modules. In addition, you need to install Respondus Lockdown Browser. You will also install other software applications that requires administration privileges. Not being able to use a work computer to take the quizzes or to install software applications is not an excuse to not submit work.

Glossary

Cyber-Harassment, or the use of a computer to cause a person harm such as anxiety, distress or psychological harm, including abusive, threatening or hateful emails and messages and the posting of derogatory information online.

Cyberbullying, or intimidating messages sent directly to the victim via email or other Internet communication mediums, and/or the use of technological means to interfere with a victim's use of the Internet such as hacking or denial of services attacks. This can also include spreading rumors about the victim in internet forums or discussion boards; subscribing the victim to unwanted online services or sending messages to others in the victim's name.

Cyberstalking, or threatening behavior or unwanted advances directed at another using the Internet and other forms of online and computer communications. With personal information becoming readily available to an increasing number of people through the Internet and other advanced technology, state legislators are addressing the problem of stalkers who harass and threaten their victims over the World Wide Web.

Flaming, or hostile and insulting interaction between internet users. It is frequently the result of the discussion of heated real-world issues such as politics, religion, and philosophy, or of issues that polarize subpopulations, but can also be provoked by seemingly trivial differences.

Deliberate flaming, as opposed to flaming as a result of emotional discussions, is carried out by individuals who are specifically motivated to incite flaming. Usually, are subtler than their counterparts, or trolls, who also post inflammatory messages in an online community. Their primary intent is to provoke readers into an emotional response and disrupt normal, on-topic, discussion.

Plagiarism, or the presentation of another person's work as your own, whether you mean to or not (i.e. copying parts of or whole papers off the Internet).

Collusion, or lending work to another person to submit as his or her own.

Fabrication, or deliberately creating false information on a works cited page.

Students with disabilities:

Students with disabilities or who suspect they have a disability may wish to self-identify for purposes of modifications. You can do so by providing documentation to the Office of Disabled Student Services located in the UTEP Union. If you have a condition which may affect your ability to exit safely from the premises in an emergency or which may cause an emergency during class, you are encouraged to discuss this in confidence with the instructor and/or director of the Disabled Student Services. For general information about the American with Disabilities Act (ADA), please call 747-5184