**IE 4308 001**

**Fall 2017**

**TTH 12:30 - 1:50**

**Room NH 229**

**Instructor**: Dr. Donald H. Liles

**Office**: 325H Woolf Hall

**Office Hours**: TTH 11:00-12:20, 2:00-3:20

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**Required Textbooks** : Quality Improvement, Besterfield 9th Edition, SPC Simplified, Amsden et al

**Course Description**: Statistical and other process improvement methods. Principles and practices of industrial quality control. Topics include the Deming philosophy, process improvements, statistical process control, process capability analysis and product acceptance.

**Course Learning Goals/Objectives**: Students will be able to use modern quality systems techniques to include the design of statistical process control systems, acceptance sampling, and process analysis and design.

**Attendance and Drop Policy**: I do not take attendance. However, you are responsible for the material presented in class when you are absent. You may drop this course through the University published last day to drop.

**Tentative Exam Schedule:**

|  |  |  |  |
| --- | --- | --- | --- |
| Exam | Coverage | Date | Comments |
| I | See Below | 26 Sep |  |
| II | See Below | 31 Oct |  |
| III | See Below | Finals week Dec 14 |  |

**Specific Course Requirements w/Descriptions**:

         Daily Quizzes/Homework/etc: 8-10 countable assignments

         Examinations: Three exams; No final

         Missed Exams: There is a single comprehensive make-up exam at the end of the semester.

         Missed Daily Quizzes/Homework: No make-up for daily work. One or two daily grades will be dropped.

         Semester project

         Key assignment

**Course Evaluation & Final Grade**:

         Three exams counting 20% each

         8-10 countable daily quizzes/homework (Due on or before 5 Dec.) plus key assignment Due (28 Nov.) (all counting 20% of the total grade.)

         Project 20% (Written report due 21 Nov, Presentation slides due on 30 Nov. Presentations given on 30 Nov, 5 Dec, and 14 Dec.)

* There will be a PEER review at the end of the semester. This will give you an opportunity to report the contributions of the members of your team.

**Topics Covered**:

## Basic concepts

## Process documentation

## Process variation

## Process sampling and the control chart

## Process improvement with control chart

## Variables control charts

## Attributes control charts

## Process diagnosis, capability and improvement

## Specifications and inspection policy

## Review of Deming, Continuous Improvement, and Six Sigma for variability reduction

Semester Schedule: I reserve the right to make changes to the daily schedule. The exams and project dates should not change.

|  |  |
| --- | --- |
| Date | Activity |
| 24 Aug | Class roll, Course Administration, Syllabus, Project and Key assignments. See Blackboard |
| 29 Aug | Class roll, Course Administration, Syllabus, Project and Key assignments. Lecture on Basic Concepts 1 (Introduction Lecture notes and Chapter 1). |
| 31 Aug | Form Teams, Do in-class exercise for Basic Concepts 1. Prepare a short presentation of your findings. |
| 5 Sep | Lecture on Basic Concepts 2, (Ch 2 and Ch 3, plus handouts)  Lecture on Basic Concepts 3, (Lecture notes).  Do in-class exercise for Basic Concepts 2 |
| 7 Sep | Do in-class exercise for Basic Concepts 3. Prepare a short presentation of your findings. |
| 12 Sep | Lecture on Basic Concepts 4, (Ch 4: Tools of SPC) |
| 14 Sep | Do in-class exercise for Basic Concepts 4 (a,b). Prepare a short presentation of your findings. |
| 19 Sep | Do in-class exercise for Basic Concepts 4 (c). Prepare a short presentation of your findings. |
| 21 Sep | Review (lecture) probability and statistics, (Ch 5 and 8). Quiz on Ch 5 and 8. |
| 26 Sep | Exam I |
| 28 Sep | Process Documentation (handout), Discussion of project and key assignment (Ch 6) |
| 3 Oct | Process variation (Ch 6) |
| 5 Oct | Process Control, example (Ch 6) |
| 10 Oct | Control Charts (Ch 6) |
| 12 Oct | Variable Control Charts (Ch 6) |
| 17 Oct | Patterns (Ch 6) |
| 19 Oct | Subgroups (Ch 6) |
| 24 Oct | Specifications and Capability (Ch 6) |
| 26 Oct | Other Charts (Ch 6 and 7)) |
| 31 Oct | Exam II |
| 2 Nov | Attribute Charts (Ch 9) |
| 7 Nov | Acceptance Sampling (Ch 10) |
| 9 Nov | Acceptance Sampling (Ch 10) |
| 14 Nov | Additional techniques (Ch 12) |
| 16 Nov | Design of experiments (Ch 13) |
| 21 Nov | Written Project Reports due |
| 23 Nov | Thanksgiving |
| 28 Nov | Key Assignment due, misc. |
| 30 Nov | Presentation materials due, Project Presentations |
| 5 Dec | Last Class Day All remaining daily work due, Project Presentations |
| Dec 14 | Exam III (not a final but held on the day of the final) (75 Min) and Project Presentations (75 Min) |

**Drop Policy:** Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance**. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://wweb.uta.edu/aao/fao/>).

**Disability Accommodations:** UTArlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including *The Americans with Disabilities Act (ADA), The Americans with Disabilities Amendments Act (ADAAA),* and *Section 504 of the Rehabilitation Act.* All instructors at UT Arlington are required by law to provide “reasonable accommodations” to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of **a letter certified** by the Office for Students with Disabilities (OSD).Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting:

**The Office for Students with Disabilities, (OSD)** [www.uta.edu/disability](http://www.uta.edu/disability) or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at [www.uta.edu/disability](http://www.uta.edu/disability).

Counseling and Psychological Services, (CAPS) [www.uta.edu/caps/](http://www.uta.edu/caps/) or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

**Non-Discrimination Policy:** *The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit*[*uta.edu/eos*](http://www.uta.edu/hr/eos/index.php)*.*

**Title IX Policy:** The University of Texas at Arlington (“University”) is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated.*For information regarding Title IX, visit* [www.uta.edu/titleIX](http://www.uta.edu/titleIX) or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or [jmhood@uta.edu](file:///C:\Users\dliles.UTA\Documents\AA%20Classes\QC\Syllabus%20etc\jmhood@uta.edu).

**Academic Integrity:** Students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

*I pledge, on my honor, to uphold UT Arlington’s tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*

*I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents’ Rule* 50101, §2.2, suspected violations of university’s standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student’s suspension or expulsion from the University.

**Student Support Services:** UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include [tutoring](http://www.uta.edu/universitycollege/current/academic-support/learning-center/tutoring/index.php), [major-based learning centers](http://www.uta.edu/universitycollege/resources/college-based-clinics-labs.php), developmental education, [advising and mentoring](http://www.uta.edu/universitycollege/resources/advising.php), personal counseling, and [federally funded programs](http://www.uta.edu/universitycollege/current/academic-support/mcnair/index.php). For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to [resources@uta.edu](mailto:resources@uta.edu), or view the information at <http://www.uta.edu/universitycollege/resources/index.php>.

**The IDEAS Center (**2nd Floor of Central Library) offers **free** tutoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. To schedule an appointment with a peer tutor or mentor email [IDEAS@uta.edu](mailto:IDEAS@uta.edu) or call (817) 272-6593.

**Electronic Communication:** UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

**Campus Carry:** Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit <http://www.uta.edu/news/info/campus-carry/>

**Student Feedback Survey:** At the end of each term, students enrolled in classes categorized as “lecture,” “seminar,” or “laboratory” shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs>.

**Final Review Week:** A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

**Emergency Exit Procedures:** Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the stairs, which is located to your immediate right as you leave the room. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

**Project Assignment for 4308 Fall 17 (Group Project)**

Today is your first day on the job. Your new boss has told you to “go fix” a quality problem that we have with a product. This is the only instruction that you have from your boss.

1. Assemble your team.
2. “Select a product”. Go to the web and select a product that you want to explore. Pick a product that comes with a bill of materials.
3. Create a set of problems.
4. Create a set of solutions. (YES, you will create both the problem(s) and solutions(s).)
5. Structure your analysis and your solution using the Enterprise Excellence method.
   1. Understand the Customer
   2. Understand and Improve the Product
   3. Understand and Improve the Process
   4. Design and Implement Effective Controls
6. Use Continuous Improvement, Six Sigma, and other tools as appropriate.
7. Use Enterprise Excellence as an outline for your project report.

Your Final Report should be structured as shown below.

Introduction and Background

Provide a brief description of the customer, the product, and the process. This section should include the preliminary analysis and general understanding of the problem.

This should be a very general description written for the person who has no background information regarding your product and the processes that produce it.

The Problems Identified and the Solutions Developed   
(Solutions Using Six Sigma and Continuous Improvement).

Problem #1

* Understand the Customer(s)
* Understand and Improve the Product
* Understand and Improve the Process
* Develop Controls

Solution #1

Problem #2

* Understand the Customer(s)
* Understand and Improve the Product
* Understand and Improve the Process
* Develop Controls

Solution #2

Problem #3

* Understand the Customer(s)
* Understand and Improve the Product
* Understand and Improve the Process
* Develop Controls

Solution #3 **….. etc. ….**

Summary of Results  
Please summarize the analyses and the solutions that you have developed. (Note: Be sure that the processes identified are sufficiently complex to allow for the individual assignments.)

**Key Assignment for 4308 Fall 17 (Individual Project)**

The key assignment is an add-on to the Group Project.

Coverage:

1. (c) an ability to design a system, component, or process to meet needs.
2. (d) an ability to function on multi-disciplinary teams
3. Criteria 9: Design and systems integration

Description of key assignment:

1. As a group develop a process/factory layout for the fabrication and assembly of the product.  Don't forget important paper processes like procurement and marketing etc.
2. From your layout, each person should pick a step in the overall process. You will then do a quality analysis of your individual step.
3. When you are finished with the individual analyses, all of it should be brought back together and integrated.
4. You are being assigned a part of the whole with the requirement that the whole is the final product.  You will be graded individually on your key assignment and as a team on the final product (the integrated solution).

The specific requirements for the individual key assignment are:

1. A layout or process flow diagram of your part of the process (1 point)
2. A definition of your problem (1 point)
3. Your analysis (1 point)
4. A description of your proposed solution (1 point)
5. Anything else that you think might be useful (1 point)

Your analysis and proposed solution must:

1. Demonstrate your ability to redesign the product/process to satisfy customer/system requirements. (3 points)
2. Demonstrate how your redesigned process is integrated with the rest of the product/process system. (1 point)
3. Demonstrate you ability to work as a team. (1 point)

The requirements for the key assignment are on the previous page numbered 1 through 8. Using the following table, discuss how well you satisfied each of the eight items. Also, give yourself a score. See the maximum points for each of the eight items, adding up to 10.

|  |  |  |
| --- | --- | --- |
| Item | Your Discussion | Score |
| #1 |  |  |
| #2 |  |  |
| #3 |  |  |
| #4 |  |  |

|  |  |  |
| --- | --- | --- |
| Item | Your Discussion | Score |
| #5 |  |  |
| #6 |  |  |
| #7 |  |  |
| #8 |  |  |

# PEER EVALUATION

# Of IE 4318/5320 Project Group Members

# Conducted at the End of Semester

Please evaluate the overall project contribution of each member of your group including yourself. Please use a ten point maximum scale for your evaluation.

|  |  |
| --- | --- |
| Group Member | Evaluation |
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|  |  |
|  |  |
|  |  |

I understand that this evaluation is private and will not be shown to the persons being evaluated. I understand also that this evaluation will influence the grades assigned to the project.

Printed Name: Signature: Date: