Department of Technology

TECH 5310 Six Sigma

Course Syllabus

Instructor: Dr. Heshium Lawrence
Section: 001, 060
Fall Semester 2022
Class Time:
Email: hlawrence@uttyler.edu
Phone: 903.566.7331
Office Hours: By Appointment

Course Content:

An understanding and application of the basic concepts of modern manufacturing process management systems, with regards to quality, just-in-time, lean manufacturing and six sigma. This three graduate hour course will present techniques for the planning, measuring, and implementation of Six Sigma Quality efforts. Key elements for company-wide strategic quality planning such as identifying customers and their needs, designing quality services, establishing optimal quality goals, statistical based improvement methods, and implementing six sigma tools to include DMAIC.

Required Textbook:

Summers, D.C.S. (2011). *Lean Six sigma: Process Improvement Tools and Techniques*
ISBN-13: 9780135125106

Additional hand-outs may be required (this will be provided by the instructor)

Course Learning Objectives

At the end of this course, students will be able to:

A. Perform problem solving, using statistical tools and techniques.
B. Better understand the connection between quality assurance, manufacturing, and management practices.
C. Gain knowledge in the areas of Just-In-Time and Lean Manufacturing techniques.
D. Learn how to change those processes that contain unacceptable quality deficiencies using Six Sigma quality improvement program methods.

Student Learning Outcomes

A. Demonstrate how to use Excel, specifically Excel's statistical add-on tool, by completing several assignments.
B. Construct statistical graphs (Pareto, Mean and Range, etc…) using Excel.
C. Differentiate between a good manufacturing process and a bad one by interpreting a Mean and Range graph.

Summarize Six Sigma concepts by completing one-page topic summaries in the course

Topics Covered in the Course:

1. Six Sigma Origins
2. Quality Masters
3. Leadership and Strategic Planning
4. Creating a Customer Focus
5. Teams
6. Project Management
7. Measures and Metrics
8. Problem Solving
9. Statistics
10. Variable Control Charts
11. Process Capability
12. Probability
13. Attribute Control Charts
14. Reliability
15. Failure Modes and Effects Analysis
16. Design of Experiments
17. Lean Enterprises

Core/Program Competencies:

A. Computer-based skills – By use software the student will store and manipulate data and perform statistical based quality improvement studies through the presentation of SPC charts and graphs.

B. Communication skills – The student will conduct, write, and present a term research project related to a variety of subject areas found within six sigma quality methods.

C. Interpersonal skills – students will work in quality improvement teams to experience the use of graphical problem-solving techniques.

D. Problems solving – Each student will interpret statistical charts to determine the status of industrial processes by gathering data and using statistical analyses. Through the use of six sigma improvement tools, students will solve problems and implement improvement processes by using the plan-do-check-evaluation cycle.

E. Ethical issues in decision making and resolution – This competency will not be addressed in TECH 5310.

F. Personal accountability for achievement – Each student will follow the designated suspense dates for course work as listed in the course syllabus.

G. Competence in basic technology principles – by the study of the major "quality gurus", the student will develop a foundation for the total quality management movement.

Grading Policy and Criteria to Determine Final Course Grade:

A. **Weighted grade distributions**

Topic summaries (x6)	60pts
Exams (x4)	188pts
Homework assignments (x14)	1050pts

B. **Suspense Dates**:

Topic Summary #1	Thur, Sept 8
Topic Summary #2	Thur, Sept 22
Topic Summary #3	Thur, Oct 6
Topic Summary #4	Thur, Oct 20
Topic Summary #5	Thur, Nov 3
Topic Summary #6	Thur, Dec 1
Thanksgiving Holiday	Nov 21-26
Final Exam Week	Dec 6-10
Homework Assignments	as scheduled

Any make up course work or exams due to a student not submitting it is considered on a case by case basis. Which means the professor reserves the right to decline make up course work or exams.

Important Covid-19 Information for Classrooms and Laboratories

It is important to take the necessary precautions to ensure a healthy and successful year. UT Tyler continues to urge you to protect yourselves against the flu, COVID and any new threats that may be developing. Be diligent about preventive measures such as washing hands, covering sneezes/coughs, social distancing, and vaccinations, which have proven to be successful in slowing the spread of viruses. Encourage those who don't feel well to stay home, and if they show symptoms, ask them to get tested for the flu or COVID. Self-isolation is important to reduce exposure *(CDC quarantine/isolation guidelines*). Please work with your faculty members to maintain coursework and please consult *existing campus resources* for support.

Disability Services

If you have a disability, including a learning disability, for which you request disability support services/accommodations(s), please contact the Disability Support Services office so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodation must provide documentation of his/her disability to the Disability Support Services counselor. In order to assure approved services the first week of class, diagnostic, prognostic, and prescriptive information should be received 30 days prior to the beginning of the semester services are requested. For more information, call or visit the Student Services Center located in the University Center, Room 282. The telephone number is 566-7079 (TDD 565-5579). Additional information may also be obtained at the following UT Tyler Web address: http://www.uttyler.edu/disabilityservices.

Academic Honesty Statement

"Academic dishonesty, such as unauthorized collusion, plagiarism and cheating, as outlined in the Handbook of Operating Procedures, University of Texas at Tyler, will not be tolerated. University regulations require the instructor to report all suspect cases of academic dishonesty to the Dean of Students for disciplinary action. In the event disciplinary measures are imposed on

the student, it becomes part of the student's official school records." Also, please note that the handbook obligates you to report all observed cases of academic dishonesty to the instructor.

Grade Replacement/Forgiveness and Census Date Policies

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. (For Fall, the Census Date is Sept. 12.) Grade Replacement Contracts are available in the Enrollment Services Center or at http://www.uttyler.edu/registrar. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar. Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.

The Census Date (Sept. 12th) is the deadline for many forms and enrollment actions of which students need to be aware. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

Students Rights and Responsibilities

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: https://www.uttyler.edu/wellness/rightsresponsibilities.php

State-Mandated Course Drop Policy

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the 12th day of class (See Schedule of Classes for the specific date). Exceptions to the 6-drop rule include, but are not limited to, the following: totally withdrawing from the university; being administratively dropped from a course; dropping a course for a personal emergency; dropping a course for documented change of work schedule; or dropping a course for active duty service with the U.S. armed forces or Texas National Guard. Petitions for exemptions must be submitted to the Registrar's Office and must be accompanied by documentation of the extenuating circumstance. Please contact the Registrar's Office if you have any questions.

Student Absence due to Religious Observance

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second-class meeting of the semester.

Student Absence for University-Sponsored Events and Activities If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

Social Security and FERPA Statement:
It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

Emergency Exits and Evacuation:
Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do Not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

License Holder Responsibilities:
We respect the right and privacy of students who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at http://www.uttyler.edu/about/campus-carry/index.php.

UT Tyler a Tobacco-Free University
All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors. Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products. There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support. For more information on cessation programs please visit www.uttyler.edu/tobacco-free.

Topic Summaries: **All topic summaries will be checked for plagiarism (you cannot use a topic summary from any previous year or course)**

Directions: Write article summaries from the following topics, to be chosen from in any order, listed below. These articles should be taken from **recent periodicals (2011-2022)**, **not handbooks/manuals or textbooks**. Each summary shall be one (1) page in length. Each summary must come from a separate periodical of a different titled publication. The articles you choose to review must have relevance to principles of quality control and reflect current trends in the quality movement. **SEE EXAMPLE ON LAST PAGE (you must follow the format and use APA or points will be deducted).**

1. just-in-time production technology
2. quality circles, teams, or work groups
3. supplier quality and certification programs
4. process capability studies and applications
5. quality in design
6. integrating quality control into manufacturing
7. KANBAN
8. statistical process control charts and applications
9. integrating quality control into the service industry
10. budget control of quality
11. quality service
12. total quality management
13. quality function deployment
14. process control studies
15. employee empowerment and management
16. Six Sigma Quality
17. Benchmarking Processes
18. Supply Chain Management
19. Five S's (5 Ss')
20. material requirements planning
21. cost of quality
22. product life-cycle management
23. Yellow, Green, Black, or Master Black Belt in Six Sigma
24. DMAIC
25. Statistical Process Control
26. Value Stream Map
27. 7 Lean tools of waste
28. Lean/Six Sigma in Healthcare
29. FMEA
30. Topic of your choice (as long as it relates to the course and you get approval from

the professor)

TECH XXXX

Course title
Name

Vehicular Systems

McCosh, D. (1986). No-springs, no-shocks. *Popular science*. *444* (6), 60-63. **(Reference must be in the correct APA format)**

The author believes active suspension will replace springs and shocks with a computer and high-speed hydraulics. The primary benefit of the system is to isolate one suspension characteristic from another. Essentially, MacPherson struts are replaced with hydraulic struts which can react within 3/1000th of a second, and can cycle up to 1500 times/minute A computer responds to tiny changes in body and wheel movement by controlling double-acting struts. As well as sensing bumps, the system reads the forces acting on the car body preventing it from banking to the outside of a curve. The idea of active suspension is credited to Britain's great interest in its application. American auto manufacturers have characterized the system as expensive, noisy, and consuming power; however, it may appear on some "expensive" U.S. automobiles.

This paragraph is an overview/synopsis of the article you just read.

Reaction

This article has good appeal for automobile enthusiasts who want to keep abreast of the latest automotive technology. The reporting of this innovative suspension system was very consistent and well documented through interviews. Several pictures of the system components were shown as well as a pictorial schematic of the complete suspension system. Upon reading this article, anyone would have a good working knowledge of the computer-controlled suspension.

This paragraph is your reaction to the article, good or bad. If you have any personal experience with the topic, include it in this section. Why you picked this article? Did the author do a good job of explaining the topic? What could have been better? (These are just some of the questions you should consider when writing this paragraph)

Note: Margins are to be set at the following dimensions:

Left	= 1.25"
Right	= 1.00"
Top	= 1.00"
Bottom	= 1.00"