GENTECH 3LS3 Course Outline

COURSE INFORMATION

Session Offered	FALL 2023
Course Name	Quality Control and Assurance Methods
Course Code	GENTECH 3LS3

Date and Time of Lectures & Tutorials	Session	Day and Time	Location
	Lecture	Tuesday, 7:30 PM to 9:20 PM	TSH B128
	Tutorial 05	Monday, 2:30 PM to 3:20 PM	Online via Zoom
	Tutorial 01	Tuesday, 2:30 PM to 3:20 PM	Online via Zoom
	Tutorial 02	Tuesday, 3:30 PM to 4:20 PM	Online via Zoom
	Tutorial 03	Friday, 9:30 AM to 10:20 AM	Online via Zoom
	Tutorial 04	Friday, 10:30 AM to 11:20 AM	Online via Zoom

Program Name	Automotive and Vehicle Engineering Technology / Automation Engineering Technology / Biotechnology
Course Calendar Description	Statistical Tools, Tests, Design and Analysis of Planned Experiments, Taguchi Methods, Control Charts for Variables and Attributes, Capability Analysis, Acceptance Sampling, Elements of Reliability, Quality Assurance, ISO 9000 Certification
Course Instructor	Misara Elgammal — Email: elgammm@mcmaster.ca
Textbook	*Montgomery, Douglas, Introduction to Statistical Quality Control, 8th edition, Wiley*
Prerequisite(s)	ENG TECH 2ES3 or 3ES3 and registration in Level III or above in Automotive and Vehicle Technology; Automation Engineering Technology; Biotechnology
Antirequisite(s)	GENTECH 3T03 AND 4SS3

COURSE EVALUATION - OVERVIEW

	WEIGHT
Test 1 *(Material from Week 1 to Week 3)*	24%
Test 2 *(Material from Week 5 to Week 7)*	24%
Final Exam *(Material from Week 9 to Week 13)*	28%
Assignments *(Individual, 8 Assignments)*	24%
TOTAL	**100%**

LEARNING OUTCOMES

1. Demonstrate an understanding of Quality Management Frameworks and ISO 9000 standards and their complementary function in operations
2. Apply quality improvement tools in a variety of settings and for a variety of processes
3. Integrate statistical techniques (DOE, SPC, Capability) within a framework of quality improvement
4. Evaluate statistical experiments with the aid of statistical software and verify the benefits and limitations of different types of designs (including Taguchi techniques) with the aid of statistical software
5. Select appropriate statistical process control tools to determine if a process is running within acceptable industrial standards with the aid of statistical software
6. Plan, design, perform, analyze and report on a statistically designed experiment with the aid of statistical software. Topic is of student choice

TOPICS	
Week 1 Sept. 5th	**Course Introduction** • Review Course Outline **Introduction to Quality** • Importance of Quality • History of Quality • Defining Quality **Quality in the Value Chain** • Perspectives of Quality in the Value Chain • Quality in Manufacturing **Defining Quality** *Assignment 1 Content*
	Assignment 1 due in Dropbox by Friday, Sept. 15th at 11:59 PM
Week 2 Sept. 12th	**Foundations of Quality Management** • Deming Philosophy • Juran's Philosophy • Crosby's Philosophy **Customer Focus** • Customer Satisfaction and Satisfaction vs. Loyalty • Identifying Customers and Understanding Customer Needs • Gathering and Analyzing the Voice of the Customer • Linking Customer Needs to Design, Production and Service Delivery **Segmentation, Targeting and Positioning** *Assignment 2 Content*
	Assignment 2 due in Dropbox by Friday, Sept. 22nd at 11:59 PM
Week 3 Sept. 19th	**Design for Quality I** • Quality Engineering Terminology • Design for Manufacturing and Assembly **Cost of Quality** • Cost of Quality Assessment **Cost of Quality** *Assignment 3 Content*
Week 4 Sept. 26th	*Test 1 on Tuesday, Sept. 26th at 7:30 PM on Week 1 to Week 3 Material*
	Assignment 3 due in Dropbox by Friday, Oct.6th at 11:59 PM
Week 5 Oct. 3rd	**Design for Quality II** • Target & Tolerance Design: Taguchi • Design for Reliability **House of Quality** *Assignment 4 Content*
	Midterm Recess Monday, Oct. 9th to Sunday, Oct. 15th
	Assignment 4 due in Dropbox by Friday, Oct. 20th at 11:59 PM
Week 6 Oct. 17th	**Design for Quality III** • Design for Flexibility • Mistake Proofing Processes • Design for Experiments **Design Failure Mode and Effects Analysis** *Assignment 5 Content*

Week 7 Oct. 24th	
	Common Measuring Tools and Measurements • Measurements and Accuracy • Measuring Tools; Spring Calipers, Gage Blocks, Indicator and Indicator Tips, Micrometers, Vernier Instruments, Attribute Gages • Pitch Diameter
Week 8 Oct. 31st	*Test 2 on Tuesday, Oct. 31st at 7:30 PM on Week 5 to Week 7 Material*
Week 9 Nov. 7th	**Statistical Process Control and Modeling Process Quality** • Histogram, Box Plot and Stem & Leaf Plot • Check Sheet, Pareto Chart, Cause and Effect Diagram • Scatter Diagram and Control Charts • Chance and Assignable Causes of Quality Variation **Generate Stem-Leaf, Histogram and Box Plot** *Assignment 6 Content*
Week 10 Nov. 14th	
	Statistical Process Control and Modeling Process Quality *Cont'd* • Statistical Basis of the Control Chart • Implementation and Application of SPC **Control Charts for Variables** • Statistical Charts for X-bar and R • Control Charts for X-bar and S • Shewhart Control Chart for Individual • Applications of Variable Control Charts **Generate Variable Control Chart** *Assignment 7 Content*
Week 11 Nov. 21st	
	Control Charts for Attributes • Control Chart for Fraction Nonconforming • Control Charts for Nonconforming – Defects • Choice between Attribute and Variable Control Charts **System Capability Analysis** • Process Capability Analysis and Conditions • Process Capability Index; Cp and Cpk **Generate Attribute Control Chart** *Assignment 8 Content*
Week 12 Nov. 28th	
	Lot by Lot Acceptance Sampling • Random Sampling • Single Sampling and Double Sampling • Standard Deviation Method • Range Method Single/Double Specification Limit
Week 13 Dec. 5th	**Catch up and Review for Final Exam**
	Final Exam is 2.5 hours on Week 9 to Week 13 Material *As Scheduled by Registrar's Office*
	Percentage grades will be converted to letter grades and grade points per the University calendar

POLICIES

ANTI-DISCRIMINATION

The Faculty of Engineering is concerned with ensuring an environment that is free of all discrimination. If there is a problem, individuals are reminded that they should contact the Department Chair, the Sexual Harassment Officer or the Human Rights Consultant, as soon as possible. https://equity.mcmaster.ca/documents/anti-discrimination-policy.pdf

ACADEMIC INTEGRITY

You are required to exhibit honestly and use ethical behaviour in all aspects if the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act of fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, located at: http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf .

The following illustrates only three forms of academic dishonesty:
1. Plagiarism. e.g. the submission of work that is not own or for which other credit has been obtained
2. Improper collaboration in group work
3. Copying or using unauthorized aids in tests and examinations.

AUTHENTICITY / PLAGIARISM DETECTION

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com, please go to www.mcmaster.ca/academicintegrity.

COURSES WITH AN ON-LINE ELEMENT

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

ONLINE PROCTORING

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

COMMUNICATIONS

It is the student's responsibility to:
- Maintain current contact information with the University, including address, phone numbers, and emergency contact information.
- Use the University provided e-mail address or maintain a valid forwarding e-mail address.
- Regularly check the official University communications channels. Official University communications are considered received if sent by postal mail, by fax, or by e-mail to the student's designated primary e-mail account via their @mcmaster.ca alias.
- Accept that forwarded e-mails may be lost and that e-mail is considered received if sent via the student's @mcmaster.ca alias.

Check the McMaster/Avenue email and course websites on a regular basis during the term.

CONDUCT EXPECTATIONS

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the Code of Student Rights & Responsibilities (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, whether in person or online.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University's Academic Accommodation of Students with Disabilities policy.

REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK

McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar "Requests for Relief for Missed Academic Term Work".

ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office normally within 10 working days of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.
http://www.mcmaster.ca/policy/Students-AcademicStudies/Studentcode.pdf

COPYRIGHT AND RECORDING

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, including lectures by University instructors
The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

EXTREME CIRCUMSTANCES

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.