GENTECH 3LS3 Course Outline

COURSE INFORMATION		
Session Offered	FALL 2021	
Course Name	Quality Control and Assurance Methods	
Course Code	GENTECH 3LS3	
Date and Time of Lectures	Lecture: Tuesday, 7:30 PM to 9:20 PM ***Zoom ID*** *to be Posted on Avenue* Tutorials: T05: Monday, 2:30 PM to 3:20 PM T01: Tuesday, 2:30 PM to 3:20 PM T02: Tuesday, 3:30 PM to 4:20 PM T03: Friday, 9:30 AM to 10:20 AM T04: Friday, 10:30 AM to 11:20 AM	
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* ISBN: 9781119399308	
Software	Minitab *Click Here to Download* or *with Purchase of Textbook*	
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 4)*	25%
Test 2 *(Material from Week 6 to Week 8)*	25%
Final Exam *(Material from Week 10 to Week 13)*	26%
Assignments *(Individual or Group, 4 Assignments)*	12%
Minitab Exercises *(Individual, 4 Exercises)*	12%
TOTAL	**100%**

TOPICS	
Week 1 Sept. 7th	**Course Introduction** • Review Course Outline **Introduction to Quality** • Importance of Quality • History of Quality • Defining Quality *(Assignment 1 Content)* • Seven Types of Waste • Measuring Waste **Quality in the Value Chain** • Perspectives of Quality in the Value Chain • Quality in Manufacturing
Week 2 Sept. 13th	***Assignment 1 due in Dropbox by Friday, Sept. 17th 11:59 PM***
	Foundations of Quality Management • Deming Philosophy • Juran's Philosophy • Crosby's Philosophy **Customer Focus** • Customer Satisfaction • 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** *Tutorial Hour, Assignment 2 Content, Not Testable Material*
Week 3 Sept. 20th	***Assignment 2 due in Dropbox by Friday, Sept. 24th 11:59 PM***
	Design for Quality I • Quality Engineering Terminology • Design for Manufacturing and Assembly **Design for Quality II** • Target & Tolerance Design: Taguchi • Design for Reliability **Design Failure Mode and Effects Analysis** *Tutorial Hour, Assignment 3 Content, Not Testable Material*

Week 4 Sept. 27th	***Assignment 3 due in Dropbox by Friday, Oct. 1st 11:59 PM***
	Design for Quality III • Design for Flexibility • Mistake Proofing Processes • Design for Experiments **House of Quality** *Tutorial Hour, Assignment 4 Content, Not Testable Material*
Week 5 Oct. 4th	***Test 1 during Lecture Hours on Week 1 to Week 4 Material***
Midterm Recess Oct. 11th to Oct. 17th	
Week 6 Oct. 18th	***Assignment 4 due in Dropbox by Friday, Oct. 22nd 11:59 PM***
	Modeling Process Quality • Describing Variation • Discrete Distributions • Continuous Distributions • Probability Plots • Approximation Methods **Minitab Exercise 1** – *Tutorial Hour* *Take **Three Screen Shots** of your Work In Progress plus Final Submission* *Make sure to show clock and date (bottom right) of your screen*
Week 7 Oct. 25th	***Minitab Exercise 1 due in Dropbox by Friday, Oct. 29th 11:59 PM***
	Inferences About Process Quality • Statistics and Sampling Distribution • Point Estimation of Process Parameters • Statistical Inference for a Single Sample • Statistical Inference for Two Samples • More than Two Populations • Linear Regression Models **Minitab Exercise 2** – *Tutorial Hour* *Take **Three Screen Shots** of your Work In Progress plus Final Submission* *Make sure to show clock and date (bottom right) of your screen*

Week 8 Nov. 1st	***Minitab Exercise 2 due in Dropbox by Friday, Nov. 5th 11:59 PM***
	Statistical Process Control • Chance and Assignable Causes of Quality Variation • Statistical Basis of the Control Chart • Implementation and Application of SPC **Minitab Exercise 3** – *Tutorial Hour* *Take **Three Screen Shots** of your Work In Progress plus Final Submission* *Make sure to show clock and date (bottom right) of your screen*
Week 9 Nov. 8th	***Test 2 during Lecture Hours on Week 6 to Week 8 Material***
Week 10 Nov. 15th	***Minitab Exercise 3 due in Dropbox by Friday, Nov. 19th 11:59 PM***
	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 **Minitab Exercise 4** – *Tutorial Hour* *Take **Three Screen Shots** of your Work In Progress plus Final Submission* *Make sure to show clock and date (bottom right) of your screen*
Week 11 Nov. 22nd	***Minitab Exercise 4 due in Dropbox by Friday, Nov. 26th 11:59 PM***
	Control Charts for Attributes • Control Chart for Fraction Nonconforming • Control Charts for Nonconforming – Defects • Choice between Attribute and Variable Control Charts
Week 12 Nov. 29th	**Process Measurement and System Capability Analysis** • Process Capability Analysis using: Histogram, Control Chart, Designed Experiments • Gauge and Measurement System Capability Studies • Setting Specification Limits on Discrete Components • Estimating Natural Tolerance Limits of a Process
Week 13 Dec. 6th	**Lot by Lot Acceptance Sampling** • Random Sampling • Single Sampling • Double Sampling • Standard Deviation Method • Range Method Single Specification Limit • Range Method Double Specification Limit

Final Exam as Scheduled by Registrar's Office on Week 10 to Week 13 Material

Percentage grades will be converted to letter grades and grade points per the University calendar

LEARNING OUTCOMES

1. Demonstrate an understanding of Quality Management Strategies 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, MSA) 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.

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.

Requests for Relief for Missed Academic Term Work (Assignments, Mid-Terms, etc.)

The McMaster Student Absence Form is a self reporting tool for **Undergraduate Students** to report absences that last up to 5 days and provides the ability to request accommodation for any missed academic work. Please note, this tool cannot be used during any final examination period.

You may submit a maximum of 1 Academic Work Missed requests per term. It is YOUR responsibility to follow up with your Instructor immediately regarding the nature of the accommodation.

If you are absent more than 5 days or exceed 1 request per term you MUST visit your Associate Dean's Office (Faculty Office). You may be required to provide supporting documentation.

This form should be filled out immediately when you are about to return to class after your absence. http://www.mcmaster.ca/msaf/

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.

Protection of Privacy Act (FIPPA)

The Freedom of Information and Protection of Privacy Act (FIPPA) applies to universities. Instructors should take care to protect student names, student numbers, grades and all other personal information at all times. For example, the submission and return of assignments and posting of grades must be done in a manner that ensures confidentiality.
http://www.mcmaster.ca/univsec/fippa/fippa.cfm

Academic Accommodation of Students with Disabilities Policy

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca. For further information consult McMaster's policy for Academic Accommodation of Students with Disabilities
http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodation-StudentsWithDisabilities.pdf

Students must forward a copy of the SAS accommodation to the instructor of each course. If a student with a disability chooses NOT to take advantage of a SAS accommodation and chooses to sit for a regular exam, a petition for relief may not be filed after the examination is complete. http://sas.mcmaster.ca

Student Code of Conduct

The Student Code of Conduct (SCC) exists to promote the safety and security of all the students in the McMaster community and to encourage respect for others, their property and the laws of the land. McMaster University is a community which values mutual respect for the rights, responsibilities, dignity and well-being of others. The purpose of the Student Code of Conduct is to outline accepted standards of behavior that are harmonious with the goals and the well-being of the University community, and to define the procedures to be followed when students fail to meet the accepted standards of behavior. All students have the responsibility to familiarize themselves with the University regulations and the conduct expected of them while studying at McMaster University.
http://judicialaffairs.mcmaster.ca/pdf/SCC.pdf