Course Outline

1. COURSE INFORMATION

Session Offered	Winter 2019
Course Name	Quality Control and Assurance Methods
Course Code	MANTECH 3LS3
Date(s) and Time(s) of lectures	Monday Jan 7th to Monday Apr 8th 2019. 6:30-9:30 pm
Program Name	Manufacturing Engineering Technology
Calendar Description	Detail understanding of Six sigma, Kaizen, KANBAN, supply chain and outsourcing. Concepts on planning, measurement, control, improvement of quality, analysis of variation and sampling techniques.
Instructor(s)	Lynn McNeil — E-Mail: mcneil2@mcmaster.ca / Office Hours & Location: DCP Office, Monday afternoons

2. COURSE SPECIFICS

Course Description

Instruction Type

Code	Type	Hours per term
C	Classroom instruction	36
L	Laboratory, workshop or fieldwork	
T	Tutorial	3
DE	Distance education	
	Total Hours	

Resources

ISBN	Textbook Title & Edition	Author & Publisher
9781118146811	Introduction to Statistical Quality Control 7th edition	Douglas C Montgomery, John Wiley & Sons
9781118324165	e-text	Douglas C Montgomery, John Wiley & Sons

Other Supplies	Source
• Minitab®Statistical Software • Quality Trainer® • Laptop • Calculator with statistics functions (Casio)	• Download (Avenue) • Register (Avenue) • Student to provide • Available at the Bookstore

Prerequisite(s)	
Corequisite(s)	
Antirequisite(s)	
Course Specific Policies	This course will be using a range of software. Students should be aware that, when they access the electronic components of this course, 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 this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.
	The instructor may also use other software including: e-mail, Avenue, LearnLink, web pages, capa, Moodle, Thinking Cap, etc.
	It is expected that students read session materials prior to class. Students are expected to actively participate during class sessions.
	Late assignments will not be accepted. One tutorial assignment mark will be dropped from the semester. If an MSAF was submitted for an assignment, the associated assignment becomes the dropped mark.
	Late projects will not be accepted.
	MSAF is not permissible for weights on evaluation that are greater than or equal to 25% (Midterm, Final exam). Any attempt to submit a falsified MSAF for this course for a missed test or midterm exam constitutes academic dishonesty and charges may be filed with the Office of Academic Integrity
Departmental Policies	Students must maintain a GPA of 3.5/12 to continue in the program.
	In order to achieve the required learning objectives, on average, B.Tech. students can expect to do at least 3 hours of "out-of-class" work for every scheduled hour in class. "Out-of-class" work includes reading, research, assignments and preparation for tests and examinations.
	Where group work is indicated in the course outline, such collaborative work is mandatory.
	The use of cell phones, iPods, laptops and other personal electronic devices are prohibited from the classroom during the class time, unless the instructor makes an explicit exception.
	Announcements made in class or placed on Avenue are considered to have been communicated to all students including those individuals that are not in class.
	Instructor has the right to submit work to software to identify plagiarism.

3. SUB TOPIC(S)		
Week 1	Quality Management frameworks, Quality systems and standards including ISO, Six Sigma/DMAIC Introduction to Minitab and Quality Trainer	Chp 1 &2
Week 2	Fundamental statistical methods part 1 -graphing and interpreting data -descriptive statistics -probability models -sampling distributions (part 1) Using Minitab for statistical methods	Chp: 3, 3.1-3.4 QT: 1-3 Assignment 1: (Review of Statistical Methods)
Week 3	Fundamental statistical methods part 2 -sampling distributions (cont'd) -confidence intervals (cont'd) -hypothesis testing	Chp: 4 QT: 6-7 Assignment 1 cont'd:

	-statistical inferences (t-tests, ANOVA)	(Review of Statistical Methods)
Week 4	Design of Experiments part 1 -Overview of Experimental Design (purpose, objectives and outputs) -Steps in designing experiments -Examples of designed experiments for process/product improvement including planning, execution, analysis and data synthesis DOE Project overview	Chp: 13 QT: 9.1
Week 5	Design of Experiments part 2 – Factorial experiments -detailed set-up and analysis of two-level factorial experiment -determining main effects and interactions effects -calculating standard errors -producing and interpreting ANOVA tables Using Minitab for factorial designs	Chp 13 QT: 9.2-9.3 Assignment 2: Factorial Experiments
Week 6	Design of Experiments part 3 – Factorial experiments cont'd -deriving model equations from DOE -blocking and confounding -2^k factorial experimental design -fractional factorial designs Using Minitab for fractional factorial designs	Chp 13 QT: 9.4 Assignment 3: Fractional Factorial Experiments
Mid-term Recess: Monday, February 18 to Sunday, February 24, 2019		
Week 8	MIDTERM 2 hours (30%), core class is cancelled Room TBD	
Week 9	Statistical Process Control (SPC) Overview -assignable and chance causes in variation -structure and elements of the control chart -control limits -out of control action plans (OCAPs) -the 'Magnificent seven' quality tools -implementation of SPC	Chp: 5
Week 10	Control Charting for Variables -determining control limits -developing and producing control charts for variables -interpreting control charts -determining process capability -Shewhart control chart for individual measurements Using Minitab to construct control charts and assess process capability	Chp: 6 QT: 4.1-4.2 Assignment 4: SPC Variable Charts
Week 11	Control charts for Attributes -developing and producing control charts for attributes -interpreting control charts Using Minitab to construct control charts for attributes -introduction to process capability	Chp: 7 QT: 4.3-4.4, 5 Assignment 5: SPC Attribute Charts
Week 12	Process and Measurement System Capability -constructing process capability histograms	Chp: 8 QT: 5, 8

	-determining process capability ratios -producing and interpreting process capability control charts -determining gauge and measurement systems capability (gauge R&R) PROJECTS DUE (20%)	
Week 13	Process Robustness -response surface methodology for process optimization -overview of Taguchi methods -assessing process robustness	Chp 14
Week 14	Review	

Classes end: Tuesday, April 9, 2019
Final examination period: Thursday, April 11 to Monday, April 29, 2019
All examinations MUST be written during the scheduled examination period.

Note that this structure represents a plan and is subject to adjustment term by term.
The instructor and the University reserve the right to modify elements of the course during the term. The University may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes.

4. ASSESSMENT OF LEARNING *including dates*	Weight
Assignments (Minitab tutorial assignments, 5 of 6 will be included in final mark)	10%
Mid-term test	30%
Project	20%
Final examination (tests cumulative knowledge)	40%
TOTAL	**100%**

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

5.   LEARNING OUTCOMES

1. Demonstrate an understanding of Quality Management frameworks including ISO 9000 and Six Sigma.
2. Demonstrate an understanding of statistical process control techniques
3. Design a statistical process control programme for assessing and monitoring whether a process is running within acceptable limits
4. Demonstrate an understanding of experimental design and analysis
5. Plan, design, execute and analyze a statistically designed experiment using statistical software

6.   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.
http://www.mcmaster.ca/policy/General/HR/Discrimination_Harassment_Sexual_Harassment-Prevention&Response.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 an on-line self-reporting tool for Undergraduate Students to report absences for:

1) Relief for missed academic work worth less than 25% of the final grade resulting from medical or personal situations lasting up to three calendar days:

   - Students may submit a maximum of one academic work missed request per term. It is the responsibility of the student to follow up with instructors immediately (within the 3 day period that is specified in the MSAF) regarding the nature of the accommodation. All work due in that time period however can be covered by one MSAF.

   - MSAF cannot be used to meet religious obligation or celebration of an important religious holiday, for that has already been completed or attempted or to apply for relief for any final examination or its equivalent.

2) For medical or personal situations lasting more than three calendar days, and/or for missed academic work worth 25% or more of the final grade, and/or for any request for relief in a term where the MSAF has not been used previously in that term:

   - Students must visit their Associate Dean's Office (Faculty Office) and provide supporting documentation.

E-Learning Policy

Consistent with the Bachelor of Technology's policy to utilize e-learning as a complement to traditional classroom instruction, students are expected to obtain appropriate passwords and accounts to access Avenue To Learn for this course. Materials will be posted by class for student download. It is expected that students will avail themselves of these materials prior to class. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail account, and program affiliation may become apparent to all other students in the course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about this disclosure please discuss this with the course instructor. Avenue can be accessed via
http://avenue.mcmaster.ca.

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.

Turnitin (Optional)

This course will be using a web-based service (Turnitin.com) to reveal plagiarism. Students submit their assignment/work electronically to Turnitin.com where it is checked against the internet, published works and Turnitin's database for similar or identical work. If Turnitin finds similar or identical work that has not been properly cited, a report is sent to the instructor showing the student's work and the original source. The instructor reviews what Turnitin has found and then determines if he/she thinks there is a problem with the work. Students who do not wish to submit their work to Turnitin.com must still submit a copy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, etc.). To see the Turnitin.com Policy, please go to

http://www.mcmaster.ca/academicintegrity/turnitin/students/

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 and to the Program Administrator of the B.Tech. Program immediately upon receipt. 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://studentconduct.mcmaster.ca/student_code_of_conduct.html