



ENGG*4050 Quality Control

Winter 2018

Section(s): C01

School of Engineering

Credit Weight: 0.50

Version 1.00 - January 05, 2018

1 Course Details

1.1 Calendar Description

The basic techniques and regulations surrounding quality control in a generic manufacturing environment are covered. The topics covered include: total quality management including relevant ISO regulations, six sigma, reliability, statistical process control, acceptance sampling and 2k factorial design of experiments.

Pre-Requisite(s): STAT*2120

1.2 Course Description

The main goal of this course is to teach you total quality management, the use of process control charts, acceptance sampling and process capability.

1.3 Timetable

Lectures:

Monday 13:30 - 14:20 RICH 2520

Wednesday 13:30 – 14:20 RICH 2520

Friday 13:30 – 14:20 RICH 2520

Tutorials:

Friday 9143 11:30 – 1:20 MCKN 227

Thursday 9144 11:30 – 1:20 MCKN 229

Monday 9145 9:30 – 11:20 ALEX 218

1.4 Final Exam

April 19, 2:30 – 4:30 pm, Room TBA on Webadvisor

2 Instructional Support

2.1 Instructor(s)

Soha Eid Moussa Ph.D., P.Eng.

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Telephone: +1-519-824-4120 x56141
Office: THRN 1341
Office Hours: Open door policy or by appointment

2.2 Teaching Assistant(s)

Teaching Assistant: Qusai Hassoun
Email: qhassoun@uoguelph.ca
Office Hours: TBA on Courselink

Teaching Assistant: David Johnson
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Office Hours: TBA on Courselink

Teaching Assistant: Scott Simmons
Email: ssimmons@uoguelph.ca
Office Hours: TBA on Courselink

3 Learning Resources

3.1 Required Resources(s)

Courselink (Website)

<https://courselink.uoguelph.ca>

Course material, news, and announcements will be regularly posted to the ENGG*4050 Courselink site. You are responsible for checking the site regularly.

Introduction to Statistical Quality Control (Textbook)

Montgomery, Douglas C, Seventh Edition, Wiley, 2013.

3.2 Additional Resources(s)

Lecture Information (Notes)

All the lecture notes will be posted on the web page (week #1-#12).

Assignments (Notes)

Download the assignments, all the solutions will be posted.

Miscellaneous Information (Other)

Other information may also be posted on the web page.

4 Learning Outcomes

4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Apply the concepts of Total Quality Management including use of tools such as Pareto Charts, scatter diagrams, etc.
2. Identify sources and types of variation affecting a process.
3. Identify the appropriate Statistical Process Control Chart.
4. Design a Statistical Process Control Chart with appropriate parameters to meet the needs of the organization/process.
5. Evaluate whether a process is in Statistical Control.
6. Design an appropriate Acceptance Sampling Plan.
7. Evaluate whether a lot is acceptable or unacceptable based on acceptance sampling plans.

8. Utilize knowledge of Process Capability to determine whether a process is capable.
9. Apply concepts of 2k Factorial Design

4.2 Engineers Canada - Graduate Attributes

Successfully completing this course will contribute to the following:

#	Outcome Set Name	Course Learning Outcome
1	Knowledge base	1, 2, 3, 7, 8
1.1	Recall, describe and apply fundamental mathematical principles and concepts	1, 2, 3, 7, 8
1.2	Recall, describe and apply fundamental concepts and principles in natural sciences	1, 2, 3, 7, 8
1.3	Comprehend and apply fundamental engineering concepts	1, 2, 3, 7, 8
1.4	Comprehend and apply program-specific engineering concepts	1, 2, 3, 7, 8
2	Problem analysis	1, 2, 3, 4, 5, 6, 7, 8, 9
2.1	Formulate a problem statement in engineering and nonengineering terminology	1, 2, 3, 4, 5, 6, 7, 8, 9
2.2	Construct a conceptual framework	1, 2, 3, 4, 5, 6, 7, 8, 9
2.3	Identify, organize and justify appropriate information	1, 2, 3, 4, 5, 6, 7, 8, 9

#	Outcome Set Name	Course Learning Outcome
2.4	Execute an engineering solution	1, 2, 3, 4, 5, 6, 7, 8, 9
2.5	Critique and appraise results	1, 2, 3, 4, 5, 6, 7, 8, 9
3	Investigation	1
3.3	Analyze and interpret experimental data	1
4	Design	4, 6
4.1	Describe the design process	4, 6
4.2	Construct design-specific problem statements	4, 6
4.3	Create engineering design solutions	4, 6
4.4	Develop engineering design solutions	4, 6
4.5	Assess engineering design solutions	4, 6
4.6	Implement engineering design solutions	4, 6
5	Use of engineering tools	1, 5, 7
5.1	Select appropriate engineering tools from various alternatives	1, 5, 7
5.2	Apply selected engineering tools	1, 5, 7
5.3	Recognize limitations of selected engineering tools	1, 5, 7
10	Ethics and equity	1
10.1	Describe Ethical and Equity based Principles and Theory	1
10.2	Summarize the similarities and differences in the ethical roles and principles in Canada and in the international context	1
10.3	Demonstrate honesty, trustworthiness and academic Integrity	1
12	Life-long learning	1, 2, 3, 4, 5, 6, 7, 8, 9
12.1	Identify personal career goals and opportunities for professional development	1, 2, 3, 4, 5, 6, 7, 8, 9
12.2	Analyze a self-assessment of skills relative to SOE defined learning outcomes	1, 2, 3, 4, 5, 6, 7, 8, 9
12.3	Identify and critique limits of their field	1, 2, 3, 4, 5, 6, 7, 8, 9

4.3 Relationships with other Courses & Labs

5 Teaching and Learning Activities

5.1 Lecture

Topic(s):	Total Quality Management: dimensions of quality, costs of poor quality
Topic(s):	Six Sigma, the DMAIC Process, Analytical Tools: flow chart, run chart, Pareto analysis, checksheet, histogram, cause & effect diagram
Topic(s):	Reliability: product reliability, failure rates
Topic(s):	Statistical Process Control: tools, Sources and types of Variation, Ways to use control charts
Topic(s):	Control Charts for Variables (x-bar and R chart)
Topic(s):	Control Charts for Attributes (p, np, c, u)
Topic(s):	Process Capability Analysis
Topic(s):	CUSUM and Exponentially Weighted Moving Average Control Charts
Topic(s):	Engineering Process Control and SPC
Topic(s):	Acceptance Sampling: Inspection (when to inspect), Sampling (how much to inspect)
Topic(s):	Sampling Plans: single-sampling plans, double-, multiple-sampling plans, acceptable quality level (AQL), lot tolerance proportion defective (LTPD), operating characteristic curve, average outgoing qua
Topic(s):	Designing sampling plans for attributes using Military Standard 105E
Topic(s):	Design of Experiments, 2k factorial design

5.2 Other Important Dates

Monday, January 8, 2018: First day of classes

Monday, February 19 – Friday, February 23, 2018: Winter Study Break

Friday, March 9, 2018: drop date – 40th class day

Friday, April 6, 2018: last day of class

6 Assessments

6.1 Assessment Details

Midterm test 1 (18.00%)

Date: Mon, Jan 29, 1:30 PM - , 2:20 PM, in class
duration 40 minutes

Midterm test 2 (18.00%)

Date: Mon, Feb 26, 1:30 PM - , 2:20 PM, in class
duration 40 minutes

Midterm test 3 (18.00%)

Date: Mon, Mar 26, 1:30 PM - , 2:20 PM
duration 40 minutes

Final Exam (46.00%)

Date: Thu, Apr 19, 2:30 PM - , 4:30 PM, Room TBA on Webadvisor

6.2 Disclaimer

The instructor reserves the right to change any of the above mid-term dates in the event of appropriate circumstances, subject to University of Guelph Academic Regulations

7 Course Statements

7.1 Course Grading Policies

Missed Assessments: If you are unable to meet an in-course requirement due to medical, psychological, or compassionate reasons, please email the course instructor. See the undergraduate calendar for information on regulations and procedures for Academic Consideration: <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Accommodation of Religious Obligations: If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements. See the undergraduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations: <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml>

Passing grade: In order to pass the course, you must obtain a grade of 50% or higher in the course.

Missed midterm tests: If you miss a test due to grounds for granting academic consideration or religious accommodation, the weight of the missed test will be added to the final exam. There will be no makeup midterm tests.

8 School of Engineering Statements

8.1 Instructor's Role and Responsibility to Students

The instructor's role is to develop and deliver course material in ways that facilitate learning for a variety of students. Selected lecture notes will be made available to students on Courselink

but these are not intended to be stand-alone course notes. Some written lecture notes will be presented only in class. During lectures, the instructor will expand and explain the content of notes and provide example problems that supplement posted notes. Scheduled classes will be the principal venue to provide information and feedback for tests and labs.

8.2 Students' Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and lab sessions. Students, especially those having difficulty with the course content, should also make use of other resources recommended by the instructor. Students who do (or may) fall behind due to illness, work, or extra-curricular activities are advised to keep the instructor informed. This will allow the instructor to recommend extra resources in a timely manner and/or provide consideration if appropriate.

8.3 Lab Safety

Safety is critically important to the School and is the responsibility of all members of the School: faculty, staff and students. As a student in a lab course you are responsible for taking all reasonable safety precautions and following the lab safety rules specific to the lab you are working in. In addition, you are responsible for reporting all safety issues to the laboratory supervisor, GTA or faculty responsible.

9 University Statements

9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The regulations and procedures for [Academic Consideration](#) are detailed in the Undergraduate Calendar.

9.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for [Dropping Courses](#) are available in the Undergraduate Calendar.

9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is

required, however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance, and not later than the 40th Class Day.

More information: www.uoguelph.ca/sas

9.6 Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The [Academic Misconduct Policy](#) is detailed in the Undergraduate Calendar.

9.7 Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

9.8 Resources

The [Academic Calendars](#) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

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