STAT 3170 Section A01
Statistical Quality Control
Winter 2017

Time	MWF 10:30 a.m. – 11:20 a.m.
Location	137 Isbister
CRN	54783

Instructor	Carrie Paquette 322 Machray Hall Telephone: 204-474-6040 Email: carrie.paquette@umanitoba.ca

Web Pages	UM Learn: `http://umanitoba.ca/umlearn` Statistics: `http://umanitoba.ca/statistics` Gradebook: `http://www.stats.umanitoba.ca/gradebook` R Download: `https://cran.r-project.org/mirrors.html`
Office Hours:	Monday 1:00 p.m. – 2:00 p.m. Wednesday 1:00 p.m. – 2:00 p.m. Friday 1:00 p.m. – 2:00 p.m.

If the above times are not convenient for you, please call, email or speak to me to arrange an alternate time to meet. I will do my best to return all email or telephone messages within 24 hours. In the event that office hours need to be cancelled please consult our course *UmLearn* page for the most up-to-date information.

Calendar Description

This course will cover techniques for quality improvement through the use of statistical process control. Topics will include acceptance sampling, Pareto diagrams, boxplots, normal probability plots, control charts (EWMA, CUSUM), measurements of process capability and process performance. Prerequisite: STAT 2000 (C).

Software

To aid in the practicality of the tools taught in this course it is required that you download and install the statistical software package, R. It is a free program available at the URL at the top of the course outline. Throughout the lectures and through additional handouts you will be taught how to use the program.

Evaluation

Term Tests (each)	25%
Final Examination	50%

The two term tests will be held during class time and will be 50 mins in duration. The tentative dates of the term tests are February 15, 2017 and March 20, 2017. Should one of these dates change, you will be informed in advance.

Should you miss one test, you will be assigned a grade of zero unless you provide valid documentation. The other test and final exam would then be worth 25% and 75%, respectively.

Should you miss both tests, you be assigned a grade of zero unless you provide valid documentation. The final exam would then be worth 100%.

There are no make up tests

Students who miss both tests, with or without valid documentation, will be reported to the Dean's office as having completed no term work. This will have repercussions on their ability to write a deferred exam for the course, should such a deferral be requested

Grades

The following are the minimum percentage grades required to receive each of the various letter grades: A^+ (90%), A (80%), B^+ (75%), B (70%), C^+ (65%), C (60%), D (50%).

Voluntary Withdrawal

The voluntary withdrawal date is **March 31** (by which time you will have received your marks for both term tests).

Academic Dishonesty

It is important that you understand what constitutes academic dishonesty and that you are familiar with the very serious consequences. Links to resources that describe academic dishonesty (including plagiarism, cheating, inappropriate collaboration and examination impersonation, as well as typical penalties) can be found at:

`http://umanitoba.ca/science/undergrad/resources/webdisciplinedocuments.html`

Copyrighted Material

All course notes, assignments, tests, exams, practice exams and solutions are the intellectual property of your instructor or the Department of Statistics. Reproduction or distribution of these materials is strictly forbidden without their consent.

Recording of Class Lectures

Your instructor and the University of Manitoba hold copyright over the course materials, presentations and lectures which form part of this course. No audio or video recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without permission from your instructor.

Use of Electronics in the Classroom

It is the general University of Manitoba policy that all technology resources are to be used in a responsible, efficient, ethical and legal manner. A student may use technology in the classroom setting only for educational purposes approved by the instructor and/or the University of Manitoba Accessibility Services. Students should not engage in electronic messaging/posting activities (e-mail, texting, video or voice chat, social networking (e.g. Facebook)) or electronic gaming during scheduled class time.

Class Communication

The University requires all students to activate an official University email account. Please note that all communication between your instructor and you as a student must comply with the Electronic Communication with Students Policy. Please see

`http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html`

You are required to obtain and use your U of M email account for all communication between yourself and the university.

Student Accessibility Services

If you are a student with a disability, please contact SAS for academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

`http://umanitoba.ca/student/saa/accessibility/`

ROASS Schedule A

Schedule A of the Responsibilities of Academic Staff with regards to Students (ROASS) policies of the University of Manitoba lists resources and policies for students. It is important that you familiarize yourself with these resources and policies. Schedule A will be posted on your instructor's UMLearn page.

Course Outline

- Setting the Stage for Studying Quality Improvement Tools and Techniques
  - Definition of Quality and related terminology.
  - An overview of the various approaches to achieving quality.
  - The systems/process approach.
- Studying Variation
  - The use of simple graphs and numerical summaries.
  - Useful graphical ideas: histogram, run chart, stem-and-leaf plots, boxplots, etc.
- The Use of Statistical Models for Understanding Processes
  - Sampling, random variables, statistic, and sampling distributions.
  - Discrete and continuous probability distributions.
  - Statistical Inference.
- Control Charting for SPC
  - The basic ideas of statistical control; "in control", common cause, assignable cause.
  - Types of control charts.
  - Rational subgrouping, control chart patterns, average run lenght.
  - Control Chart issues.
- Variables Control Charts
  - $\bar{x}$ and R charts.
  - $\bar{x}$ and S charts.
  - Median charts.
  - Individuals charts.
- Attributes Control Charts

  - p, np, c, and u charts.
- Process and Measurement Capability and Performance
  - Assessing nonconformance
  - Process Capability and indexes
- EWMA and CUSUM Charts.