STAT 3170 – Statistical Quality Control

Winter 2015
CRN: 21807

Time and Location:

Slot 6 (M,W,F 11:30–12:20)
315 Buller

Instructor:

Richard Gagnon
355 Machray Hall
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Office Hours:

Monday	10:00 – 11:00
Tuesday	1:00 – 2:30
Wednesday	10:00 – 11:00

Calendar Description:
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 and CUSUM), measurements of process capability and process performance. Prerequisite: STAT 2000 or STAT 2001 (005.200) (C).

D2L:
All things material to the course (announcements, examples, etc.) will be made available on the University of Manitoba's D2L. It is your responsibility to check D2L regularly to keep up to date. You can access D2L at `www.umanitoba.ca/d2l`.

Academic Dishonesty:
Please review the sections in the University of Manitoba General Calendar 2014-15 dealing with academic dishonesty. In particular, see `http://umanitoba.ca/faculties/science/undergrad/resources/webdisciplinedocuments.html`.

Mark Breakdown:

Project — 10%
Term Test 1 — 20%
Term Test 2 — 20%
Final Exam — 50%

Voluntary Withdrawal:
The voluntary withdrawal date is March 19.

Grading Scheme:
There are no predetermined cut-offs for each of the letter grades. However, the following are guarantees to you: A+ (≥ 90), A(≥ 80), B+ (≥ 75), B(≥ 70), C+ (≥ 65), C (≥ 60), D (≥ 50).

Test and Exam:
The midterm tests are scheduled for **Friday, February 13** and **Friday, March 13**. The term test will be written in class. The final exam will be scheduled by student records.

Gradebook:
All grades for the course will be posted on the statistics gradebook: `www.stats.umanitoba.ca/gradebook/2`.

2014-15 Registration Advisory:
Important Note from the Dean of Science: It is your responsibility to ensure that you are entitled to be registered in this course. This means that you have:

- the appropriate prerequisites, as noted in the calendar description, or have permission from the instructor to waive these prerequisites;
- not previously taken, or are concurrently registered in, this course and another that has been identified as "not to be held with" in the course description. For example, STAT 1000 cannot be held for credit with STAT 2220.

The registration system may have allowed you to register in this course, but it is your responsibility to check. If you are not entitled to be in this course, you will be withdrawn, or the course may not be used in your degree program. There will be no fee adjustment. This is not appealable. Please be sure to read the course description for this and every course in which you are registered.

Course Outline:

Chapter 1 – 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.

Chapter 2 – Studying Variation

- The use of simple graphs and numerical summaries.
- Useful graphical ideas: histogram, run chart, stem-and-leaf plots, box plots, etc.

Chapter 3 – The Use of Statistical Models for Understanding Processes.

- Sampling, random variables, statistic, and sampling distributions.
- Discrete and continuous probability distributions.
- Statistical inference.

Chapter 4 – 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 length.
- Control chart issues.

Chapter 5 – Variables Control Charts

- $\bar{x}$ and R charts, $\bar{x}$ and S charts, Median charts and Individual charts.

Chapter 6 – Attributes Control Charts

- p, np, c and u charts.

Chapter 7 – Process and Measurement Capability and Performance

- Assessing nonconformance
- Process capability and indexes

Chapter 8 – EWMA and CUSUM Charts