University of Manitoba
Faculty of Science
Department of Statistics
Winter 2013

Course Title: Statistical Quality Control   **Instructor:** Carrie Paquette
Course No: 3170   **Office:** 335 Machray Hall
Class Time: MWF 11:30-12:20am   **Telephone:** (204) 474-6040
Location: 115 Armes   **CRN** : 22798
Office Hours: T/Th: 1:00 p.m. – 2:00 p.m. and W 10:00 a.m. – 11:00 a.m.
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Course 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), or the equivalent.

Course Evaluation:

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

For your final grade, I have the following "guarantees":

Minimum Percent Grade Required	Letter Grade
90	A+
80	A
75	B+
70	B
65	C+
60	C
50	D

This means, for example, that if you obtain 80% or more, you will receive no worse than an A. Your grades will be posted on www.stats.umanitoba.ca/gradebook, it is your responsibility to ensure your grades are correct.

Examination and Term Test

There will be two term tests: Midterm 1 is scheduled for Friday, February 15, 2013 and Midterm 2 is scheduled for Wednesday, March 15, 2013 . The results will be made available by the *March 20, 2013* VW deadline.

Project

There will be one group project that will be handed prior to the February midterm break (or shortly thereafter) and will be end of March. More details will be given in class.

JUMP Portal:

I will be making use of the JUMP Portal in order to post announcements, examples etc... It is your responsibility to check JUMP regularly. Be sure you have claimed your computer ID in order to access the course material.

Academic Integrity:

A Note about Academic Dishonesty: It is important that you understand what constitutes academic dishonesty and that you are familiar with the consequences. For descriptions of these terms and other issues, please see http://umanitoba.ca/science/student/webdisciplinedocuments.html.

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, BIOL 1000 cannot be held for credit with BIOL 1020.

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:

- 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.