University of Manitoba
Faculty of Science
Department of Statistics
Fall 2015

Course Title: Statistical Quality Control
Course No: 3170
Class Time: MWF 10:30-11:20am
Location: 115 Armes
Office Hours: T/Th: 1:00 p.m. – 2:00 p.m. and M: 9:30 a.m. – 10:30 a.m.
Email: carrie.paquette@umanitoba.ca

Instructor: Carrie Paquette
Office: 335 Machray Hall
Telephone: (204) 474-6040
CRN : 15601

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%

Examination and Term Test

There will be two term tests: Midterm 1 is scheduled for Wednesday, October 14, 2015 and Midterm 2 is scheduled for Monday, November 16, 2015 .

Project

There will be one group project that will be handed out in October, due the end of the course. More details will be given in class.

Umlearn:

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

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.