Course Outline

MATH 0210, Quantitative Methods for the Social Scientist

Instructor: Maria Grazia Viola
Office: OA 3027
E-mail: mviola@lakeheadu.ca
Office Hours: Tuesday 12:00-2:00, Wednesday 1:00-3:00 Thursday 2:30-4:30, or by appointment.

Lectures: Monday and Wednesday 7:00-8:30 in OA2017.
Lab: Wednesday 5:30-6:30 in OA2017.

Text: Elementary Statistics, a step-by-step approach, by Bluman and Mayer, second Canadian edition, McGraw-Hill.

Goals and Learning Outcomes: By the end of this course, successful students should be able to:
1. Understand the meaning of symbols, words and phrases with statistical denotations and connotations.
2. Understand the uses and limitations of probability and statistics.
3. Critically read assertions and statements using statistical arguments in Health Sciences related and in everyday communications.
4. Identify questions, make hypotheses and design simple experiments to test hypotheses about means, variances and proportions.
5. Use tables and spreadsheets to test the significance of data.

Course Outline:
- **The nature of Probability and Statistics (Chapter 1):** qualitative and quantitative variables, data collection, uses and misus of statistics.
- **Frequency distribution and graphs (Chapter 2):** histograms, pie graphs, stem and leaf plots.
- **Data description (Chapter 3):** measures of central tendency, measures of variations, measures of position.
- **Probability (Chapter 4):** sample space, classical probability, multiplication rule and conditional probability, counting rules.
- **Discrete probability distribution (Chapter 5):** probability distributions, expectation, mean, variance, binomial distribution.
- **The normal distribution (Chapter 6):** normal distribution, applications of the normal distribution, central limit theorem.
- **Confidence intervals and sample sizes (Chapter 7):** confidence intervals for the mean, confidence intervals for variances and standard deviations.
- **Hypothesis testing (Chapter 8):** z-test, t-test, chi-square test

- **Testing of the difference between two means and two variances (Chapter 9):** testing the difference between two means using the z-test, testing the difference between two means using the t-test, testing the difference of two variances.
- **Correlation and regression (Chapter 10):** scatter plots, correlation, regression, coefficient of determination and standard error of the estimates.
- **Analysis of variance (Chapter 12) if time permits:** ome-way analysis of variance, the Tukey test, two way analysis of variance.

Grading System: Final grade will be determined by a midterm, a final exam, the labs and the homework. The weight of each component is as it follows:

Homework Grade 20%
Midterm 30%
Final 50%

Exam Schedule: The midterm will be on February 27, 2013.

Homework: I will give a list of homework problems to work as a practice. The homework will be collected on the due date. No late homework will be accepted except with a well documented valid university excuse. IF YOU WORK ALL THE ASSIGNED HOMEWORK PROBLEMS, YOU SHOULD DO WELL IN THE COURSE. Moreover, I will drop the lowest homework grades when determining your final homework grade. Apart during my office hours, you can obtain help with your math questions using the tutorial center run by the Department of Mathematical Science. To use this service, go to the web site of the math department and click on the math tutorial lab link. You will be connected through skype with one of their tutors.

Lab: The Lab is an important part of the course. In the lab we will work problems and you will be able to ask questions from the homework. I will also show you how to use some software.

Calculator: You will need a standard scientific calculator for the class. Calculators that can store formulas or any large amounts of data ate not allowed on the test.

Make-up policy: A make-up midterm will be given only with well documented valid university excuses (sickness, etc). Moreover, a make-up has to be written within two weeks of the original date of the miterm.

This is a general outline. Any communication or change regarding this outline, the time and location of exams as well as other matters

concerning the course will be posted on the website and announced in the lecture.