

Course Outline

MATH 0210/MATH0212: Quantitative Methods for the Social/Health Scientist

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Office Hours: Tuesday 1:15-2:30, Wednesday 11:00-1:00, or by appointment.

Lectures and Lab: Lectures on Monday and Wednesday 8:30-10:00, Lab on Thursday 2:30-3:30.

Text: Elementary Statistics, a step-by-step approach, by Bluman, tenth 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 related to statistics and probability.
2. Understand the uses and limitations of probability and statistics.
3. Critically read assertions and statements in Social Sciences, Environmental Science and in everyday communications which use statistical arguments.
4. Identify questions, make hypotheses and design simple experiments to test hypotheses about means, variances and proportions.
5. Use tables and graphs to represent the significance of data.

Course Outline:

- **The nature of Probability and Statistics (Chapter 1):** qualitative and quantitative variables, data collection, uses and misuse 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 for a mean/proportion, t-test for a mean/proportion, chi-square test for a variance/standard deviation.
- **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 test (Chapter 12), if time permits:** One-way analysis of variance, the Scheffe Test and the Tukey test, two-ways analysis of variance.

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

Homework Grade 20%
Midterm I 25%
Midterm II 25%
Final 30%

Exam Schedule: The first midterm will be on October 5, while the second midterm will be November 9.

Reading: You should read the material that will be covered in class before coming to class so that you know in advance which points are more obscure for you and you can ask questions in class.

Lab: There is a lab associated with this class. Lab time will be used in multiple ways: to go over more examples, to answer homework question, to deepen your knowledge of the subject by working on more difficult problems and integrating more than one concept in a problem.

Homework: A homework assignment will be due every week on Friday. No late homework will be accepted. **IF YOU WORK ALL THE ASSIGNED HOMEWORK PROBLEMS, YOU SHOULD DO WELL IN THE COURSE. WITHOUT PRACTICING THE MATERIAL COVERED IN CLASS IT WILL BE VERY UNLIKELY THAT YOU WILL RECEIVE A GOOD GRADE.** Moreover, I will drop one homework grade (the lowest) when determining your homework grade for the semester.

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

Class Policies: You should attend both the lecture and the lab if you want to do well in the class. Cell phones should be turned off during class. Midterms and exams must be taken on the date assigned. During the exam you will be able to utilize a calculator, but the use of books, cell phones, or other aids is prohibited. If you miss the midterm for a legitimate reason, a make-up midterm must be written by the student within two weeks of the date of the original midterm.

Accessibility Services: Lakehead University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please visit: <http://studentaccessibility.lakeheadu.ca>

Plagiarism and academic misconduct: Exams and homework assignments must be independent work. Highly similar assignments will be graded at zero, The head of the department will also be informed of the academic misconduct. Plagiarism is an extremely serious academic offense and carries penalties varying from failure in an assignment to expulsion from the university. See the Code under Policies - Student Related in the University Policies at www.lakeheadu.ca/faculty-and-staff/policies.

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.