Course Outline

GEOG 2271, Quantitative Methods in Geography

Instructor: Maria Grazia Viola Office: OA 3027 E-mail: mviola@lakeheadu.ca Office Hours: Tuesday 1:00-2:30, Wednesday 2:30-4:00. Thursday 12:50-1:50, or by appointment.

Lectures and Lab: Lectures on Monday and Wednesday 1:00-2:30 in OA 2015, Lab on Thursday 2:30-4:00 in OA 1002.

Text: STAT 2 with review cards and CourseMate Printed Access Card,, by Johnson and Kuby, Brooks/Cole.

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 Geography and Science in general, which use statistical arguments.
- 4. Identify questions, make hypotheses and design simple experiments to test hypotheses about means, variances and proportions.
- 5. Be familiar with linear regression and analysis of variance.
- 6. Use tables and graphs to represent the significance of data.

Course Outline:

- Statistics (Chapter 1): qualitative and quantitative variables, measurability and variability, data collection.
- Descriptive Analysis and Presentation of single-Variable (Chapter 2): histograms, pie graphs, bar graphs, measures of central tendency, measures of variability, measures of position.
- Probability (Chapter 3): probability of events, conditional probability, rules of probability, mutually exclusive events, independent events.
- Probability distribution (Chapter 5): random variables, probability distributions of a discrete random variable, binomial distribution, Poisson distribution.
- The normal probability distribution (Chapter 6): normal probability distribution, applications of the normal distribution, exponential distribution.
- Sample variability (Chapter 7): sampling distribution, central limit theorem, sampling distribution of sample means applications.

- Introduction to statistical inferences (Chapter 8): confidence interval for the mean, hypothesis testing for the mean.
- Inferences involving one population (Chapter 9): inferences about the mean, inferences about a proportion.
- Descriptive analysis and presentation of bivariate data (Chapter3): bivariate data, linear correlation, linear regression
- Linear correlation and regression analysis (Chapter 13): linear correlation analysis, inferences about the linear correlation coefficient, linear regression analysis, inferences about the slope of the regression line, confidence interval for regression
- Inferences involving two population (Chapter 10): inferences about the mean difference using two dependant samples, inferences about the mean difference using two independent samples, inferences about the difference between two proportions using two independent samples, inferences about the ratio of variances using two independent samples.
- Elements of nonparametric statistics (Chapter 14): Mann-Whitney U Test.
- Analysis of variance (Chapter 12): analysis of variance techniques, applications of Single-Factor Anova.
- Application of Chi-Square (Chapter 11): Inferences concerning multinomial, inference concerning contingency tables.
- Multivariate modelling: multiple regression model.

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

Homework Grade 18% Midterm 1 12% Midterm 2 12% Lab Test 1 12% Lab Test 2 12% Final 34%

Exam Schedule: The first midterm will be on October 2, while the second midterm will be November 6, 2019. The first lab test will be on October 3, while the second lab test will be on November 21, 2019.

Software: In the lab you will learn to use the software package SPSS to solve statistical problems. SPSS is available for use in the OA1002 computer lab. If you wish to purchase it for your personal computer, you can do so through Helpdesk or Campus Tech. While the student version of SPSS has all the capabilities that you will need for this course, you should be aware that is it is not as powerful as the full version you will be using in the university labs. Purchasing SPSS is not necessary or recommended,

Homework: I will give a list of homework problems to work as a practice. A homework assignment will be due in class every week on Wednesday. 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. 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 ate 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 midterms and final exam you will be able to utilize a calculator, but the use of books, cell phones, or other aids is prohibited. Cell phones or other electronic devices are not allowed to be on your person during midterms and exams, per university policy. If you miss the midterm for a legitimate reason which you can document (e.g. doctor's note), the documented proof of absence should be provided to me, no later than 10 days after the exam was written. A make-up midterm will be given only with well documented valid university excuses (sickness, etc). 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.