Department of Geography. Orillia Campus. Autumn 2018.

Geography 2271 Quantitative Methods in Geography

Introduces methods and techniques for handling, describing, and analyzing data in the context of geography and studies of the environment. Topics may include: describing a distribution, discrete and continuous probability distributions, estimating means and proportions, hypothesis testing, linear regression, contingency tables and point pattern analysis. **Credit Weight:** 0.5 **Offering:** 3-1.5 **Course Classifications:** Type A: Humanities; Type C: Engineering, Mathematical and Natural Sciences.

Welcome! Geography 2271 is structured as an introductory course in statistical analysis for geographers and anyone else doing research where space and location are important. ***No previous statistical background is assumed.*** *The course does require some basic mathematical skills but nothing more sophisticated than what you have previously seen in high school mathematics courses.*

Meeting Schedule

Lectures Tuesday and Thursday, 11:30-1:00 pm (OA2008)
Labs Monday, 10:30 am -12:30 pm (OA1002)

Lecturer: Lisa TUTTY, Email LTUTTY@LAKEHEADU.CA or Skype (fleminggeomatics_LTUTTY), Office hours: W from 2:30-3:30 in OA1002 and R from 10:00-11:00 in OR1037.

Textbook

Johnson, R. and Kuby, P. (2012) STAT2 with review cards and CourseMate Printed Access Card, Cengage Publishers.

Other Supplies

- Bring a pencil and eraser to class
- A pocket calculator with scientific functions (factorials, logarithms, exponents) is essential
    - *Programmable* calculators will not be permitted in tests and exams!
- A memory stick is required for backing up work done in labs

Software

While some assignments should be completed with a calculator, others will be completed using two main software packages: **Microsoft Excel** and **SPSS**. These are available for use in the OA1002 computer lab, and optionally for purchase at student prices 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.

Accuracy
Assignments will include mathematical calculations typically performed with the aid of calculators or software packages. These can give the illusion of greater accuracy than is logically possible. Unless otherwise required (by the question or by logic) all final answers should be rounded to *3 or 4 significant digits*. Do *not* round off numbers during intermediate steps.

Course website
This course makes use of the Desire2Learn Courselink web portal. PowerPoint slideshows used in lectures can be downloaded in pdf format from the course site before class. There will also be announcements and updates concerning tests, assigned exercises, etc.

Marks breakdown

Weekly assignments **25%**
Midterm test 1 (Thursday 27th September) **10%**
Midterm test 2 (Thursday 1st November) **10%**
Lab test 1 (Monday October 22nd) **10%**
Lab test 2 (Monday December 3rd) **10%**
Final examination **35%**

Late penalty is 10% per day, including weekends. No late assignments will be accepted after the marks and/or assignments have been returned to the class.

A+	90 to 100%	Outstanding understanding of the course concepts including integration of materials and ideas, ability to apply knowledge to situations
A	80 to 89%	
B	70 to 79%	Above average to excellent knowledge, ability to apply knowledge to situations
C	60 to 69%	Satisfactory knowledge including ability to recognise and apply major course concepts, and to progress to next level of course
D	50 to 59%	Some grasp of course concepts; will likely encounter difficulty with higher levels
E	40 to 49%	Failed to meet minimum requirements of the course
F	1 to 39%	Failure
F	0	Failure resulting from academic dishonesty

Mark descriptions from Lakehead University. Students are advised to refer to the University Calendar to ensure that they have adequate grades and/or average to proceed in their program. Grades in this course are numerical (not letters).

Course learning objectives
This course will not turn you into an expert statistician. Rather the goal is to give you a better appreciation of statistical methods in order that you may:

(a) recognize situations amenable to particular types of statistical analysis;
(b) interpret the results of statistical analysis and convey them to an audience that is not necessarily versed in those techniques;
(c) understand and follow the content of articles in academic journals that make use of statistical analysis.

A more specific objective of the course is to give you practical experience using two computer software programs: Microsoft Excel and IBM SPSS (Statistical Package for Social Sciences).

Course Policies

Behavioural standards – Speak and listen with respect.

Attendance – To succeed in this course, regular attendance at lectures and labs is absolutely essential. As persons aspiring to be professionals, whether in geography or any other field, it is expected that you will be present at all lectures and labs.

Group work/collaboration – The weekly assignments are individual work, *not* group work.

Nettiquette – If you post on the D2L Discussion Board please do so with respect. Please also consider that everyone in the course can see your posting, so don't include personal information. If you email the Lecturer, please use your LU email and include the course code as the subject line so that I know which of my classes you are emailing about.

Accessibility

The University provides academic accommodations for students with disabilities in accordance with the terms of the Ontario Human Rights Code. This occurs through a collaborative process that acknowledges a collective obligation to develop an accessible learning environment that both meets the needs of students and preserves the essential academic requirements of the University's courses and programs.

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. The office of Student Accessibility Services is located in OA1030.

Academic Integrity

The University takes a most serious view of offences against academic honesty such as plagiarism, cheating and impersonation. Penalties for dealing with such offences will be strictly enforced.

The "Code of Student Behaviour and Disciplinary Procedures" including sections on plagiarism and other forms of misconduct may be found on the Lakehead University Senate website. See the Code under Policies - Student Related in the University Policies at www.lakeheadu.ca/faculty-and-staff/policies

The following rules shall govern the treatment of candidates who have been found guilty of attempting to obtain academic credit dishonestly.

(a) The minimum penalty for a candidate found guilty of plagiarism, or of cheating on any part of a course will be a zero for the work concerned.

(b) A candidate found guilty of cheating on a formal examination or a test, or of serious or repeated plagiarism, or of unofficially obtaining a copy of an examination paper before the examination is scheduled to be written, will receive zero for the course and may be expelled from the University.

Students disciplined under the Code of Student Behaviour and Disciplinary Procedures may appeal their case through the Judicial Panel.

Note: "Plagiarism" shall be deemed to include:
1. Plagiarism of ideas as where an idea of an author or speaker is incorporated into the body of an assignment as though it were the writer's idea, i.e. no credit is given the person through referencing or footnoting or endnoting.
2. Plagiarism of words occurs when phrases, sentences, tables or illustrations of an author or speaker are incorporated into the body of a writer's own, i.e. no quotations or indentations (depending on the format followed) are present but referencing or footnoting or endnoting is given.
3. Plagiarism of ideas and words as where words and an idea(s) of an author or speaker are incorporated into the body of a written assignment as though they were the writer's own words and ideas, i.e. no quotations or indentations (depending on format followed) are present and no referencing or footnoting or endnoting is given.

Specific *examples* of cheating

Turning in an assignment previously submitted for another class
Paraphrasing ideas without documenting the source
Using information considered common knowledge without citation
Having someone in your class check over a paper before turning it in
Working with others on a project to be completed individually
Asking someone who's already taken the exam what's on it
Making suggestions about what to study to someone who hasn't yet taken the exam
Including references on a bibliography that were not used in the paper
Taking credit for participation in a group without doing a fair share of the work
Making up an excuse for missing an exam or assignment due date
Using your phone to look up an answer during an exam but not finding it
Knowing that someone is cheating but not reporting it
Being in a study group that divvies up homework problems and then shares and discusses the problem solutions
Falsifying data from experiments, surveys, or other research activities

Course schedule: Subject to change.

DATE	LECTURE	TOPICS	LAB	READING	ASSIGNMENT
Sept 3-7	T&R 11:30-1 OA1008	**T:** Analyzing the distribution of a variable; Constructing frequency tables and histograms. **R:** Choropleth maps; Measures of central tendency	None, Monday is a holiday	Chapter 2 (2.1-2.3)	A1 due on F7
Sept 10-14	T&R 11:30-1 OA1008	**T:** Measures of dispersion; Spatial measures. **R:** Concept of probability;	M 10:30-12:30 OA1002. Intro to Excel.	Chapter 2 (2.4-2.7) and Chapter 4	A2 due on F14
Sept 17-21	T&R 11:30-1 OA1008	**T:** Discrete vs continuous events; Binomial distributions; Geographical applications of binomial distributions; geometric and Poisson distributions. **R:** Continuous probability distributions - Normal and Exponential distributions	M 10:30-12:30 OA1002. Descriptive stats and charts with Excel.	Chapter 5 and 6	A3 due on F21
Sept 24-28	T&R 11:30-1 OA1008. R 27 is **MIDTERM TEST 1.**	**T:** The central limit theorem - Concept of sampling; Properties of a sampling distribution. **R:** MIDTERM.	M 10:30-12:30 OA1002. Importing CANSIM data into Excel.	Chapter 7	
Oct 1-5	T&R 11:30-1 OA1008	**T:** Confidence intervals – estimating a population mean based on large and small samples; estimating a proportion; estimating sample sizes needed for interval estimates **R:** Introduction to hypothesis testing – Constructing null and research hypotheses, one vs. two tailed tests	M 10:30-12:30 OA1002. Probability distribution functions in Excel.	Chapter 8 (8.1-8.5)	A4 due on F5
		Oc 8-12 Thanksgiving Holiday and Study Break			
Oct 15-19	T&R 11:30-1 OA1008	**T:** Hypotheses about means and proportions – testing hypotheses about population means with large and small samples; testing hypotheses about proportions. **R:** Bivariate analysis and correlation - Constructing scatter plots; Finding Pearson's r	M 10:30-12:30 OA1002. A database in SPSS.	Chapter 9 (9.1-9.2) and Chapter 3	A5 due on F19

Oct 22-26	T&R 11:30-1 OA1008	**T:** Explanation using regression – Determining best fit equations; Residuals; Explained/unexplained variation. **R:** Regression hypothesis tests – testing a slope for significance; assumptions and pitfalls of regression	M 10:30-12:30 OA1002. **LAB TEST 1 Excel.**	Chapter 13 (13.1-13.6)	A6 due on F26
Oct 29-Nov 2	T&R 11:30-1 OA1008. R 1 is **MIDTERM TEST 2.**	**T:** Comparing means: Independent samples – Two sample difference of means t-test for independent samples; Mann-Whitney U-Test; **R:** MIDTERM	M 10:30-12:30 OA1002. SPSS: Descriptive stats; recoding/frequency count, compute.	Chapter 8 and Chapter 10 (10.1,10.3, 10.5) and Chapter 14 (14.3)	A7 due on F2
Nov 5-9	T&R 11:30-1 *Lectures are online only.*	**T:** Comparing means: Dependent samples – Matched Pairs t-Test. **R:** Comparing two proportions – test for comparing two sample proportions	M 10:30-12:30 *Lab is online only.* SPSS: Applications of regression analysis.	Chapter 10 (10.2, 10.4)	*No office hours. I will be away at a conference.*
Nov 12-16	T&R 11:30-1 OA1008	**T:** ANOVA – analysis of variance technique; difference between multiple means. **R:** Contingency tables – calculation of expected values in a contingency table; manual calculation of a chi-square statistic	M 10:30-12:30 OA1002. SPSS: Comparing means.	Chapter 12 and Chapter 11	A8 **and** A9 due on F16
Nov 19-23	T&R 11:30-1 OA1008	**T:** Other applications of the Chi-Square Test – testing the representativeness of a sample; testing for randomness in a spatial pattern of residuals. **R:** Point pattern analysis – testing for randomness.	M 10:30-12:30 OA1002. SPSS: Contingency tables.		A10 due on F23
Nov 26-30	T&R 11:30-1 OA1008	**T:** Nearest neighbour analysis. **R:** Multivariate Modelling – The need for multivariate models; Building a multiple regression model; Dummy variable in r. model.	M 10:30-12:30 OA1002. Statistics in ArcMAP and GEOMAPAPP.		A11 due on F30
Dec 3-7	None.		M 10:30-12:30 OA1002. **LAB TEST 2 - SPSS**		

Dec 6-16		*LU exams run Dec 6-16th inclusive, and Dec 17th is the contingency day.*	

Student Supports

Scholarships https://www.lakeheadu.ca/studentcentral/financing-budgeting

Student Health and Wellness Centre OR1015 https://www.lakeheadu.ca/current-students/student-services/or/health-and-wellness

Writing and Tutoring OR1031 haley.doherty@lakeheadu.ca

Orillia success in Science Centre OA3012 haley.doherty@lakeheadu.ca

Student Success http://mysuccess.lakeheadu.ca

Library https://library.lakeheadu.ca/about/hours/orillia-ua
Please note: the librarians can be an excellent help for research, referencing, etc.