

## Analytical Methods (GGR270H1F)

Fall Semester 2017

University of Toronto

**Lecture:** Wednesday 2-4pm – Location: Leslie L. Dan Pharmacy Building (PB) B150

**Tutorials:** Wed 4-5pm (SS2110), 5-6pm (SS1086), 6-7pm (SS1086),

Thu 11-12pm (SS1084), 12-1pm (SS1084), 2-3pm (SS2127)

### Professor:

Dr. Michael J. Widener

Office: 5037 Sidney Smith Hall

Office Hours: Tuesdays, 9-11am or by appointment. TAs also hold office hours (TBA)

Email: michael.widener@utoronto.ca

### Required Materials:

- Rogerson, Peter Statistical Methods for Geography 4<sup>th</sup> Edition. Sage Press, 2015.
- Calculator (cell phone calculators not permitted during quizzes and test)

### Course description:

The course introduces students to elementary analytical concepts of quantitative methods. The principal focus will be on statistical techniques, with an emphasis on their use with spatial and geographic data.

When these concepts and techniques are understood, students will possess a powerful analytical toolkit which will aid them in research design and analysis, research projects or papers, other geography courses, and social and physical sciences courses generally. The techniques are also frequently used in the jobs that geographers take up on graduation. In addition to learning these new analytical methods, students will learn ways to interpret and communicate their findings – an integral part of engaging in the discipline.

The course is a requirement for geography majors and is also a pre-requisite for more advanced 'method courses' in geography (and in other departments).

### Learning Outcomes:

Given the completion of the course requirements, students will be able to:

- 1) use descriptive statistics, probability models, hypothesis testing, and regression techniques to characterize and analyze datasets;
- 2) understand basic spatial statistical techniques; and
- 3) interpret and communicate, in writing, results of quantitative analyses through writing.

### Grading:

Problem Sets (10%)

Quizzes (10%)

In Class Assignments (5%)

Midterm Test (30%)

Final Exam (45%)

### Lecture and Tutorial Organization:

This course will have a two hour lecture every Wednesday at 2pm, and a one hour tutorial period. During the lecture I will present the course material, work through example problems, and oversee the completion of worksheets. Additionally, two quizzes will be administered in Week 4 and Week 10 at the beginning of the class period.

Homework problem sets will be assigned at the end of the class period in Weeks 1, 3, 5, 8, and 10. These problem sets are designed to reinforce the concepts reviewed in class, and will give students ample practice in working through various statistical methods. Students are to hand in their solutions at their tutorial session to their TA at the beginning of class. You may only hand in your homework at the tutorial session you are signed up for. If you have an approved reason for missing your tutorial session, make arrangements with your TA to hand in your assignment ahead of tutorial.

Assignments handed in after tutorial has started (10 minutes after the hour) will receive a **50% reduction** in marks. Every additional day the assignment is late will result in a further reduction of 10% per day.

Tutorial sessions are provided as a way for students to work with each other and their TAs to have any concepts clarified. Generally, the tutorial TA will hand back assignments a week after they were turned in and review the answers (if there was a problem set the previous week), and then spend the remainder of the period reviewing examples that are similar to the next week's assignment.

**Outline of Course (adjustments may be made to ensure all material is covered):**

<b>Week Number</b>	<b>Class Date</b>	<b>Lecture Topic/Readings</b>	<b>Quiz</b>	<b>Problem Sets</b>
Week 1	September 13	Introduction to Stats for Geography and Descriptive Stats (Ch 1, 2)	-	-
Week 2	September 20	Descriptive Stats, cont., Descriptive Spatial Stats (Ch 2)	-	-
Week 3	September 27	Probability and Discrete Prob. Distributions (Ch 3)	-	PS 1 Due
Week 4	October 4	Continuous Probability Distributions and Prob. Models (Ch 4)	<b>Q1: Ch 1-3</b>	-
Week 5	October 11	Inferential Statistics I: Confidence Intervals and Hypothesis Testing (Ch 5)	-	PS 2 Due
Week 6	October 18	Inferential Statistics II: Hypothesis Testing, cont. and Sampling (Ch 5)	-	-
Week 7	October 25	<b>Midterm</b>	-	PS 3 Due
Week 8	November 1	Analysis of Variance (Ch 6)	-	-
Week 9	November 15	Correlation (Ch 7)	-	-
Week 10	November 22	Introduction to Regression (Ch 8)	<b>Q2: Ch 6-8</b>	PS 4 Due
Week 11	November 29	Regression (Ch 8, 9) or Spatial Patterns (Ch 10)	-	-
Week 12	December 6	Spatial Patterns (Ch 10)	-	PS 5 Due
Exam Period	TBA	<b>Final Exam</b>	-	-

**Reading Schedule:**

All chapters from Peter Rogerson's Statistical Methods for Geography 4<sup>th</sup> Edition and should be read prior to class.

### **Notes on Problem Sets:**

Group work is permitted on problem sets, but do not simply copy the steps/results from your collaborator. Your course grade is weighted so that you must understand how to complete these problems on your own during quizzes and exams. If you're having trouble, ask your TA and/or come to office hours. *We are here to help you learn!* Additionally, students will have access to the Math Help Centre – details about this will be provided in class.

### **Late assignments:**

Assignments handed in after tutorial has started (10 minutes after the hour) will receive a 50% reduction in marks. Every additional day the assignment is late will result in a further reduction of 10% per day.

Students who miss an assignment but produce one of the following documents will be allowed to hand in their work late, with no penalty. The deadline for these assignments should be discussed with the professor and will be determined on a case-by-case basis:

- **UofT Verification of Illness or Injury Form:** This form, available to students online, is restricted to a select group of medical practitioners and provides responses to the relevant questions about the absence.
- **Student Health or Disability Related Certificate:** A streamlined variant of the UofT Verification of Illness or Injury Form provided by our own internal doctors who can vouch for health problems without so many details.
- **A College Registrar's Letter:** This is a letter that only senior College Registrarial staff are authorized to write. It should identify itself as a "College Registrar's Letter."
- **Accessibility Services Letter:** This sort of letter may address needed accommodations or document on-going disability issues that have made absence or lateness unavoidable.

Make up quizzes, tests, or exams will not be given, unless a student produces any of the above documentation. For more on late and missed work, please refer to the academic handbook:

<http://www.artsci.utoronto.ca/faculty-staff/teacher-info/academic-handbook-for-instructors>

### **General student issues:**

If students have any questions or issues not covered in the syllabus, they are expected to email the professor or speak with him after class or during office hours.

### **Accessibility Needs:**

The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact Accessibility Services as soon as possible: [disability.services@utoronto.ca](mailto:disability.services@utoronto.ca) or <http://studentlife.utoronto.ca/accessibility>

### **Academic Integrity:**

All work turned in by students must be their own. Do not cheat or plagiarize. The Department and University treat all cases of cheating and plagiarism as serious offenses and sanctions are severe. You should be familiar with the university's Code of Behaviour on Academic Matters:

<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>.

Note also that using information directly from sources such as books, articles, videos, the Internet or work of fellow students without proper citation is considered plagiarism. Quotation marks are required when using someone else's words. Changing a few words in a sentence is not enough to make it your own.

Please refer to this U of T document for more information about plagiarism: "How not to plagiarize" (<http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize>).