University of Toronto at Mississauga
Department of Geography
Fall 2008

GGR 276 F SPATIAL DATA ANALYSIS AND MAPPING

Instructor: Alan Walks

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Lectures: Mondays, 3-5 p.m., in CC 3140
Lab/ Tutorial: Mondays 12-1 and 1-2, SE 1154
Office hour: Wednesdays, 4:30-5:30pm

Prerequisite: GGR117, or any 4.0 FCE in Geography

COURSE DESCRIPTION:

Statistical literacy is important for advanced geographical analysis. This course acts as the main introduction to quantitative methods in geography and provides basic skills required for future work in spatial analysis, mapping and GIS (geographic information systems). Students will be introduced to a range of methods and methodological concepts that can be applied to the exploration, modeling and visualization of spatially arranged information. The course begins by examining the difference between spatial (geographic) and aspatial data, outlining the main descriptive statistics for both types of data, and introducing students to different ways of classifying and mapping geographic data. After this, inferential statistics and hypothesis testing are introduced, followed by measures for statistical significance, goodness-of-fit, probability, analysis of variance, and point-pattern and area-pattern analysis. Finally, students are introduced to tools used for explanatory modeling, including correlation and regression analysis. The special requirements needed for applying these methods to geographic data and interpreting the results are then covered.

COURSE OBJECTIVES:

The objectives of this course are to:

1. Introduce students to the most important statistical methods for analyzing both spatial and aspatial data, but with an emphasis on geographical applications and research

2. Acquire experience in analyzing and mapping different types of spatial data, from both human and physical geography, and in interpreting the results

3. Acquire the skills and statistical literacy needed for future work (coursework and research) in spatial analysis, applied statistics, GIS, and mapping

COURSE ORGANIZATION:

The class consists of one 2-hour lecture each week, plus a one-hour tutorial. Tutorials begin on Monday Sept. 15. Tutorials will take place every subsequent Monday, with the exception of October 13 (thanksgiving – there is no class on this day either), and October 27 (this is the date of the mid-term test – there is no tutorial on this day).

ASSIGNMENTS

There are three written assignments required for the course, as well as a mid-term test and a final exam.

GRADING

The grading scheme is as follows:

15%	Assignment 1	(due Oct. 6)
10%	Assignment 2	(due Oct. 27)
15%	Assignment 3	(due Dec. 1)
20%	Mid-Term Test	(Oct. 27)
40%	Final Exam	(exam period)

READINGS:

There is one textbook for this course (will be available for purchase in the UTM bookstore):

> McGrew, JC Jr., and Monroe, CB (2000) *An Introduction to Statistical Problem Solving in Geography* (2nd Edition). Toronto: McGraw-Hill.

As well, some supplementary readings and examples are drawn from the following books. Note that these will be available on reserve in the UTM library - there is no need to purchase them:

> Bailey, TC & Gatrell, AC (1995) *Interactive Spatial Data Analysis.* New York : Longman
>
> Burt, JE & Barber, GM (1996) *Elementary Statistics for Geographers*. New York: Guilford Press.

DEPARTMENT OF GEOGRAPHY LATE ASSIGNMENT/MISSED TEST POLICY

Late assignments will be subject to a late penalty of 5% per day (weekends will count as one day) of the total marks for the assignment. Assignments submitted 7 calendar days beyond the due date will be assigned a grade of zero. Exceptions can be can be made when an assignment is late or a student is unable to write a term test/quiz for University accepted, verifiable reasons beyond one's control.

There will be no re-writes for term test/quizzes missed for University accepted, verifiable reasons. Instead the final exam will be re-weighted by the value of the term test/quiz. You must inform your professor as soon as physically possible of any circumstances that prevent you from submitting an assignment on time or writing a term test/quiz.

University accepted documentation (e.g., U of T Student Medical Certificate) for late assignments and missed tests must be provided in person to Grace Chung (Academic Counsellor, Room SE 2110G Department of Geography) upon your return to campus. No assignment or exam will be graded until the documentation is submitted. Failure to comply with this policy will result in a grade of zero for the assignment or test in question.

E-MAIL COMMUNICATION

Note that many hotmail, Rogers and yahoo email accounts are blocked by the University of Toronto spam filters. Students should thus use an official University of Toronto (utoronto) email account when communicating with the instructor. All electronic messages are to be composed in a respectful, appropriately constructed manner, should identify the full name and student ID of the student, and should refer to the course code. E-mail should not be viewed as an alternative to meeting with the professor during office hours. Students are advised to consult www.enough.utoronto.ca for information on university policy concerning the appropriate use of information and communication technology.

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LECTURE SCHEDULE

Sept. 8 **Introduction to the Course**

Sept. 15 **Spatial and Non-Spatial Data, Classification and Measurement**
Required Reading: McGrew and Monroe, Chapters 1 and 2
Supplementary Reading: Burt and Barber, Chapter 1

Sept. 22 **Descriptive Statistics, Data Classification continued**
Required Reading: McGrew and Monroe, Chapter 3
Supplementary Reading: Burt and Barber, Chapter 2

Sept. 29 **Descriptive SPATIAL Statistics**
Required Reading: McGrew and Monroe, Chapter 4
Supplementary Reading: Burt and Barber, Chapter 3

Oct. 6 **Probabilities and Spatial Distributions**
Required Reading: McGrew and Monroe, Chapter 5
Supplementary Reading: Burt and Barber, Chapters 5 and 6

Oct. 13 ***Thanksgiving – No Class***

Oct. 20 **Statistical Sampling**
Required Readings: McGrew and Monroe, Chapters 6 and 7
Supplementary Readings: Bailey and Gatrell, pages 75 – 94, Burt and Barber, Chapter 7

Oct. 27 **MID TERM QUIZ**

Nov. 3 **Inferential Statistics, Correlation, Analysis of Variance, Goodness-of-fit**
Required Reading: McGrew and Monroe, Chapters 8, 10, 11, 13
Supplementary Reading: Burt and Barber, Chapter 8, 12

Nov. 10 **Inferential SPATIAL statistics, Point/Area Pattern Analysis**
Required Reading: McGrew and Monroe, Chapter 12
Supplementary Reading: Burt and Barber, Chapter 11

Nov. 17 **Introduction to Regression**
Required Reading: McGrew and Monroe, Chapter 14, pages 210-220

Nov. 24 **Regression Continued**
Required Reading: McGrew and Monroe, Chapter 14, pages 220-238
Supplementary Reading: Burt and Barber, Chapters 13 and 14

Dec. 1 **Regression continued, Exam Review**