Quantitative Methods in Geography
GTECH 30100/70200, Grad Center Course 79903
Fall 2017 Syllabus
Version 1, August 7, 2017

Instructor: Allan Frei, afrei@hunter.cuny.edu
Office Hours: by appointment
Course Times: Tuesday 5:35-8:25 pm, with a 10 minute break
Course Room: 1090B-2 Hunter North (small lab)

Course Overview

The focus of this course is on the application of statistical methods to geographic research. The goal is to understand these techniques so that you can later interpret and use them in an intelligent and appropriate manner; and so that you can learn how to explore related techniques independently. This course is "applied" in the sense that we focus on the application of these techniques more than on the derivation of equations. While we review information from introductory statistics courses, we also focus on their application in geographical analysis. In addition, we learn multivariate techniques not typically included in introductory courses. This course will prepare you for more advanced spatial analysis topics covered in courses such as GTECH 70500.

Prerequisites

The prerequisite for this course is an introductory statistics course such as STAT 11300 or STAT 21300 at Hunter College (or equivalent with permission of instructor).

Expected Learning Outcomes

In today's society, it is helpful to have a strong understanding of data analysis and statistical concepts in order to be able to think critically about the quantitative information you encounter every day—from opinion polls to government policies, from scientific studies to news headlines. You need to be able to understand the information that is being presented and to ask the right questions about any conclusions that are drawn from it.

After completing this course, you should be able to perform the following in the context of geographical analysis:

- produce and interpret graphical and numerical summaries of univariate and multivariate data
- build models to fit a range of datasets and data types
- interpret the inputs and outputs to various statistical models
- apply hypothesis testing

Textbook

You are expected to own a copy of Peter A. Rogerson, *Statistical Methods for Geography: a Student's Guide* (4th edition), SAGE Publications, 2015. ISBN 978-1446295731. This textbook is available at the Hunter College Bookstore and through many online retailers as an ebook, rental, hardcover or softcover. Used copies of the 4th edition may also be available. Supplementary reading and data will be provided.
Companion web site: https://study.sagepub.com/rogerson4e

Software
No experience with any particular software package is required, although it is expected that most of you have familiarity with EXCEL, which we will be using for a variety of exercises. The primary statistical software packages to be used are SPSS and R.

Evaluation
Final grades are based on the following. No extra credit assignments are given.

	Undergrads	**Grads**
7 Assignments:	80%	70%
4 Quizzes:	20%	20%
Grad student presentations		10%

Assignments
Assignments will usually be discussed in class on the day they are due. Therefore, assignments are due before the beginning of class on the due date. LATE ASSIGNMENTS WILL NOT BE ACCEPTED without prior permission from the professor. All assignments must be submitted via blackboard. Some assignments will include different and/or additional work for graduate students. Three of the assignments area "low impact", meaning that the students gets either full credit, or no credit. Graduate students are also required to meet with Prof. Frei at the beginning of the semester to discuss their interest in this class, and to make a presentation to the class at the end of the semester.

Quizzes Four quizzes will be given during the semester. They are typically administered at the beginning of class prior to starting a new lecture topic. They are each worth only 5% of your grade, and will usually take 30-40 minutes each. No makeup quizzes will be given without prior permission from the professor.

Graduate Student Presentations
Graduate Students are expected to present results related to their own work, or some topic of interest to them, that is related to our course material. The topics of the presentations will be discussed with, and approved by, the professor.

Attendance/Lateness
Prompt attendance is required. Up to two unexcused absences, and two late arrivals, will be accepted. Every unexcused absence after the second one will result in a decrease of 2.5% in the final grade. Every late arrival after the second one will result in a decrease of 1% in the final grade. An arrival so late that a student misses more than half the class is considered an absence.

Communication with the Professor
All email messages about this course should go to afrei@hunter.cuny.edu, should include "GTECH 301/702" in the subject line, and should be signed with your full name as it appears on blackboard or CUNYFirst.
I try to respond promptly, but please do not hesitate to contact me again if I do not respond to your email within two days, or sooner if you need more urgent attention!

Blackboard
Everything pertaining to this course will be communicated through Blackboard. You will access material, check grades, upload your assignments, and submit your work, through Blackboard.

Grading Policy
All grading for this course will follow the CUNY grading policy, which can be found: http://catalog.hunter.cuny.edu/content.php?catoid=15&navoid=1433.

Incomplete (IN) Grades
A final grade of IN (incomplete) will be given only under extraordinary and documented circumstances.

CR/NC Grades
The CR/NC grade is available only to undergraduate students that have fulfilled the requirements of the course, i.e., complete all course requirements, including all exams/quizzes, assignments, etc. CR/NC must be submitted to the professor no later than 15 minutes prior to the beginning of the 4th quiz, on 5:35 on Monday, December 12. Graduate students do not have the CR/NC option.

Lab Access
The lab(s) (HN-1090B-1) are as of this writing open 7 days a week, 24 hours a day, and students with appropriate access are entitled to work in these labs when the labs are not being used for teaching. Additional information on labs and lab policies is available here. **EATING, DRINKING, OR SLEEPING IN THE LABS ARE STRICTLY PROHIBITED. YOUR LAB ACCESS MAY BE DENIED IF YOU BREAK THESE RULES.**

Class Environment
To ensure that all class members feel welcomed and equally able to contribute to class discussions, we will all endeavor to be respectful in our language, our examples, and the manner in which we conduct our discussions and group work. If you have any concerns about the environment of the class, please contact the professor.

Hunter College Policy on Academic Integrity
Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures. Be sure and reference all material you use. If you have any questions, please contact me!

Students with a Disability
In compliance with the *Americans with a Disability Act* and with Section 504 of the *Rehabilitation Act*, Hunter College is committed to ensuring educational access and accommodations for all its registered students. Hunter College's students with disabilities and medical conditions are encouraged to register with the Office of AccessABILITY for assistance and accommodation. For information and appointment contact the Office of AccessABILITY located in Room E1214 or call (212) 772-4857 /or TTY (212) 650-3230.

Syllabus Changes
This syllabus and schedule are guides for the course and are subject to change without advance notice. All changes will be announced on Blackboard, by email, and/or in class.

Tentative Schedule (Subject to Change)

Week	Date	Topic	Required Reading *	Assignment Due / Quiz Dates
1		**1. Introduction**: exploratory data analysis (EDA), descriptive stats, Intro to SPSS		
2	9/5	Introduction to R	Ch. 1, Ch. 2	HW 1 **
3	9/12	**2. Probability theory and distributions**	Ch. 3, 4	HW 2 **
	9/19	*No Class*		
4	9/26	**3. Inferential statistics**, central limit theorem	Ch. 5	**Quiz 1. Ch. 3, 4**
5	10/3	**4. Correlation**, transformations, bivariate EDA	Ch. 7	HW 3 (Ch. 3,4)
6	10/10	5. **Bivariate and Multiple Regression,** trend analysis, calibration validation	Ch. 8	HW4 (Ch. 5)
7	10/17	5. (cont'd)	Ch. 9	HW 5 (Ch. 7)
8	10/24	5. (cont'd)		
9	10/31	5. (cont'd)		**Quiz 2. Ch. 5, 7**
10	11/7	5. (cont'd)		
11	*11/14*	**6. Data reduction: factor / principle components**	Ch. 12	HW 6 (ch 8, 9, & calibration/validation)
	11/21	*No class*		
12	11/28	**7. possible additional topics**: spatial issues, cluster anal, weighted regression, quantile regression, robust / computer intensive methods		**Quiz 3** (ch. 8, 9, & calibration/validation)
13	12/5	7. (cont'd)		HW 7 (multivariate regression, PCA)
14	12/12	7. (cont'd)	Ch. 10	*CR/NC forms due* **Quiz 4** (multivariate regression, PCA)
15	12/19	**Graduate Student Presentations, attendance required for all students**		

* additional readings may be assigned

** assignments 1, 2, and 4 are low impact