

GEO363 – Introduction to Quantitative Methods

Syllabus

Fall, 2017

Instructor: Dr. Pearson
Office: Assistant Professor of Geography
Room 231, Geography Building
Phone: ext 27163
Email: apearson@msu.edu
Office hours: TR 8:00-10:00a, or appt

Teaching Asst: Dan Wanyama
Office: Room 21, Geography Building
Email: wanyamad@msu.edu
Office hours: R 11:40a-12:30p (lab), W 10:00-11:00a (office), or appt

Time & place: Lectures: TR 10:20a – 11:40a Nat Sci 150
Computer Lab: Any public lab on campus

Class webpage: on D2L

This page will be used to post homework assignments, datasets, documentation, and other information. I urge you to check this site regularly. You will also have to upload your completed assignments to the D2L Dropbox (more details in Late Policy).

Prerequisites: None, but basic mathematical knowledge is essential. Knowledge of Microsoft Word and Excel are also essential. You will also need to know how to scan documents.

Required textbook: Ha, R. and J. Ha, *Integrative Statistics for the Social & Behavioral Sciences*. 2012, Thousand Oaks, CA: Sage Publications.

Computing: Software: Stata, Excel, Word
Homework assignments will involve statistical analyses that will generally require access to statistical software. Commands covered in the lectures and computing help available for Stata or Excel. Stata is available in all public computer labs on campus. Stata is also available on Geography's Magellan server. You will need a user log in if you do not already have one. Contact the TA if you need a user log in.

Calculator and flashdrive: Recommended
Calculator not required, but recommended. Mobile phones NOT permitted to be used during exams. Flashdrive recommended for all 'computer lab' tutorial sessions.

Scanning: Required
You will be required to scan your hand-written work (solving problems) for Ex 1 and 4. There are scanning facilities in the library and other offices on campus. Scan all sheets as one file. I recommend submitting a pdf file on D2L, as these are clearly read by the program.

Attendance: Lectures: Required
Lab sessions: Recommended; help available 12:40 – 1:30 Tue
Business College N012.

Assignments/Grades:	Exercise 1	2%	Exercise 5	6%
	Exercise 2	3%	Exercise 6	7%
	Exercise 3	4%	Exercise 7	8%
	Exercise 4	5%	Final Exam	35%
	Midterm Exam	30%		

90-100 = 4.0	A
85-89 = 3.5	B+
80-84 = 3.0	B
75-79 = 2.5	C+
70-74 = 2.0	C
65-69 = 1.5	D+
60-64 = 1.0	D
< 60 = 0.0	F

Note that points are assigned, then weighted using the scheme above. These values are then rounded to the nearest integer to assign a value from 0-100. Then, each final grade is assigned a grade point using the scheme in the box. No curves are applied to final grades.

Readings:

Please read these before class, as indicated. You may need to read some of these items more than once, as some of them may be more difficult to comprehend on the first reading. If I make changes to the syllabus, I will notify you by email.

Lectures:

These serve to clarify difficult or important portions of the readings and to expand on the methods, provide further examples and applications in health geography. It is **very** likely that important material will be included in the lectures, which is not found in the text or online materials for the course. You are expected to be familiar with the textbook reading assignments, concepts and applications from assignments and material from the lectures for your Mid-term and Final exams.

Additional resources:

Additional reading: (posted on website)

- Altman M, McDonald MP (2001) Choosing Reliable Statistical Software *PSOnline* 681-687.
- McGrew JC, Lembo AJ, Monroe CB (2014) An Introduction to Statistical Problem-Solving in Geography, third edition, Waveland Press: Long Grove, IL.
- Maybe more to come...

Learning objectives:

The main purpose of this course is to provide you with the ability to comfortably read and evaluate quantitative academic literature in your particular area of interest. A second objective is to enable and encourage you to utilize quantitative methods (when appropriate) in your own writing and research.

As this is an introductory course, we will not cover a number of more complex methods. Nevertheless, more complex methods depend upon the statistics covered in this course. It is assumed that most of you do not have extensive experience with university-level mathematics or statistics. However, I do assume that you have a background in basic mathematics operations and symbols (e.g., algebra). The diagnostic test on the first day assesses the accuracy of that assumption and will assist in highlighting areas for improvement. This course involves both the *theoretical* foundation in statistics and *practical* applications using a statistical software program (Stata).

1. Distinguish among nominal, ordinal, interval, ratio and geographic data types
2. Describe the central limit theorem
3. Conduct and interpret descriptive univariate and bivariate statistics (mean, median, proportion, scatterplot, cross tabulation)
4. Differentiate among sampling types and describe their influence on statistical processes
5. Calculate and interpret sample mean, standard deviation, and variance and use these estimates to make population inference
6. Calculate probability and conditional probability
7. Conduct and interpret the following statistics: t-test, paired t-test, confidence intervals, chi-square, ANOVA, Kruskal-Wallis, Pearson's correlation, Spearman's rank, simple linear

regression using State software. Describe the reasons for using a parametric versus non-parametric test and know examples of each

8. Understand the purpose of multiple regression and geographic applications of regression

Estimated hours of preparation per week:

Preparation time for this course outside of class will average about 6-8 hours per week. This will vary from week to week because some weeks you will have more or less work than others. Exercises 6 and 7 usually take students 10-15 hours to complete (each).

Exercise information:

Some exercises require hand-written work, then scanned copies of your work. Show enough of the calculation so the TA can follow your logic in the calculation. You may receive partial credit if you are attempting the calculation using the correct equation but made an error in the final result. However, most exercises require the use of Stata software, excel and word. You may not submit raw Stata output. Instead, you will be required to make tables in excel to show results. You will put all your results into a word document to upload to D2L. I recommend converting the word document to a pdf prior to uploading, as D2L appears to work better with pdf documents. It is your responsibility to ensure it was uploaded correctly. Do not upload Stata code files (.do) or datasets (.dta). Upload ONE document for each assignment. Failure to follow these directions will result in point penalties.

It is reasonable that you may have a question about grades. If you have a question, do not wait until the end of the semester to ask. To ensure you obtain the appropriate grade for this course:

- Email Dr. Pearson to arrange an appointment **by the deadline for each exercise in the course schedule**. The TA is available to assist with course material but cannot address concerns about grades.
- Inquiries about exercise grades may not be made past those outlined in this syllabus. All grades are final after these deadlines pass.

Exam information:

- The exams will be a combination of short answer, fill in the blank and multiple choice. Preparation of all exams will be conducted in “review” and “summary” sessions preceding both the Mid-term and the Final exams.
- Please bring photo ID and a writing implement to the exams.
- You may not use your cell phone.
- Hats with any type of brim must be removed during the exam.
- Students entering the exam > 15 minutes late will not be permitted to take the exam.
- Students arriving to the exam late, will not be given extra time to complete the exam.
- Students with an excused absence (documented medical issue, university event or religious observance) may be permitted to take a make-up exam. This must be approved by Michael Connelly, Director of Student Affairs and Services. Job and internship interviews are not considered excused absences. Make-up exams must be taken no later than 2 weeks after the originally scheduled exam day and scheduled by the student within one week of the missed exam.
- The final exam is cumulative and will cover content from the entire course.

If the proctor finds you are using any unauthorized materials, electronics or books, you will receive zero points for the exam. If you have concerns about the Mid-Term exam or your exam grade, you have one week for schedule a meeting with Dr. Pearson. If you have a concern about the final exam, you must meet with Dr. Pearson immediately following the final exam, as this is the last day for office hours. **Email communication about exams and grading will not be conducted.**

Office Hours:

The last day for office hours will be the final exam date. It will not be possible to meet with students after this date. This is done in order to provide you with final grades in the timeliest manner possible. Please speak with the professor about all matters, including grades by this date.

Keys to course success:

1. Plan ahead and work ahead. Avoid procrastination.
2. Read the required material before class and re-read important points after class.
3. Make a list of concepts you do not understand.
4. Keep the list of concepts next to you while you take notes in class.
5. Ask questions if a concept you did not understand is not covered in the lecture.
6. Attend office hours or make an appointment to ask questions if you still do not understand the material in class. For questions related to exercises, attend lab sessions or email the TA.
7. Complete all assignments in advance of the deadline. Starting assignments the day before they are due is not recommended in this course.
8. Maintain due dates in a calendar with reminders set for this class and other classes.
9. Be proactive! We are here to help. Don't wait until it is too late to get help.

GEO363 – Introduction to Quantitative Methods

Course schedule

Fall, 2017

The following is a tentative outline of the topics to be covered during the semester. We reserve the right to modify this outline as conditions require.

Date	Topic	Book pages	Due	GQ email
31 Aug	Diagnostic test, introduction, expectations	Preface, p1-7		
5 Sept	Open work day			
7 Sept	Diagnostic review, basic applications, context of statistical techniques in Geo [L2]	p8-21, 25-38		
12 Sept	Descriptive statistics, central tendency, dispersion, geographic data [L3]	p42-48		
14 Sept	MAUP, spatial measures of central tendency, intro to Stata [L4]	p48-65, D2L1	Ex. 1	Sept 21
19 Sept	Probabilities, normal distribution, odds [L5]	p69-86		
21 Sept	Sampling distributions, central limit theorem, practice sampling [L6]	p91-99	Ex. 2	Sept 28
26 Sept	Hypothesis testing, sampling types, spatial sampling, practice [L7]	p102-114		
28 Sept	Bivariate descriptive statistics in Stata [L8]			
3 Oct	Intro to inference, confidence intervals, t-stats, practise [L9&10]	p118-140	Ex. 3	Oct 10
5 Oct	Cont'd, Sample problems			
10 Oct	Paired t-tests, practise [L11]	p145-159		
12 Oct	Chi-square, contingency tables [L12]	p291-303	Ex. 4	Oct 19
17 Oct	Review for Mid-term, Exercise 4 [L13]			
19 Oct	MID-TERM EXAM (in CLASS, closed book)			
24 Oct	Review test, schedule 10 min with TA			
26 Oct	Progress reports with TA			
31 Oct	T-tests and nonparametric tests in Stata, practise [L14]	p159-179, 308-314		
2 Nov	Review of distributions, f distribution, ANOVA [L15]	p185-205	Ex. 5	Nov 9
7 Nov	ANOVA, Kruskal-Wallis test in Stata [L16]	p315-319		
9 Nov	Point and area pattern analysis [L17]	D2L2		
14 Nov	Correlation, spearman's rank, practise [L18]	p251-260, 319-323		
16 Nov	Simple linear regression [L19]	p260-268		
21 Nov	Simple linear regression, practice, in Stata [L20]			
23 Nov	HOLIDAY			
28 Nov	Tests of model fit, residuals in Stata [L21]		Ex. 6	Dec 7
30 Nov	Basics of cluster analysis [L22]	D2L3		
5 Dec	Examples multiple regression + review items, in Stata [L23]	p268-288, D2L4		
7 Dec	Review [L24]		Ex. 7	Dec 14
14 Dec	FINAL EXAM (in CLASS) 10:00am-12:00pm			

Relevant policies

1. Expectations for success

Students are expected to attend class on time, read the required material before class on the date assigned, and complete work in a timely manner.

- It is also anticipated that students will be active participants in class. The instructor will make an effort to encourage student engagement with the material.
- Students are encouraged to communicate with the instructor if issues arise with course material and/or any other issue that hinders their ability to complete course work.

2. Requirements for communication via email

Electronic mail (email) will be used for communication of errata and other announcements that are of interest to the general class. I will use the email address supplied by the university course registration list. It is the student's responsibility to ensure that they are receiving emails at their desired email address.

- An MSU email account is required for this course. Please make sure you are able to access your MSU email.
- Please include GEO 363 in the subject line of your email.
- Dr. Pearson and the TA will not respond to emails sent from non-MSU accounts.
- The content of emails is a professional exchange and thus the content should be professional in nature. This pertains to communications between colleagues in class, the TA, and the instructor.
- Acronyms, abbreviations, and emoticons should be avoided in professional communications.
- Email should be used to verify meeting times and other kinds of short communications.
- Extensive questions about course material should be reserved for office hours.
- **I will also not discuss grades over email due to privacy concerns.** This should be done in office hours.
- Please allow 48 hours for a response to email during the week. Email will not be checked on weekends or after 5pm.
- If you do not receive a response to an email, please speak with me in person. Emails can be missed due to the large number of emails received. A non-response is not intentional.

3. Attendance policy

As noted above, attendance at all lectures and course-scheduled lab time are required. However, failure to attend the lectures and laboratory time will not count against your overall grade.

4. Turning in assignments and late policy

All homework assignments (exercises) will be due the date indicated above, unless modified by me. Assignments must be loaded into the D2L Dropbox by 5pm on the date indicated or will receive a penalty. Each 24hour period thereafter receives -20% off that assignment's value. **There is an exception: No late assignments for Exercise 4 accepted. DO NOT put an assignment in my mailbox.** We reserve the right to grade only selected portions of the written homework. If you would like to make a request for an extension or modified due date, you must receive approval from Michael Connelly, Director of Student Affairs and Services.

5. Academic integrity

Article 2.3.3 of the Academic Freedom Report states, "The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades and professional standards."

Assignments will consist of applications of statistical methods to real data analyses and application of equations and concepts learned in the textbook and in lectures. Students are encouraged to seek help from the instructor, the TA, or other students with the written homework problems. However, the work that is handed in should reflect only that student's work. That is, obtaining help from other students in order to learn the METHODS of solution is allowed, but copying another student's answer is NOT – this is considered unauthorized collaboration.

6. Disability accommodation requests statement

Michigan State University is committed to providing equal opportunities for participants in all programs. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at rcpd.msu.edu (884-RCPD). Once your eligibility for an accommodation has been determined, you will be issued a verified individual services accommodation (VISA) form. Please present this form to me at the start of the term and/or two weeks prior to the accommodation date (test, project, etc). Requests received after this date will be honoured whenever possible. Please feel free to visit me during my office hours to discuss.

7. Use of social media

As members of a learning community, students are expected to respect the intellectual property of course instructors. All course materials presented to students are the copyrighted property of the course instructor and are subject to the following conditions of use:

- Students may record lectures or any other classroom activities (including photographs) and use the recordings only for their own course-related purposes.
- Students may share the recordings with other students enrolled in the class. Sharing is limited to using the recordings only for their own course-related purposes.
- Students may not post the recordings or photographs or other course materials online or distribute them to anyone not enrolled in the class without the advance written permission of the course instructor and, if applicable, any students whose voice or image is included in the recordings.
- Any student violating the conditions described above may face academic disciplinary sanctions.

8. Emergency information

In an event of an emergency arising within the classroom setting, the professor/instructor will notify the students of actions that may be required to ensure their safety. It is the responsibility of each student to understand the evacuation or 'shelter-in-place' guidelines posted in each facility and to act in a safe manner. If an evacuation is ordered, please ensure that you do it in a safe manner and facilitate those around you that may not otherwise be able to safely leave. You are allowed to maintain cellular devices in a silent mode during this course, in order to receive emergency messages distributed by the university. When a student receives such a notification or observes an emergency situation, they should immediately bring it to the attention of the professor/instructor in a way that least alarms your fellow students.