

GGG 300: Quantitative Methods for Geographical Analysis

Course Syllabus, Fall 2016, 3 Credits

INSTRUCTOR

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COURSE BASICS

Meeting times: Tuesday and Thursday, 3-4:15pm
Location: 2310 Exploratory Hall
Web location: Blackboard
Office hours: Tues 4:30-6pm, Wed 1-3pm

REGISTRATION DATES Drop without, with tuition penalty dates: September 6, 2016, September 7 – 30, 2016

REQUIRED TEXT McGrew, Lembo, and Monroe. 2014. An Introduction to Statistical Problem Solving in Geography (Third Edition). Waveland Press, Inc., Illinois. ISBN: 1478611197
*Make sure to get the **Third** Edition! Available at the GMU Bookstore or at www.waveland.com*

OTHER REQUIREMENTS USB thumb drive or other form of portable storage device (minimum of 1 GB)

OVERVIEW & OBJECTIVES

GGG 300 introduces students to the use of statistical techniques and quantitative methods in a spatial context. The course focuses on the basic components of quantitative research in geography: developing research questions, evaluating the questions via formal hypothesis testing, and interpreting the results of the tests (including the redevelopment of research questions). The course provides students with the ability to:

- Conduct rigorous statistical analysis of data and information commonly encountered in geographic research using a widely-used statistical software, and
- Understand statistical analysis that is commonly encountered in geographic research and the broader scientific literature.

GGG 300 is a Students as Scholars, *Scholarly Inquiry* course. In the course, students will learn about the broader process of conducting research in geography and geoinformation science. Importantly, students will learn that statistical testing and quantitative approaches are used to not only provide answers, but also to refine research questions and generate new questions, ideas, and hypotheses. This course will prepare students to conduct original, scholarly research. In GGG 300, students will learn to:

- Articulate and refine a research question
- Follow ethical principles in research
- Choose the appropriate process, approach, or methodology for scholarly inquiry
- Situate the scholarly inquiry within a broader context

GGG COMPUTER LAB, ASSIGNMENTS, & EXPECTATIONS

GGG 300 Students have 24/7 access to the GGG Student Computer Lab located in 2102 Exploratory Hall. The computers in this lab have the software required for this course (SPSS). Mason also offers “remote” access to this software (and others) via the Virtual Computing Lab (<http://doit.gmu.edu/students/computer-labs/virtual-computing-lab/>).

Lab assignments will be based on the lecture material and will be administered via Blackboard. Lab assignments will be assigned on Thursdays and will be due the following week *prior to the start of the lecture* (except where noted in the Course Schedule). Late labs will be penalized 20% for each day late. Late submissions will only go unpenalized for the usual documented medical reasons or by previous agreement with the instructor.

GRADING SCHEMA

Assessment	Points	% (of final grade)	Grades will be based on the following cutoff values, although I reserve the right to alter the values at the end of the course:
Lab Assignments (12)	200	50%	A (93%), A- (90%), B+ (87%), B (83%), B- (80%), C+ (77%),
Midterm Exam	100	25%	C (73%), C- (70%), D (60%)
Final Exam	100	25%	

The midterm exam will cover the first 7 weeks of the course. The final exam will be semi-comprehensive, focusing on the final 7 weeks of the course, but also covering key topics from throughout the entire semester. There will be 3-4 *ungraded* pop quizzes during the semester. The quizzes will be used to evaluate how well the course information is being presented and retained; they also provide an opportunity to preview potential exam questions.

OUTLINE & SCHEDULE (subject to change)

NOTE: the Lab and Assignment dates below refer to the date they will be assigned!

Date	Lecture Number and Topic	Readings / Assignments
8/30	T 1 - Introduction to GGS 300, Data, and Statistics	McGrew, Chp 1
9/1	R 2 - Characteristics of Geographic Data	McGrew, Chp 2; Steneck, Chp 6 Lab 1: Introduction to SPSS & Data characteristics
9/6	T 3 - Descriptive Statistics	McGrew, Chp 3
9/8	R 4 - Descriptive Spatial Statistics	McGrew, Chp 4 Lab 2: Data Presentation & Description
9/13	T 5 - Basics of Probability	McGrew, Chp 5
9/15	R 6 - Probability	McGrew, Chp 6 Lab 3: Probability
9/20	T 7 - Sampling	McGrew, Chp 7; Steneck, Chp 8; The Ethics of Scientific Collaboration (Discover Blog)
9/22	R 8 - Sampling (cont.)	Reading Reflection: Scientific Collaboration
9/27	T 9 - Estimation in Sampling	McGrew, Chp 8
9/29	R 10 - Estimation in Sampling (cont.)	Lab 4: Confidence Intervals
10/4	T 11 - Inferential Statistics	McGrew, Chp 9
10/6	R 12 - Inferential Statistics (cont.)	Lab 5: Hypothesis Testing
10/11	T No Class, Columbus Day recess	
10/13	R 13 - Two-Sample and Matched-Pairs Difference Tests	McGrew, Chp 10
10/18	T 14 - Two-Sample and Matched-Pairs Difference Tests (cont.) Midterm Review	Lab 6: Two-Sample Difference of Means Test (due 10/27)
10/20	R MIDTERM EXAM	
10/25	T 15 - Three-or-more-Sample Difference Tests	McGrew, Chp 11
10/27	R 16 - Three-or-more-Sample Difference Tests (cont.)	Lab 7: ANOVA
11/1	T 17 - Categorical Difference Tests	McGrew, Chp 12
11/3	R 18 - Categorical Difference Tests (cont.)	Lab 8: Distribution Test
11/8	T 19 - Introduction to Spatial Analysis	McGrew, Chp 13 and 14
11/10	R 20 - Introduction to Spatial Analysis (cont.)	McGrew, Chp 15 Lab 9: Spatial Pattern
11/15	T 21 - Correlation	McGrew, Chp 16
11/17	R 22 - Correlation (cont.)	Lab 10: Correlation Analysis
11/22	T 23 - Regression	McGrew, Chp 17
11/24	R No Class, Thanksgiving recess	
11/29	T 24 - Regression (cont.)	Lab 11: Regression Analysis (due 12/8)
12/1	R 25 - Multiple Regression	McGrew, Chp 18 (p.269-276)
12/6	T 26 - Applying Statistical Methods	Delamater et al. 2012
12/8	R Review Session for Final Exam	
12/15	R FINAL EXAM (1:30 - 4:15)	

ACADEMIC INTEGRITY

GMU has an Honor Code with clear guidelines regarding academic integrity. Three fundamental and rather simple principles to follow at all times are that: (1) all work submitted be your own; (2) when using the work or ideas of others, including fellow students, give full credit through accurate citations; and (3) if you are uncertain about the ground rules on a particular assignment, ask for clarification. No grade is important enough to justify academic misconduct. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions.

GGG COMPUTER LAB ACCESS

All GGS students should receive “swipe” access (using your Student ID) to the GGS Student Computer Lab (Room 2102, Exploratory Hall) upon registering for the course. If you experience problems accessing the lab, please see Debbie Hutton or Samantha Cooke in the Main GGS Office (2400, Exploratory Hall).

GGG COMPUTER LAB ASSISTANCE

If you experience problems with the computers (e.g., software or hardware issues) in the GGS Student Computer Lab (Room 2102, Exploratory Hall), please email our student lab assistants, Hong Vuong (hvuong2@gmu.edu) and Ian McVey (imcvey@gmu.edu) for technical assistance. Please copy Dr. Delamater on any correspondence with Hong and/or Ian, if it is related to GGS 300.

GMU EMAIL ACCOUNTS

Students must use their MasonLive email account to receive important University information, including messages related to this class. See <http://masonlive.gmu.edu> for more information.

OFFICE OF DISABILITY SERVICES

If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Services (ODS) at 993-2474, <http://ods.gmu.edu>. All academic accommodations must be arranged through the ODS.

STUDENTS AS SCHOLARS

Students as Scholars is GMU's award-winning initiative to give students the opportunity to conduct undergraduate research. If you are interested in conducting research or simply learning more about the program, check out oscar.gmu.edu or stop by the Office of Student Scholarship, Creative Activities, and Research to learn about the many programs available to GMU students.

GMU RESOURCES

The Writing Center: <http://writingcenter.gmu.edu>

University Libraries, Ask a Librarian: <http://library.gmu.edu/ask>

Counseling and Psychological Services: <http://caps.gmu.edu>

University Catalog: <http://catalog.gmu.edu>

University Policies: <http://universitypolicy.gmu.edu>