

Quantitative Methods in Geography

Geography 3190
Fall 2009: MW 9 – 10:20 pm
Lab 1: Friday 9 – 9:50 am
Lab 2: Friday 10 – 10:50 am
Lecture in ENV 391
Labs in ENV 336

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Office Hours: MW 10:30 am – noon or by appointment

Course Objectives:

This course is designed to immerse students in descriptive and inferential statistics in a problem-oriented research context, primarily within geography. In order to succeed in the course, students must comprehend and be able to communicate the complete analytical process from:

- Framing a research question*
- Generating statistical hypotheses related to that research question*
- Choosing the appropriate statistical test to test those hypotheses*
- Interpreting results of the statistical test*
- Drawing conclusions from the analysis*

Students who fully understand the subject matter should be able to accomplish each of these tasks by the end of the class and should be able to read and comprehend analytical publications including scholarly journal articles and research reports that incorporate the use of basic quantitative analyses.

Required Texts:

Cronk, B. C. 2008. *How to Use SPSS, Fifth Edition*. Pyrczak Publishing, Glendale, CA.

McGrew, J. C., Jr. & C. B. Monroe. 2000. *An Introduction to Statistical Problem Solving in Geography, Second Edition*. McGraw Hill, Boston.

Grading:

8	Homeworks @ 15 pts each	=	120 pts
4	Exams @ 50 pts each	=	200 pts
4	Projects @ 50 pts each	=	200pts
1	Final Notebook	=	80 pts
1	Cumulative SPSS Practicum @ 200 pts	=	200 pts
1	Cumulative Final Exam @ 200 pts	=	200 pts
Total = 1000 pts Final Grades (90% & above = A; 80 – 89.4% = B; 70 – 79.4 % = C; 60 – 69.4% = D; below 60 % = F)			

COURSE OUTLINE:

Weeks 1&2 Science, Hypothesis Testing, Basic Sampling, Scale
Aug 28 to Sep 4 Lab 1: Intro to SPSS (Aug 28)

Week 3 Grouping, Central Tendency, Dispersion
Sep 9 – 11 Lab 2: Descriptive Statistics in SPSS

Week 4 Graphing Data
Wednesday: Exam 1, weeks 1 to 4
Sep 14 – 18 Lab 3: Graphing Data in SPSS

Week 5 Z-Scores & Basic Probability in Statistical Inference
Sep 21 – 25 **Project 1: Descriptive statistics & graphing due Friday**

Week 6 Normality, Central Limit Theorem, Confidence Intervals
Sep 28 – Oct 2 Lab 4: Normality& Confidence Intervals in SPSS

Weekly Readings:

Cronk Chs. 1 & 2, 6.1
M&M Chs. 1, 2, & 6

Cronk Ch. 3
M&M Ch. 3

Cronk Ch. 4

Reading Handout

Reading Handout
M&M Ch. 7

Week 7 Oct 5 – 9	Parametric Tests of Sample Differences Wednesday: Exam 2, weeks 4 to 6 Lab 5: Student's t tests & ANOVA	Cronk Ch. 6.2, 6.3, 6.4, 6.5 M&M Ch. 10
Week 8 Oct 12 – 16	Non-parametric Tests of Sample Differences Lab 6: Mann-Whitney & Kruskal-Wallis in SPSS	Cronk Ch. 7.3, 7.4, 7.5 M&M Ch. 10
Week 9 Oct 19 – 23	Application of Tests and Synthesis of Results: Sample Differences Project 2: Sample differences due Friday	Cronk Ch 6 & 7
Week 10 Oct 26 – 30	Tests on Categorical Data Wednesday: Exam 3, weeks 7 to 10 Lab 7: Chi-Square tests in SPSS	Cronk Ch. 7.1 & 7.2 M&M Ch. 11
Week 11 Nov 2 – 6	Application of Tests and Synthesis of Results: Categorical Data Tests Project 3: Tests on Categorical Data due Friday	Cronk Ch. 7
Week 12 Nov 9 – 13	Correlation and Simple Linear Regression Lab 8: Correlation and Regression in SPSS	Cronk Ch. 5 Reading Handout
Week 13 Nov 16 – 20	Application of Tests and Synthesis of Results: Correlation & Regression Project 4: Correlation & Regression due Friday	M&M Chs. 13&14
Week 14 Nov 23 – 25	Monday: Exam 4, weeks 10 to 13 Effect Size	Reading Handout Cronk Appendix A
Week 15 Nov 30 – Dec 4	Cumulative SPSS Practicum	
Week 16 Dec 7 – 11	Choosing tests, framing arguments, interpreting results, drawing conclusions Notebooks due Friday, Dec 18	

Cumulative Final Exam Friday Dec 18th, 8 am

DISABILITY ACCOMODATION

The Department of Geography, in cooperation with the Office of Disability Accommodations, complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disabilities. Please present your written accommodation request by the second lab.

EXTRA CREDIT

The Department of Geography does not allow extra credit assignments (work not specified on a course syllabus).

ACADEMIC DISHONESTY

Students caught cheating or plagiarizing will receive a "0" for that particular assignment or exam. Additionally, the incident will be reported to the Office of Student Rights and Responsibilities for further penalty. According to the UNT catalog, the term "cheating" includes, but is not limited to: (a) use of any unauthorized assistance in taking quizzes, tests, or examinations; (b) dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; (c) the acquisition, without permission, of tests or other academic material belonging to a faculty or staff member of the university; (d) dual submission of a paper or project, or resubmission of a paper or project to a different class without express permission from the instructor(s); or (e) any other act designed to give a student an unfair advantage. Altering a returned test and claiming a grader or scanning machine made an error is also considered cheating. The term "plagiarism" includes, but is not limited to: (a) the knowing or negligent use by paraphrase or direct quotation of the published or unpublished work of another person without full and clear acknowledgment; and (b) the knowing or negligent unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

CLASSROOM/OFFICE COURTESY

Please follow these guidelines to avoid disrupting the class:

- (1) Turn off cell phones before arriving.
- (2) Do not arrive late or leave early (except for a bathroom break or emergency).
- (3) Do not sleep or eat during class.
- (4) Do not work on other assignments during class.
- (5) Do not talk when the instructor is lecturing, unless prompted for feedback by the instructor.

ATTENDANCE/TARDINESS POLICY

After missing (*excused* or *unexcused*) 5 class periods a student will receive a WF (F if after the WF deadline) for the course. Students who are greater than 5 minutes late should come to class so as not to miss the material, but they will be counted absent for the period. Perfect ('perfect' means 'entirely without any flaws, defects, or shortcomings' [dictionary.com]) on-time attendance (lecture and labs) will result in a 3% course grade reward in the final course grade (e.g., an 88% [B] would become a 90% [A]). Those who miss (or are tardy for) only one class period (lecture/lab) will receive a 1.5 % final grade reward.

MISSED-CLASS POLICY

Neither the professor nor the TA re-teaches the course outside of lecture or lab; we are happy to answer questions, clarify content, and provide guidance for those who attend class and come in with informed questions after they have attempted the work themselves. Students who miss class must secure notes from another student in the class; notes will not be provided by the instructor.

Homework Schedule

HW1 due Sep 11 – Grouping & Descriptive Stats

HW2 due Sep 16 – Graphing

HW3 due Sep 28 – z-scores, basic probability

HW4 due Oct 5 – Central limit theorem and confidence intervals

HW5 due Oct 12 – One-sample Student's t test

HW6 due Oct 19 – phrasing results of tests of sample difference

HW7 due Nov 2 – Chi-square tests & phrasing results of Chi-square tests

HW8 due Nov 20 – Correlation and regression & phrasing results of correlation and regression

Project Schedule

P1 due Sep 25

P2 due Oct 23

P3 due Nov 6

P4 due Nov 20

Exam Schedule

E1 Sep 16

E2 Oct 7

E3 Oct 28

E4 Nov 23

Practicum Nov 30 to Dec 4

Final Friday Dec 18 @ 8 to 10 am

**University of North Texas
Department of Geography**

Matrix Summary of Comparative Methods

Number of Samples	Type of Test		
	Non-Parametric		Parametric
K	X^2 K-Sample Test	Kruskal-Wallis H-test	Analysis of Variance
2	X^2 Two Sample Test	Mann-Whitney U-test	t-test of difference between means
1	X^2 One Sample Test	Kolmogorov- Smirnov D-Test	t-test
Relationships and Trends	N/A	Spearman Rank Correlation	Product-Moment Correlation Simple Linear Regression
Measurement Scale	Nominal	Ordinal	Interval/Ratio

Adapted from Shaw and Wheeler, *Statistical Techniques in Geographical Analysis*.

Email received in August from Spring 2009 Student

Dear Dr. Wolverton,

I would like to thank you so much for serving as a reference for my interview with Wood Mackenzie. They offered me the job and I accepted about two weeks ago. I've already moved to the Houston area and start on August 17th.

Many of the skills that I acquired from your course proved to be extremely valuable for the interview. Before the interview started, they had me perform quantitative analysis on energy and pricing data for the North American power grid that I would present to the manager and head analysts in a powerpoint presentation. If it had not been for the knowledge that I gained from your course, the interview might have been over at that point. In fact, the head analyst complemented me for including a wider variety of statistical information than any of the other candidates.

Thank you so much again for serving as a reference and for teaching the Quantitative Methods course, without which, I may have never landed this job.

Best Regards,

Student

I promised the student they would remain anonymous.