



Department of Political Science and
Criminal Justice

*Master of Public Administration
Program*

POLS 7600, Section A
Statistics for Public
Management
Spring Semester 2009

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Office Hours: M-Th, 3:30-5 p.m.

Purpose

Lord Kelvin (William Thomson, 1824-1907) wrote: ". . . [W]hen you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind." Government administration has become increasingly technical and quantitatively oriented; the public administrator no longer lives by politics alone. Government agencies must build complex infrastructures, treat clients with uniform procedures, issue benefit checks in a timely and accurate manner, apply systematic personnel standards, and create intricate budgets. All of these processes involve quantitative records.

The inability to apply statistical methods leaves a public administrator dependent on co-workers who *do* know these methods, leaves him or her vulnerable to efforts to mislead him or her statistically, and may impede his or her potential for successful performance and advancement. The techniques that will be taught in this course can be applied readily to nearly every work environment. You may find yourself recognized as a much more valuable employee if you master the statistical techniques of this course and make an effort to demonstrate them at your workplace.

Eligibility

This course is designed for students who have been admitted to study in the M.P.A. Program. As a requirement for enrollment in POLS 7600, students are expected to have a facility for college algebra (e.g., equations, functions, and graphs). Students who lack this facility should defer their participation in POLS 7600, and, in the meantime, take an undergraduate course in college algebra.

Learning Objectives

- Understand the needs and opportunities for using

quantitative analyses in public management.

- Be able to understand and interpret tables and graphs that summarize raw data, and to prepare tables and graphs summarizing raw data.
- Know methods and formulas for calculating probabilities.
- Be able to test hypotheses and use methods of statistical inference.
- Calculate measures of association between two variables.
- Understand how the foregoing skills can be used to enhance the quality of decision-making in the public sector.

Concerning NGCSU's Information Literacy Learning Outcomes (based on NGCSU's Quality Enhancement Plan): These are the five outcomes.

1. The information-literate student determines the nature and extent of the information needed. *Know*
2. The information-literate student accesses needed information effectively and efficiently. *Access*
3. The information-literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system. *Evaluate*
4. The information-literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose. *Use*
5. The information-literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally. *Ethical/legal¹*

The homework assignments and the application paper are designed to contribute to the accomplishment of all of these five outcomes. In this course, the "information" under examination is predominantly quantitative in nature.

Course Requirements

1. READING AND HOMEWORK

The following required items are available at the NGCSU Campus Connection:

? The textbook for this course is:

¹ Learning Outcomes adapted from the Association of College and Research Libraries (ACRL) standards.

Meier, Kenneth J.; Brudney, Jeffrey L.; and Bohte, John.
Applied Statistics for Public and Nonprofit Administration. 7th ed. Belmont, Calif.: Thomson Wadsworth, 2009.

? Purchase a **Casio fx-260 calculator**. Use it for your homework, during class, and during examinations. **Other calculators are unauthorized and unacceptable, and you will use them entirely at your own risk; you may not disturb the class or me on account of your use of an unauthorized calculator.**

You should read and study the book as assigned on the accompanying schedule of assignments.

For each chapter, a number of problems have been assigned for a written homework assignment. In doing calculations, avoid excessive rounding within the problem, because rounding errors compound. Try to carry at least three significant digits at every step.

At the *beginning* of the class session, I will accept submissions of homework assignments from members of the class who would like to submit them. If you choose to submit your assignment, make a photocopy for your files; otherwise, you won't have your assignment to refer to during the class. I will peruse homework and assess a score (usually 0, $\frac{1}{2}$, 1, or $1\frac{1}{2}$). Show all necessary steps in obtaining a solution to a problem; no credit will be given for answers that appear out of thin air. I will return homework assignments with comments and score. Late homework, however, will not receive a score. The accumulated scores will be used to reduce the weight of your examinations, and you'll receive an "A+" for these scores. The reduction will be distributed proportionately between the midterm and final examinations.

A few words about plagiarism: *Don't do it*. I encourage students to study together and to discuss homework solutions together. But you may *not* copy from each other in writing up your assignments. Your written solutions and statements must be your own work, not a copy of someone else's. Plagiarism can cause you to fail this course. If you don't understand this rule, don't experiment: Give me a call and we'll talk about it in detail.

2. EXAMINATIONS

There will be two examinations during the semester. The midterm examination will be administered on Wednesday, February 18, and Monday, February 23. This examination will account for 30% of your grade. The final examination will be

administered on Monday, April 20, and Wednesday, April 22. This examination will account for 45% of your grade. Your calculator can calculate mean, standard deviation, and other statistics; you can use this feature to check your work, but you will still have to calculate statistics yourself and show all work.

3. APPLICATION PAPER

An application paper that identifies a problem in public administration and offers a useful, complete, and logical solution based on statistical methods presented in this course will be due on or before Wednesday, April 8. Be sure to select one or more *substantial statistical methods* from the textbook and lectures that you will use for your analysis. Show all work, including formulas and computation tables. Note that your instructor will look with the *most* favor on papers whose statistical computations are done in the student's own hand, in the manner of the homework assignments; if the computer (e.g., SPSS) has done the computations and created the printout, the instructor will look less favorably or even unfavorably on the paper. Materials taken from other sources must be cited.

The paper will count as 25% of your course grade. Do not place your paper into a folder or report cover; just staple. Please submit two copies of your paper.

4. ATTENDANCE

Attendance is compulsory. You are considered responsible for being attentive to lectures and class discussions, for taking notes, and for being aware of the content of all class announcements. Please take note of the university's policy on "Class Attendance" (2008-2010 *Undergraduate Bulletin*, pp. 79-80) which is incorporated herein by reference. A student who accumulates more than four unexcused absences on this two-session-per-week schedule can expect to receive a "W" or "WF," or to sustain a reduction in the course grade.

Do not bring to class items that will emit audible signals, such as cell phones and watches that announce the top of the hour.

5. OTHER REQUIREMENTS

a. Incorporation of other controlling authority. All of the rules, regulations, and standards published in the undergraduate and graduate bulletins of North Georgia College & State University and the "Regulations of the M.P.A. Program" are incorporated by reference in this document.

b. Cheating and plagiarism. NGCSU's integrity code--"On my honor, I will not lie, cheat, steal, plagiarize, evade the truth, or tolerate those who do"--reflects the university's commitment to academic integrity. The "Academic Integrity Policy" (2008-2010 *Undergraduate Bulletin*, p. 90) is incorporated herein by reference. Please note that in this course, as in all others at NGCSU, plagiarism and other forms of cheating are expressly prohibited. Any student who commits plagiarism or cheating may receive a reduced grade, which may involve a failing grade, and his or her matriculation in the M.P.A. Program may be terminated by the M.P.A. Advisory Committee. A report of the incident will be provided to the university's Academic Integrity Council. The council and the vice president for academic affairs may take additional action, which may include a formal reprimand, probation, suspension, or expulsion from the university.

c. Disabilities and accommodations. North Georgia College & State University is committed to equal access to its programs, services, and activities for people with disabilities. If you believe that you have a disability requiring an accommodation, reasonable prior notice needs to be given to the instructor and the Office of Student Disability Resources. In this case, contact Elizabeth McIntosh, coordinator of student disability resources, at Barnes Hall, Room 122 (706-867-2782).

d. On-line students' evaluation of course. Course evaluations at NGCSU are now conducted on-line through BANNER. Evaluation of the class is considered a component of the course and students will not be permitted to access their course grade until the evaluation has been completed. The evaluations will be accessible beginning one week prior to the final-exam week.

e. Course grades. Course grades are available on BANNER Web 2000 within about two days of the end of final examinations. Except in emergency situations, please do not request grades by telephone, E-mail, or similar method.

Schedule of Assignments

(Note: We will not cover "t" tests in this course. Where problems refer, or seem to refer by implication, to "t" tests, it is never necessary for you to apply "t" tests in completing your homework assignments.)

<u>Day</u>	<u>Date</u>	<u>Topic</u>	<u>Reading</u>
W	Jan. 7	Introduction	Ch. 1

M	Jan. 12	Frequency Distributions Measures of Central Tendency Prob. 4.1 (do a histogram, not a frequency polygon), 4.3, 5.1, 5.2, 5.4, 5.5, 5.7 (optional), 5.10	Ch. 4 Ch. 5(pp. 77-84)
W	Jan. 14	Measures of Dispersion Prob. 6.1, 6.2, 6.4, 6.8	Ch. 6(pp. 96-100)
M	Jan. 19	No Class - M. L. King's Birthday	
W	Jan. 21	Measures of Dispersion Prob. 6.3 (problem should say, "Skewness = +2.46"), 6.5, 6.7	Ch. 6(pp. 100-105)
M	Jan. 26	Probability Prob. 7.1, 7.3, 7.4, 7.6, 7.8	Ch. 7
W	Jan. 28	Probability Normal Distribution Prob. 7.2, 7.7, 7.9, 7.10, 8.1, 8.9	Ch. 7 Ch. 8
M	Feb. 2	Binomial Probability Distribution Prob. 9.1, 9.2, 9.3, 9.5	Ch. 9
W	Feb. 4	Binomial Probability Distribution Special Probability Distributions Prob. 9.4, 9.7	Ch. 9 Ch. 10
M	Feb. 9	Special Probability Distributions Prob. 10.2, 10.10	Ch. 10
W	Feb. 11	Measurement Prob. 2.1, 2.2, 2.3, 2.4, 2.5.	Ch. 2
M	Feb. 16	Research Design Prob. 3.1.	Ch. 3
W	Feb. 18	MIDTERM EXAMINATION - Part 1	
M	Feb. 23	MIDTERM EXAMINATION - Part 2 (5:30-7:15 p.m.)	
W	Feb. 25	Inference (Note: You will not need to learn about or apply the t distribution in this or the subsequent chapters.) Prob. 11.1, 11.2, 11.4, 11.7	Ch. 11

- M Mar. 2 ADVISEMENT FOR SUMMER SESSION AND FALL SEMESTER BEGINS
 Inference Ch. 11
 Hypothesis Testing Ch. 12
 Prob. 11.9, 12.1, 12.2 (Do not use the t distribution; assume that the normal distribution applies.)
- W Mar. 4 Hypothesis Testing Ch. 12
 Prob. 12.3, 12.6 (Do not use the t distribution; assume that the normal distribution applies.)
- F!** Mar. 6 Georgia Public Administration Academic Conference at Georgia College & State University, Milledgeville
- M Mar. 9 Estimating Population Proportions Ch. 13
 Prob. 13.1, 13.2, 13.5, 13.6, 13.7, 13.9, 13.10 (Assume that the normal distribution applies.)
- W Mar. 11 Testing the Difference Between Two Groups Ch. 14
 Prob. 14.1, 14.4, 14.5 (Assume that the normal distribution applies.)
- M Mar. 16 Spring Break
 W Mar. 18
- M Mar. 23 Contingency Tables Ch. 15
 Prob. 15.1, 15.3, 15.4, 15.10
- W Mar. 25 Chi-Square Ch. 16 (pp. 260-266)
 Compute χ^2 for these problems: Prob. 16.1, 16.3
- M Mar. 30 REGISTRATION FOR THE SUMMER SESSION AND FALL SEMESTER BEGINS
 Measures of Association Ch. 16 (pp. 266-274, 276-278, 279-284)
 Prob. 16.2, 16.7; also, Prob. 16.10 (calculate lambda instead of gamma for Prob. 16.10)
 Physical Controls Ch. 17
 Write *brief* answers for any *four* of the following: 17.1, 17.2, 17.4, 17.5, 17.6, 17.8, and 17.9. (NOTE: Even brief answers should be meaningful.)
- W Apr. 1 Linear Regression Ch. 18
 Prob. 18.1, 18.3, 18.4, 18.7, 18.10 (Write *brief* answers for 18.3, 18.4, and 18.10.)

M	Apr. 6	Linear Regression Prob. 18.2, 18.6, 18.8	Ch. 18
W	Apr. 8	APPLICATION PAPER DUE Linear Regression Prob. 19.1, 19.3, 19.4, 19.5, 19.6 (optional). Time Series Analysis Prob. 20.1, 20.3 (graph, don't compute), 20.5, 20.7, 20.9. (Do not write long essays for these problems.)	Ch. 19 Ch. 20
M	Apr. 13	Multiple Regression Prob. 21.1, 21.2, 21.3, 21.8. (Do not write long essays for these problems.)	Ch. 21
W	Apr. 15	Multiple Linear Regression Prob. 21.5, 21.6, 21.7 (Do not write long essays for these problems)	Ch. 21
M	Apr. 20	FINAL EXAMINATION - Part 1	
W	Apr. 22	FINAL EXAMINATION - Part 2 (5:30-7:15 p.m.)	

**QUESTIONS THAT MAY APPEAR ON THE M.P.A. COMPREHENSIVE
EXAMINATION**

1. What are measures of central tendency? measures of dispersion?
2. What is a Bernoulli process?
3. What is a Z score?
4. Why are social-science variables so difficult to measure? Explain validity and reliability.
5. What are the "levels of measurement"?
6. Compare and contrast the experimental design and the quasi-experimental design. Why are social scientists more likely than natural scientists to use the quasi-experimental design?
7. What is the purpose of "inferential statistics"?
8. How do the standard deviation of the population and the standard error of the mean compare in terms of size? Why?
9. What is a Type 1 error? How much risk of a Type 1 error is a social scientist willing to endure?

10. In the methodology for chi-square, what does "expected value" mean? If the expected values and observed values are very close to each other, what conclusion is supported?
11. In measures of association like gamma and r, what does a measure of +1 tell us? a measure of 0? a measure of -1?
12. What is a concordant pair of observations? a discordant pair?
13. Explain "proportional reduction in error." Name two statistical measures that report the PRE.
14. Explain these terms: control, physical control, statistical control.
15. Why is simple linear regression also known as "least-squares" regression?
16. If gamma or r is equal to +1, does this prove that X causes Y? Why or why not?
17. A social scientist wants to forecast values of Y based on a time series. He does a regression and extrapolates through the forecast horizon. Is this methodology sound? Explain.
18. Identify and define the four components of a time series.
19. In a multiple linear regression, there is a partial slope, $b_{14.235}$. What does that represent, specifically?

Vocabulary

Operational
definition
Indicator
Theory

Hypothesis
Working hypothesis
Spurious relationship
Homoscedasticity