

Indiana University - Purdue University at Indianapolis
School of Public and Environmental Affairs

V506 - STATISTICAL ANALYSIS FOR EFFECTIVE DECISION MAKING
Spring 2007 (Course# 21713)

Meeting Times: Thursdays 6:00-8:40 (BS 3014)

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Office Hours: Th 3:00-5:00
or by appointment

Course Description

This course provides a foundation in statistical analysis for students studying public and nonprofit management, policy analysis, and related areas. The aim is to give students the tools to conduct analyses of data that they will deal with in the course of their professional work and the knowledge to effectively and responsibly interpret and use statistical analyses conducted by others.

The course covers the basics of statistics from the descriptions of single variables to probability distributions, various forms of hypothesis testing, through multiple regression, one of the most important statistical tools for many types of public and nonprofit-sector applications. Examples will be provided of the application of the statistical methods to problems encountered in the public and nonprofit arenas. Since the course is geared at the graduate level and some familiarity with undergraduate statistics is assumed, the course will travel rather quickly through the more elementary material.

The course will emphasize the use of statistical analysis software, *SPSS for Windows* (the *Statistical Package for the Social Sciences*), for conducting statistical analyses. Students will use SPSS regularly in class and in homework assignments to apply the statistical methods learned in the course.

Course Objectives

At the conclusion of the course, students will be able to do the following:

- Calculate and interpret frequency distributions, measures of central tendency, and measures of variability.
- Understand the nature and application of basic probability distributions.
- Develop sampling strategies, understand sampling distributions, and calculate confidence intervals for sample statistics.
- Conduct hypothesis tests for one- and two-sample tests.
- Conduct hypothesis tests using chi-squared tests and simple analysis of variance.
- Do simple and multiple regression analyses, interpret the relevant statistics, and conduct the basic tests of hypotheses.
- Develop basic multiple regression models with an understanding of the problems encountered and methods for creating more elaborate multiple regression models.
- Use SPSS for Windows for statistical analysis.

MPA Core Competencies

The SPEA IUPUI MPA program has developed a set of core competencies to be addressed in the MPA core curriculum. This section describes the competencies to be addressed in this course.

The major competency to be addressed in this course is in the broad area of Strategic Analysis and Action:

- To have a basic understanding of statistics and data analysis as well as research design
 - An in-depth understanding of statistics and data analysis.

Additional competencies are also addressed in the course:

Governance

- To be able to take on a leadership role and work effectively with constituencies in the public, private, and nonprofit sectors and within the legal and managerial frameworks discussed above.
 - Use of inferential statistics to structure and apply decision rules related to effective management of public, private, and nonprofit organizations.
- To be able to analyze situations which involve interaction between the public, private, and nonprofit sectors in solving social problems and to work collaboratively with those individuals and institutions in coming up with strategies for financing and managing these social problems.
 - Use of descriptive and inferential statistics to analyze data that shows the interaction between public and private organizations. Use of inferential statistics to examine the impact of organizational strategies on outcomes related to social problems.

Strategic Analysis and Action

- To have an understanding of the key forces that drive change and the flexibility and adaptability that are essential attributes for implementing change.
 - Understand how to critically assess the research literature on these issues, particularly the ability to assess the appropriateness of statistical analyses and to interpret the results of statistical analyses.
- To understand the role of technology in public policy and management.
 - Understand and apply computer applications for statistical analyses.
- To identify the factors that motivate the economic and political behavior of various agents in society (and across the sectors) and use this information in planning, strategizing, and decision-making.
 - Understand the use of statistical data in decision making around these issues.
- To use models to structure empirical analysis. To be able to apply and use these skills and tools in policy formulation, evaluation, and decision-making. To be able to present and defend positions through oral and written reports using these techniques.
 - Use bivariate and multivariate statistical procedures for evaluation and decision making.
- To be able to use information technology in analyzing public policy and managing organizations.
 - Computer applications for statistical analysis.

Professionalization

- To develop self-awareness about one's responsibility and service to the public, to have an understanding of the role values play in decision making, and a commitment to ethical practices and professional excellence.
 - Understanding the role of values in the statistical analysis of data, particularly as a basis for decision making.
- To take responsibility for one's own work and decisions. To complete one's work in a professional and ethical manner.
 - Being able to lay out the requirements and conditions for managerial decision making that is based on real-life data; being able to make the case for why certain decisions were made.

Texts

Statistics for Management and Economics Abbreviated (7th Edition), by Gerald Keller, Thomson South-Western, 2007.

I have asked that the text be bundled with a guide for using SPSS, called "Doing Data Analysis". You will find this book to be helpful.

Grading Policy

Grades will be determined as follows:

	<u>Percentage of Grade</u>
Assignments	30%
Final Assignment	10%
Exam 1	20%
Exam 2	20%
Final Exam	20%

The final grading scale will be as follows:

97%	A+	77%	C+	under 60%	F
93%	A	73%	C		
90%	A-	70%	C-		
87%	B+	67%	D+		
83%	B	63%	D		
80%	B-	60%	D-		

There is a strict make-up policy. It is University policy that an instructor is not under any obligation to give a make-up exam unless the student has a valid excuse. Valid excuses are those recognized by the University and include illness, religious observation, participation in University activities at the request of the University, or compelling circumstances beyond the student's control. Students are responsible for notifying the instructor to schedule a make-up before the next class meeting following the exam.

Assignments

Assignments will be made weekly (excluding those weeks when exams are scheduled). They will focus on material covered in class and may involve computer application. The assignments will each be due the following week. Points will be deducted for late assignments, and assignments are no longer accepted after a key has been distributed and we have discussed the assignment in class. There will be a final assignment due in the last two weeks of the semester. Details about the final assignment will be provided to students within the first few weeks of the semester.

Attendance and Class Participation

Students are expected to attend class regularly. Students will share in the responsibility of the accomplishment of the course objectives. It is important that if the pace of the course is too fast or if my presentation of the material is unclear that I receive feedback to that effect. Otherwise, I assume that I am moving at a comfortable pace for the class. Students should also let me know if I present information that they believe to be in error--you may very well be right. I am always willing to entertain reasonable suggestions, objections, and questions in connection with the course material.

Course Outline

For each date, the readings listed are expected to be completed prior to the class meeting on that date. Readings are labeled as either K (for the Keller text) or CN (for the Carver and Nash book).

January 11	Topic: Graphical Descriptive Techniques Readings: Chapters 1-3 (K)
January 18	Topic: Numerical Descriptive Measures, Sampling, SPSS Readings: Chapters 4-5 (K), Sessions 4, 5 (CN)
January 25	Topic: Probability and Discrete Probability Distributions Readings: Chapters 6 (sections 6.1, 6.2, 6.3), 7 (sections 7.1, 7.2) (K) Sessions 6, 7 (CN)
February 1	Topic: Discrete and Continuous Probability Distributions Readings: Chapters 7 (section 7.4), 8 (K) Sessions 7, 8 (CN)

EXAM 1 – February 8

February 15	Topic: Sampling Distributions Readings: Chapter 9 (K), Session 9 (CN)
February 22	Topic: Introduction to Estimation and Hypothesis Testing Readings: Chapters 10-11 (K), Session 10 (CN)
March 1	Topic: Inference about the Description of a Single Population Readings: Chapter 12 (K), Session 11 (CN)
March 8	Topic: Inference About the Comparison of Two Populations Readings: Chapters 13-14 (K), Session 12 (CN)
March 22	Topic: Analysis of Variance Readings: Chapter 15 (K), Session 13 (CN)

EXAM 2 – March 29

April 5	Topic: Chi-Squared Tests Readings: Chapter 16 (K), Session 20 (CN)
April 12	Topic: Simple Linear Regression and Correlation Readings: Chapter 17 (K), Sessions 15, 16 (CN)
April 19	Topic: Multiple Regression Readings: Chapter 18 (K), Sessions 16, 17 (CN)
April 26	Topic: Model Building, Review Readings: T.B.A.

FINAL EXAM – May 3

SPEA 2007 Policies

Academic Misconduct

Students are responsible for upholding and maintaining academic and professional honesty and integrity (*IUPUI Code of Student Rights, Responsibilities, and Conduct*, available at <http://www.iupui.edu/code/>, Part II Student Responsibilities, G). All faculty have the responsibility of fostering the “intellectual honesty as well as the intellectual development of students” and part of this responsibility means that faculty must investigate cases of potential academic misconduct promptly and thoroughly. Faculty members also have the responsibility of taking appropriate action when academic misconduct occurs. The penalties for academic misconduct include but are not limited to lowering a grade on an assignment, lowering a course grade, or failing a student for a course. SPEA faculty take their responsibilities seriously and do not tolerate cheating, plagiarism, or any other form of academic misconduct. If you have not done so, you should read about your responsibilities in the *IUPUI Code of Student Rights, Responsibilities, and Conduct* to ensure that you understand what these terms mean and what penalties can be issued for academic misconduct. Significant violations of the *Code* can result in expulsion from the University. If you have any questions about what constitutes academic misconduct for a course you are taking, be sure to ask the instructor for an explanation.

The *IUPUI Code of Student Rights, Responsibilities, and Conduct* defines four areas of academic misconduct: cheating, fabrication, plagiarism, and interference. The prohibited activities and actions include the following:

1. **Cheating.** A student must not use or attempt to use unauthorized assistance, materials, information, or study aids in any academic exercise, including, but not limited to, the following:
 - a. A student must not use external assistance on any "in-class" or "take-home" examination, unless the instructor specifically has authorized external assistance. This prohibition includes, but is not limited to, the use of tutors, books, notes, and calculators.
 - b. A student must not use another person as a substitute in the taking of an examination or quiz.
 - c. A student must not steal examinations or other course materials.
 - d. A student must not allow others to conduct research or to prepare work for him or her without advance authorization from the instructor to whom the work is being submitted. Under this prohibition, a student must not make any unauthorized use of materials obtained from commercial term paper companies or from files of papers prepared by other persons.
 - e. A student must not collaborate with other persons on a particular project and submit a copy of a written report which is represented explicitly or implicitly as the student's individual work.
 - f. A student must not use any unauthorized assistance in a laboratory, at a computer terminal, or on field work.
 - g. A student must not submit substantial portions of the same academic work for credit or honors more than once without permission of the instructor to whom the work is being submitted.
 - h. A student must not alter a grade or score in any way.
2. **Fabrication.** A student must not falsify or invent any information or data in an academic exercise including, but not limited to, records or reports, laboratory results, and citations to the sources of information.
3. **Plagiarism.** A student must not adopt or reproduce ideas, words, or statements of another person without appropriate acknowledgment. A student must give credit to the originality of others and acknowledge an indebtedness whenever he or she does any of the following:
 - a. Quotes another person's actual words, either oral or written;
 - b. Paraphrases another person's words, either oral or written;
 - c. Uses another person's idea, opinion, or theory; or
 - d. Borrows facts, statistics, or other illustrative material, unless the information is common knowledge.

4. **Interference.**

- a. A student must not steal, change, destroy, or impede another student's work. Impeding another student's work includes, but is not limited to, the theft, defacement, or mutilation of resources so as to deprive others of the information they contain.
- b. A student must not give or offer a bribe, promise favors, or make threats with the intention of affecting a grade or the evaluation of academic performance.

Classroom Etiquette and Disorderly Conduct

SPEA, which is a professional school, expects students to conduct themselves in a courteous and civil manner in interactions with professors and fellow students. Examples of discourteous behavior during class include reading the newspaper, working crossword puzzles, listening to headphones, using computers to surf the web or for other non-class activities, talking or laughing with others, arriving late, and so forth. These behaviors are distracting to the instructor and to classmates, and SPEA faculty will address these problems as they arise either in class or on an individual basis.

Disorderly conduct that interferes with teaching, research, administration, or other university or university-authorized activity will not be tolerated and will be reported immediately to the Office of the Dean of Students for disposition, which may result in disciplinary action, including possible suspension and/or expulsion from the university. Students should read the *IUPUI Code of Student Rights, Responsibilities, and Conduct*, which can be accessed at <http://life.iupui.edu/help/code.asp> in order to understand your responsibilities as a student.

Communication between Faculty and Students

In order to verify the identity of all parties involved, effective September 1, 2004, all email communication from current SPEA students to SPEA staff must originate from an Indiana University email account. For email communication with SPEA faculty, current SPEA students should refer to course syllabi for instructors' preferences (Oncourse, Webmail, etc.). This policy applies to current students only. Instructions for forwarding your IUPUI email to another account can be found at <http://uits.iu.edu/scripts/ose.cgi?berh.def.help>

Course Withdrawals

Students who stop attending class without properly withdrawing from the class may receive a grade of F. It is important to withdraw from a course within specified timeframes (see chart below). Note that withdrawals after Week 12 of a regular session or Week 4 of a summer session are rarely granted. **Poor performance in a course is not grounds for a late withdrawal.**

Withdrawal forms will not be processed in the Office of the Registrar after the last day of classes. Any requests for a late withdrawal after the last day of classes must go through the grade appeal process, but each student should remember that in accordance with campus policy, SPEA does not permit a student to withdraw from a course if he/she has completed the course requirements. Grade replacement should be used in this case. See the Office of the Registrar's website at <http://registrar.iupui.edu/withdraw.html> for more information. To withdraw, obtain a withdrawal slip (DROP/ADD Form) from the SPEA Student Services window. Instructions for completing it are given on the form.

Withdrawal Deadlines	
Course deleted from record, no grade assigned, 100% refund (Advisor signature IS NOT required)	Week 1 (last day)

Withdrawal with automatic grade of W (Advisor signature IS required)	Week 2– Week 7 (regular session) Week 2 – Week 3 (summer session)
Withdrawal with grade of W or F (Advisor and instructor signatures ARE required)	Week 8 – Week 12 (regular session) Week 3 – Week 4 (summer session)

Incompletes

A grade of incomplete (I) indicates that a ‘substantial portion’ of the work in a course has been satisfactorily but not entirely completed by the student as of the end of the semester. The incomplete can be given to a student facing a hardship such that it would be unjust to hold the student to the established time limits for completing the work. To be eligible for the incomplete in a SPEA course, the student’s work must be of passing quality, and the student must have completed 75% of the course requirements. **Poor performance in a course is not grounds for an incomplete.** SPEA follows the campus guidelines, which may be accessed at the Office of the Registrar’s website at <http://registrar.iupui.edu/incomp.html>, in awarding incompletes. Incompletes must be removed within a time period not to exceed one year after the semester in which the student was enrolled in the course. The incomplete will revert to an ‘F’ if the work is not completed within the allotted timeframe established by the instructor.

Grade Changes

Under certain circumstances, students can seek grade changes for previously taken courses if they believe that a grade has been calculated or assigned incorrectly. A student who is seeking a grade change must first contact the instructor and ask for the grade change. In the event the instructor does not change the grade, the student can file a Change of Grade Petition with the Registrar’s Office. **In SPEA, a student has 90 days after the conclusion of a course to appeal a grade.** In cases of extenuating circumstances, SPEA may consider petitions filed after this date. SPEA will review the request and make a final decision on a case-by-case basis. The Change of Grade petition form is located at the Office of the Registrar’s website at <http://registrar.iupui.edu/grdfm.html>.

Students Called to Active Duty

SPEA encourages any student who is in the Indiana Military Reserves and is called to active duty to finish his/her coursework if at all possible. Students who cannot complete their courses have the option of withdrawing with 100% fee refund, but this request must be made within one week of being called to active duty. Students who are called to active duty may qualify for an incomplete (provided that all the above criteria have been met). For further information, please see the Office of the Registrar’s website at <http://registrar.iupui.edu/activeduty.html>.

Final Exam Schedule

If a final exam is given, it must be held on the day and time set in the final exam schedule. If an instructor has changed the final exam date, the student should first consult with the instructor. Students who have more than three final exams in one day or insufficient time to get from one exam to another should consult with their instructors to resolve these conflicts. Exams may not be given in the week before the final exam week. If a student is not able to resolve a final exam problem with the instructor, the student may report the problem to the Director of Undergraduate or Graduate programs. See the Office of the Registrar’s website at <http://registrar.iupui.edu/accal.html> for the final exam week schedule.