

COURSE SYLLABUS
Statistics for Public Administrators
PADM 5312-001
SPRING 2013
Tuesday 7:00 – 9:30 pm

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Office Hours: Monday & Tuesday 1:00 p.m. – 3:00 p.m. and 6:00 – 7:00 p.m., Wednesday
11:00 am – Noon, by appointment as necessary.

COURSE DESCRIPTION

“Statistics: The only science that enables different experts using the same figures to draw
different conclusions.”

Evan Esar
Esar's Comic Dictionary
1948

COURSE DESCRIPTION:

This course provides an overview of statistical methods and hands-on application to managerial
decision-making in public administration. Understanding statistical analysis and being able to
work with data are important competencies of professionalism in public administration. Course
topics include data collection and measurement in public administration, descriptive statistics,
hypothesis testing, processes for selecting statistical tests and assessment of statistical
assumptions, measures of association and other bivariate statistics, index variable construction,
regression analysis, and an overview of selected other statistical and quantitative methods
applied to problems of public administration. Students get hands-on experience through the use
of EXCEL. Recognizing the social, political, and economic context of data collection, analysis,
and reporting practices in the public sector, this course also discusses the ethics of data analysis
and information technology policy and management.

Note: This course is part of a two-semester sequence that also includes a course on research
methods. Students are expected to have a working familiarity with Microsoft Excel and
PowerPoint.

STUDENT LEARNING OUTCOMES:

At the conclusion of this course the successful student in this course will:
1. Demonstrate a substantial understanding of the each of the statistical concepts covered in
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the course through successful completion of homework assignments and exams.

2. Utilize the SPSS statistical analysis software to assisting in statistical analysis.

3. Properly apply statistical techniques and analysis to current, relevant data sets to simulate a decision making opportunity the student may confront in professional life.

**REQUIRED TEXTS:**


Some late model version of IBM® SPSS® Statistics Base GradPack at the minimum. The University does have several computer labs with the latest full version of SPSS. The base grad pack will do what we need however and can be rented for 6 months or a year at a reasonable price. See Elite graduate link [http://sell.tamu.edu/Students/Student_Software_List.php](http://sell.tamu.edu/Students/Student_Software_List.php).

**LEARNING ASSESSMENT/COURSE REQUIREMENTS:**

In general, your grade for each assignment will follow these guidelines:

**Grade Standard:**

**A (90-100%):** Meets all requirements of the assignment in a sound, clear, thorough, and professionally presented manner. Analytic tools are applied appropriately, performed correctly, and interpretations are accurate.

**B (80-89%):** Meets almost all of the requirements in a sound, clear, thorough, and professionally presented manner; or meets all of the requirements but lacks soundness, clarity, thoroughness, or professional presentation. Analytic tools are mostly applied appropriately, performed correctly, and interpretations are mostly accurate.

**C (70-79%):** Meets some of the requirements in a sound, clear, thorough, and professionally presented manner; or meets all of the requirements but lacks a combination of soundness, clarity, thoroughness, or professional presentation. Analytic tools are not applied appropriately, or not performed correctly, or interpretations are not accurate.

**D or F (<70%):** Less than the standard for “C”. Both of these grades are failing. All course requirements must be completed to receive a grade from this course.

This course relies heavily on student attendance and interaction. Attendance and punctuality are expected in all classes. *Your absence from this class will be detrimental to your grade.* Class work cannot be learned in absentia, and on-time attendance is expected. Each class will be devoted to discussion and analysis of the specific topics indicated for that class on the syllabus. It is important that each student come to each class well prepared to participate in discussions.
Students are required to complete all assignments. The distribution of points is as stated below. All final grades are curved, and are whole letter (no plusses or minuses).

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Points</th>
<th>Due</th>
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<tbody>
<tr>
<td>Homework (each 10 points)</td>
<td>40</td>
<td>Feb 12, Feb 26, April 9, May 7</td>
</tr>
<tr>
<td>Presentation</td>
<td>10</td>
<td>May 7</td>
</tr>
<tr>
<td>Exam 1</td>
<td>10</td>
<td>March 5</td>
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<tr>
<td>Exam 2</td>
<td>10</td>
<td>April 16</td>
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<tr>
<td>Final Exam</td>
<td>20</td>
<td>May 14</td>
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<tr>
<td>Attendance</td>
<td>10</td>
<td>Every class day</td>
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<td>Total</td>
<td>100</td>
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**COURSE OUTLINE**

Note: The following readings include more information than we will emphasize or address in class. Before each week, I will let you know what we will cover so that you can focus on the appropriate material.

**January 29**  Why Data Analysis?
Readings: Berman, Chapter 2
* Introduction to the course and course requirements
* Role of data in management
* Competencies and proficiency
* Ethics in data analysis and research
* Begin assignment 1

**February 5**  Research Design
Readings: Berman, Chapter 2
* Basic vs. Applied Research
* Quantitative vs. Qualitative Research
* Research Design
* Introducing variables and their relationships

**February 12**  Data Sources, Sampling and Introduction to SPSS for Windows
**Assignment 1 Due**
Readings: Berman, Chapter 5
Berman Workbook Chapter 20 (SPSS User’s Guide)
Cronk, Chapters 1 & 2
Note: Be sure to bring your workbook, Exercising Essential Statistics!!
* Sources of data
* Surveys
* Sampling methods
* Getting familiar with SPSS
* Data input using SPSS

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* Begin assignment 2

February 19  
Conceptualization and Measurement  
Readings: Berman, Chapter 3  
Cronk Chapter 8.  
* Measurement levels and scales  
* Conceptualization and operationalization  
* Index variables  
* Measurement validity

February 26  
Descriptive Statistics  
Assignment 2 Due  
Readings: Berman, Chapters 6 and 7  
Cronk, Chapters 3 & 4  
* Averages and central tendency  
* Frequency distributions  
* Standard deviations  
* Boxplots and simple charts  
* Charts and workbook examples

March 5  
Exam 1 – To cover information in Berman Chapters 1-7; Cronk 1-4 & 8

March 12  
Spring Break

March 19  
Bivariate Relationships – Association and Prediction  
Reading: Berman Chapters 8, 9 & 11 pp 188 – 192  
Cronk, Chapter 5 Sections -- 5.1 and 5.2  
* Contingency table  
* Pivot table  
* Statistical relationships  
* Pearson correlation coefficient  
* Spearman correlation coefficient  
* Begin assignment 3

March 26  
Bivariate Relationships -- Nonparametric Inferential Statistics  
Readings: Berman, Chapter 10 & 11  
Cronk, Chapter 7  
* Hypothesis testing  
* Chi-square

April 2  
Bivariate Relationships – Parametric Inferential Statistics.  
Readings: Berman, Chapter 12  
Cronk Chapter 6 Sections 6.1 to 6.4  
* T-tests

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* Central limit theorem
* Homogeneity of variances

April 9  Analysis of Variance -- ANOVA
**Assignment 3 Due**
Readings: Berman Chapter 13
          Chapter 6, Sections 6.5 to 6.8
          * Analysis of variance
          * One-way ANOVA
          * Two-way ANOVA
          * Post hoc test

April 16  **Exam 2: Covers Berman, Chapters 8-13; Cronk, Chapters**

April 23  Simple Regression
Reading: Berman Chapter 13
          Cronk Chapter 5, Section 3
          * Begin Assignment 4

April 30  Multiple Regression
Reading: Berman Chapter 14
          Cronk Chapter 5, Section 4

May 7     Student Presentations
**Assignment 4 Due**

May 14    Final Exam

**HOMEWORK**

**Assignment 1 -- Posting: My career and use of quantitative data. Due February 12.**

“Please post a statement about your (i) career interests, (ii) recent or past positions relating to your career (if any), (iii) the next job you would like to have (based on your qualifications and MPA degree), and (iv) possible future jobs thereafter in your career. Then, identify (v) how data/quantitative methods played a part in your current or past job, (vi) how data could have played a larger part if you had had more quantitative skills, and (vii) how data/quantitative methods are relevant to your next job, including how having such skills can aid you in getting that job (e.g., assisting in the job interview).

The posting should be substantive and show significant, relevant elaboration. Grading is curved. Post in the discussion board (under “communication”), called “Week 3: My Career & Quantitative Data.”

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Assignment 2 – Secondary Data Sources Due February 26.

The purpose of this assignment is to help you become familiar with secondary data sources in your area of interest. You will research the Internet, including Web sites of public and private organizations, for datasets that contain variables relevant to your area of interest. If or when these data do not cover your geographic area or subject population, knowledge of these other areas can be relevant to you, for example, for benchmarking (see textbook, p. 80).

Provide a brief report that includes the following information:

1. Your area of interest.

2. A few (at least 5) Web portals that contain links to useful Web sites in your area of interest (consider local, regional, national, and international portals).

3. About twenty (20) datasets that contain useful information. These should span at least five different Web sites. Identify the (i) Web site, (ii) data sources and collection methods, (iii) data collection time frame, (iv) range of variables, and (v) caveats or limitations of these datasets.

4. A discussion of fifteen (15) variables relevant to you. State (i) what information they provide, (ii) how you can use these variables in your current or future line of work (be very specific!), (iii) caveats or limitations of the data, and (iv) how you justify the use of these data despite their limitations and caveats.

Assignment 3 -- Chi-square tests and t-tests. – Due April 9

Problem 1. Chi-square

Do men and women (Gender) differ in their perception that their contributions are recognized when they do well in their job (Recogniz)? Formulate and test the hypothesis that gender is associated with these perceptions. At what level of significance can the null hypothesis be rejected? Provide a complete write-up (see handout for example) and identify results on the SPSS output (test and table). Note that both variables are categorical. Use the Employee Attitudes dataset on the CD accompanying the workbook Exercising Essential Statistics.

Note: Be sure to construct your table with demographic variables in the column.

Problem 2. Index variable and T-test

2a. Create an index variable of workplace practices based on the variables Welchang, Problems, Freedom, and Feedback. Read the variable labels of these variables on the SPSS spreadsheet. Call the new index variable Practice, which we will assume as a measure of modern workplace practices. What is the Cronbach alpha measure of this variable? Is this acceptable? Identify results on the SPSS output. In your write-up, identify the variables.

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2b. Consider the variable *Practice* a continuous variable. Do men and women differ in their perception of workplace practices? Provide a write-up and identify results on the SPSS output.  
*Important note:* You can consider the variable *Practice* as being normally distributed based on visual inspection. Use the Employee Attitudes dataset on the CD accompanying the workbook *Exercising Essential Statistics.*

**Assignment 4 – Simple and Multiple Regression –Due May 7**

Problem 1. Simple regression with outlier

In this exercise, we examine the effect of water pollution on the concentration of fish in a lake. The Time dataset (on CD accompanying the workbook *Exercising Essential Statistics*) contains two variables, FISHCON (the concentration of fish) and CONTAM1 (the concentration of a water pollutant). The observations are drawn from different parts of a large lake in order to test the hypothesis that alleged water pollution is affecting the stock of certain fish.

1a. Examine the distribution of variables FISHCON and CONTAM1. Note that both variables are approximately normally distributed. Calculate the means and standard deviations.

1b. Make a scatterplot of FISHCON and CONTAM1 for the purpose of getting a visual read of the relationship. Is the relationship positive or negative? Is it strong or weak? Are there any possible outliers? Print the output (and hand it in as Figure 1.1) and write-up your answers. Use this SPSS command:

```
GRAPHS → SCATTER → DEFINE (Y:FISHCON X:CONTAM1)
```

1c. Based on your visual read, you wish to test the hypothesis that the two variables are related. Use the following command:

```
ANALYZE → REGRESSION → LINEAR → DEPENDENT:FISHCON INDEPENDENT:CONTAM1
Also: STATISTICS → CASEWISE DIAGNOSTICS
Also: PLOTS Y:ZRESID X:ZPRED.
Also: LINEAR REGRESSION → SAVE → RESIDUALS STANDARDIZED
```

Provide a write-up of (i) the hypothesis, (ii) the relationship between the variables (already stated under 1b), (iii) the correlation and percent variance explained (r and r-squared), (iv) possible outliers (observations with standardized residuals greater than 3.0).

1d. Identify the outlier, and eliminate it from subsequent analysis. Remove this observation by using

```
DATA → SELECT CASES → IF CONDITION IS SATISFIED: zre_x le 3 and zres_x gt -3.,
```

whereby zre_x is the error term that has last been saved (e.g., zre_1). *Circle* the outlier on Figure 1.1. Note: Every time you run a regression and request to save the standardized residuals, SPSS adds a new error term to your dataset, labeled zre_1, zre_2, zre_3, etc.

1e. (i) Plot the standardized residuals (ZRESID) against the predicted values of the dependent
variable FISHCON (ZPRED) and note that the residuals are randomly distributed around 0,0. Include this printout as Figure 1.2. (ii) Continue the above write-up, and provide (a) the relationship between the variables (y=ax+b), (b) the new correlation and percent variance explained (r and r-squared). Include the final SPSS regression model output with your write-up as well. Note: Be sure to ‘unselect’ the condition that removes observations from the dataset in 1d before going on to the next assignment!

Problem 2. Multiple regression with dummy variable

The Time dataset also contains observations from 35 cities regarding the use of citizen focus groups in these jurisdictions (FOCUS). The data are based on a survey, and most variables are index variables taken from different survey questions. The variables are as follows:

FOCUS = A composite measure of the breadth and depth of focus groups in each jurisdiction. Varies from 0 (low) to 20 (high).
MGRINT = A measure of the interest of the city manager in productivity improvement. Varies from 1 (low) to 4 (high).
PUBCOMPL = A measure of public complaints about the quality and effectiveness of a wide range of municipal services. Varies from 1 (low) to 8 (high).
BUDGET = Indicates whether municipal budgets have increased in the past two years. Values are -1 = decrease in budget; 0 = no change in budget; 1 = increase in budget.
SIZE = City size. Varies from 1 = small to 7 = large.
REGION = An indicator variable of the region in which the city is located. Values: 1 = Northeast; 2 = South; 3 = Midwest; 4 = West.

In this project, you wish to understand which variables increase the efficiency and effectiveness of a range in jurisdictions.

2a. State one hypothesis, and identify the control variables.
2b. Provide a brief description of each of the variables (i.e., univariate analysis).
2c. Examine whether MGRINT, PUBCOMPL, BUDGET, and SIZE are statistically associated with the efficiency and effectiveness of a range of programs and services. For this purpose, run a multiple regression in which the dependent variable is the use of focus groups (FOCUS), and the independent variables are MGRINT, PUBCOMPL, BUDGET, and SIZE. In addition, include the effect of region as an independent variable. To do this, you must make REGION a dummy variable. Assume you wish to compare the effect of the different regions against MIDWEST. To make the dummy variables for the NORTHEAST, SOUTH, and WEST, you must either recode the data for each region, or enter the data manually. Through either of these techniques, add the variables NORTHEAST, SOUTH, and WEST to your model.

(i) Include a copy of the printout and add it as Figure 2.1 (ii) Provide a complete write-up of the regression. Identify which variables are significant, and at what level. Identify the R-squared adjusted statistic (Is it a strong or weak association?). Also, discuss the beta coefficients. What
do you conclude? (iii) Plot the standardized residuals against the standardized predicted values, and include this as Figure 2.2 What do you conclude? (iv) To examine the possibility of multicollinearity, examine bivariate correlations among the (interval- and ordinal-level) independent variables. Print out the table of correlations (Analyze → Correlate → Bivariate) and show it as Figure 2.3. What do you conclude? Given the significance of the regression coefficients, is multicollinearity a problem here?

**Student Presentation -- Due May 7**

Using the information you gathered in Assignment 2, propose an appropriate research question in the field of your area. The question must be able to be answered by available secondary data sources. Formulate the research question, why it is important, identify the dependent and independent variables, level of measurement etc. and use an appropriate statistical method we studied this semester to answer the question. Run the statistics and report them in a PowerPoint presentation to be no more than 10 minutes long. Turn in the PowerPoint presentation and attach the statistical analysis output.

**ACADEMIC HONESTY:**

All responses and worked turned in to the instructor are to be your own personal work product. You are expected to understand and uphold the Academic Honor Code published in the Student Handbook. In addition to information listed in these sources, you are advised that:

1. If, on a rare occasion, you take material that is not yours, from any source whatsoever, and copy it into assignments for this class, you must provide a footnote, endnote, or parenthetical reference to the source of the material. I specifically expect you to use the styleguide of the American Psychological Association.

2. Any material which quotes verbatim from other sources must be enclosed in quotation marks and its source attributed as noted in rule #1 above.

3. Material not taken verbatim from a text but paraphrased must also be attributed as in rule #1.

4. Violations of these rules in any assignment may be subject to a minimum penalty of a grade of zero (0) for the assignment and may result in a grade of "F" for the course.

5. Violations of these rules can also result in administrative removal from the MPA program and the University depending on the instance.
STUDENTS WITH DISABILITIES:

The Americans with Disabilities Act (ADA) requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Disability Services Office at (361) 825-5816 or visit the office in 116 Corpus Christi Hall.

ACADEMIC ADVISING OFFICE

If you are majoring, or planning to major, in a field taught in the College of Liberal Arts, and if you have not yet obtained a signed degree plan, you should see your Academic Advisor immediately. Degree plans are important and useful to successful progress toward graduation.

GRADE APPEAL PROCESS

As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules Web site at http://www.tamucc.edu/provost/university_rules/index.html.

For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

OTHER NOTES

1. Syllabus Disclaimer and Changes. The instructor reserves the right to make changes in the syllabus. Such changes will be announced in class.

2. Attendance Policy. No points are deducted for student absences but, the lack of class attendance will affect student learning and, hence, performance.

3. Late Hand-in. Acceptance of late hand-ins or postings is at the discretion of the instructor. Points will be deducted for late hand-ins.

4. Distance Learning. Electronic, on-line learning may be substituted for in-class lectures. Students are responsible for accessing modules and completing assignments according to announced time tables.

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5. Computer and Software Access. The hands-on, computer-based laboratory assignments are an important part of homework and this course. You will need to have access to SPSS, at least the graduate base version. I suggest that you install it on your own computer. If you do not have easy access to a computer there are student computer labs on campus which have the full version of SPSS.

6. Rules and Tips for Success. Statistics is a challenging course for most students, and most students will experience one or more episodes of moderate to severe confusion. Though these are normal occurrences in the practice and study of statistics, the sources of confusion must be identified and addressed. To reduce such episodic discomfort and promote learning efficiency, students are required to adhere to the following rules: (i) Students must come to each class prepared, that is, having fully familiarized themselves with the reading material and any assignments, specifically, identifying passages that are unclear and hence require extra attention during the classroom period. Students who fail to identify unclear passages prior to class typically experience a deceptive sense of ease during the class, only to be followed by intensified confusion at some point in subsequent weeks. Remember: Preparing for class means that you know what you don’t know. (ii) Students should always study with other students before and after each class. You can make a study group, or simply call each other a day or two before and after each class. The nature of such interaction can vary from joint reading, to verifying each other’s understanding of the material, and addressing points of uncertainty. (iii) Students who are unclear about material should generally first consult other students before contacting the instructor. Questions that remain unclear after consultation with other students should be brought to the attention of the instructor, who generally will discuss the matter at the beginning of the next classroom period. The preferred way of contacting the instructor is through e-mail. (iv) As the saying goes, technology fails you when you need it most. Files become unreadable or simply disappear. Software programs fail to open, and computers go on the blink. Successful students plan ahead and allow for unexpected failures and crises to occur. Specifically, you should plan to complete your homework several days before the deadline!

7. Contacting the Instructor. The preferred way of contacting the instructor is through e-mail or during office hours. I check my e-mail almost daily (except when on travel), and will respond. If you send an e-mail, I may ask you for a phone number to contact you for follow-up, if necessary.

8. Student Conduct. Students should conduct themselves in ways that are consistent with promoting an efficient learning environment for themselves and everyone else. Students should be conscientious, helpful, properly motivated to learn, honest, and respectful of others and their opinions at all times. Such conduct is consistent with generally regarded norms of professionalism, including those found in graduate, professional degree programs. Points may be deducted for inappropriate conduct, and students referred to the University for further investigation of the matter.

Students should also familiarize themselves with the university Code of Student Conduct. Academic misconduct includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, and any act designed to give an unfair academic advantage to the student PADM 5312
(such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructors, providing false or misleading information in an effort to receive a postponement or an extension on a test, quiz, or other assignment), or the attempt to commit such an act. Other acts of misconduct are stated in the Code of Student Conduct. Please note that plagiarism is a serious academic offense that may result in a student being expelled from an academic program or institution.