

**PPD 502X**  
**Statistical Foundations for Public Management and Policy**

**Fall 2016**

**University of Southern California**  
**School of Policy, Planning and Development**

**Instructor:** Vi-Nhuan Le  
E-Mail: [stats502usc@gmail.com](mailto:stats502usc@gmail.com)

**T.A.:** TBD

Office: Online  
Class Location: Online  
Class Dates: August 25, 2016 – December 1, 2016  
Class Hours: Presentations each week on Thursdays at 6:00 pm Pacific time. These sessions may be attended live or reviewed later in recorded format.  
Office Hours: By appointment

### **COURSE DESCRIPTION**

This class serves as a graduate level statistical prerequisite for students pursuing the MPP, MPA, or MHA in the School for Policy, Planning, and Development. The goal of the class is to prepare students with the statistical foundations required to intelligently work with numbers and data in managerial situations. Additionally, the course prepares students to take courses in quantitative analysis and policy or program evaluation. Students will review and understand selected statistical techniques for summarizing and analyzing data and for addressing public policy and management questions of interest using applied data analysis.

Credits received in the course cannot be applied to the unit requirement for the MPA, MHA, or MPP.

### **TEACHING METHOD**

This course is taught in a distance format. Class sessions are held online and students need not reside in Los Angeles to take this course. To attend a session live, students can log onto <http://uscprice.adobeconnect.com/ppd502xonline/>. Course assignments will consist of a text book and online lectures.

Weekly online sessions will be conducted using web conferencing software. These sessions will focus on the applications of concepts to issues of public management and policy and review applications of the concepts introduced for that week. The sessions, however, do not directly introduce those concepts. Students are responsible for reviewing these concepts through the text and for coming to class having prepared to review the applications. There will be a traditional textbook that can be bought in either hard copy and web-based formats or only in the web-based format (this second option is less expensive and highly recommended).

There are 12 problem sets during the course session. All problem sets are required and graded. The problem sets will be available online. There are two exams, a midterm and a final. Both will be take home exams and will closely follow the lectures. See the course outline for these due dates.

## COURSE OBJECTIVES

Students in this course will learn

1. To identify the sources of data most frequently used by managers, policy analysts and researchers in policy, planning and management;
2. To recognize the manner in which data are collected and the biases that may arise from different collection techniques;
3. To organize and arrange data in graphical forms that clearly conveys the essence of the data;
4. To apply basic numerical techniques to summarize data, including measures of central tendency, dispersion, and correlation, specifically as they tend to be applied within policy and management;
5. To analyze sample data to make inferences about broader populations, with particular emphasis on policy and management applications;
6. To understand and apply the “recurring themes” of basic statistics in problem solving and critical analysis in the field of policy and public administration;
7. To be able to use spreadsheet programs and/or statistical tools.

## TEXTBOOKS & COURSE RESOURCES

- Sullivan, Michael, *Statistics: Informed Decisions Using Data*, 4<sup>th</sup> Edition Pearson.
- It is highly recommended that you purchase online access to the text. If you would like a hard copy of the text, make sure that the copy of the book allows you access to the Pearson course website (ISBN-13: 9780321891907). **In the vast majority of cases, purchases of the hard copy version of the textbook through third-party sites (such as Amazon or Chegg) do not come with access to the online Pearson course website.** Thus, we recommend that you make all purchases through the Pearson website, otherwise Pearson will be unable to assist you with securing the correct course material.
- Pearson CourseCompass Website. The Pearson site can be accessed at <http://portal.coursecompass.com/portal/>. Course lectures are available at Course Tools/Document Sharing. There will be a word document that lists the URL for each lecture. It will be updated weekly.
- The primary resource for this class is the lectures which will be supported by the text. Weekly online sessions will present applications of that week’s material and will give students an opportunity to ask questions. **It will be assumed that students will have read the text prior to the weekly sessions.**

## TECHNOLOGY REQUIREMENTS

Because of the distance learning format, all students must have access to some basic computer technology. They need a computer with at least a 1 GHz chip, at least 512 MB of RAM, and a current web browser (preferably Internet Explorer, Safari, or Firefox). It is assumed that students have a

broadband internet connection. **ALL STUDENTS MUST CONDUCT THE BROWSER CHECK PRIOR TO THE BEGINNING OF THE CLASS.**

## **COURSE REQUIREMENTS**

### **Course Material**

- Students must keep on the schedule of lecture modules and chapter reading. The course is divided into weekly sessions with 14 lectures.
- There are problem sets reviewing material every week. The problem sets must be completed by 11:59 pm Pacific Standard Time on the posted due date. Students will be locked out of the problem set if it is not completed on time.
- I can grant one-week extensions if needed, but you must contact me via email ([stats502usc@gmail.com](mailto:stats502usc@gmail.com)) by noon of the day of the lecture (Thursday). You do not have to provide me a reason as to why you need an extension (life happens!). However, students are limited to three extensions for the entire course.

### **Student interaction**

This course requires a high degree of student commitment and initiative. The core material is presented in the lectures. Students are responsible for keeping up with the reading. Most importantly, you are responsible for reaching out for help to master material. You can consult the optional materials and ask the professor for help.

To facilitate student interaction and discussion all students are required to participate in class. To fulfill the participation requirement, students are required to engage in at least one of the following:

- Participate during the lectures. Participation requires that students engage in class discussion by asking or answering questions. **It is not sufficient to merely logon to the Adobe site.** Students must **actively participate** in at least 12 lectures to receive full participation credit. Participation credit for these sessions will be determined empirically as explained in class.
- Provide a critique of up to **three research reports/journal articles** that touches upon the material we have learned in class. An example is provided in Lecture 1. Report/article critiques should identify the statistics involved, provide competing explanations to the ones offered by the researchers, and give viable suggestions of designs for future research.
  - Critiques must be emailed to [stats502usc@gmail.com](mailto:stats502usc@gmail.com) by December 1 at 11:59 PM. Late critiques will not be accepted.
- Full credit for participation may be given in a mix-and-match fashion. Students who participate in fewer than 12 sessions can still receive full participation credit without submitting all three critiques. In this case, the number of critiques needed to be submitted for full participation will be determined by how many classes students have attended. One critique is equivalent to participation at four lectures.
- Students may suggest alternative methods for participation, but these other alternatives must be approved by me, and must be fulfilled by December 1 at 11:59 PM.
- Please contact me ([stats502usc@gmail.com](mailto:stats502usc@gmail.com)) if you have any questions about your status for participation credit.

Periodically, I will communicate with the entire class via email. This will be done via your USC NetID, which is also your USC email address. You are accountable for the information content of the messages I send to you.

Please note that I acknowledge and respond to every email I receive from students, most within 24 hours. To reach me, email me directly at stats502usc@gmail.com. Please do not use the “email” function under the Course Tools of the Pearson website, as these emails never reach me. The only time you should be trying to contact me via the Pearson website is when you are asking about a specific homework item. In that case, you will use the “Ask my instructor” button found in your problem set so that I can see the particular numbers assigned to your homework item. An example can be found in Lecture 1.

## GRADING AND COURSE EVALUATION

30% Midterm Exam  
35% Final Exam (Comprehensive)  
29% Problem Sets  
6% Participation

Please note that the exams will closely resemble the lectures. Thus, it is important to review the lectures, even if you cannot attend the lectures live.

## STATEMENT ON ACADEMIC CONDUCT AND SUPPORT SYSTEMS

### Academic Conduct

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *Campus* in Section 11, *Behavior Violating University Standards* <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct/>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu/> or to the *Department of Public Safety* <http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us>. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage [sarc@usc.edu](mailto:sarc@usc.edu) describes reporting options and other resources.

### Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* [http://sait.usc.edu/academicsupport/centerprograms/dsp/home\\_index.html](http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html) provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

## COURSE OUTLINE AND LECTURE SCHEDULE

NOTE: The schedule and due dates may be adjusted during the semester to account for unforeseen events.

Sullivan - Sullivan, *Statistics: Informed Decisions Using Data*, 4<sup>th</sup> Edition

<i>Week</i>	<i>Topics</i>	<i>Chapters / Readings</i>
<p>Week 1 Class 8/25/16 6:00 pm Pacific Time</p>	<p><b>Introduction to Statistics and Statistical Reasoning in the Policy Process</b></p> <ul style="list-style-type: none"> <li>• Demonstrate the basics about collecting data and the implications for the inference that can be drawn based on that data.</li> </ul> <p><b>Sullivan</b> Chapter 1 Data Collection</p> <p><b>Due 8/31/2016: Problem Set #1</b></p>	
<p>Week 2 Class 9/01/16 6:00 pm Pacific Time</p>	<p><b>Using Data to Make Persuasive Policy Arguments</b></p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• Recognize the importance of data graphs in analyzing and communicating data on management issues.</li> <li>• How to tell a valid and compelling story through the graphical display of data</li> <li>• Identify common methods used to misrepresent data graphically.</li> </ul> <p><b>Sullivan</b> Chapter 2 Organizing and Summarizing Data</p> <p><b>Due 9/07/2016: Problem Set #2</b></p>	

<p>Week 3 Class 9/08/16 6:00 pm Pacific Time</p>	<p><b>Using Data to Make Persuasive Policy Arguments (continued)</b></p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• Recognize the importance basic summary statistics for analyzing and communicating management issues.</li> <li>• Calculate standard measures of central tendency and dispersion that are used to summarize data.</li> <li>• Differentiate between these measures and understand the situations in which they should be employed.</li> <li>• Calculate and interpret the correlation coefficient.</li> <li>• Recognize the uses and limitations of correlations.</li> <li>• Construct and interpret a contingency table</li> </ul> <p><b>Sullivan</b> Chapter 3 Numerically Summarizing Data  <b>Sullivan</b> Chapter 4.1 and 4.4 Describing the Relation between Two Variables</p> <p><b>Due 9/14/2016: Problem Set #3</b></p>
<p>Week 4 Class 9/15/16 6:00 pm Pacific Time</p>	<p><b>Introduction to Probability</b></p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• Identify management decisions that require probabilistic reasoning.</li> <li>• Compute and interpret probabilities.</li> <li>• Differentiate between these measures and understand the situations in which they should be employed.</li> </ul> <p><b>Sullivan</b> Chapter 5 Probability; Sections 5.5 and 5.6 are optional</p> <p><b>Due 9/21/2016: Problem Set #4</b></p>
<p>Week 5 Class 9/22/16 6:00 pm Pacific Time</p>	<p><b>Discrete Probability Distribution</b></p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• Distinguish between discrete and continuous random variables</li> <li>• Use Binomial and Poisson to calculate probabilities that arise out of administrative decision-making situations.</li> <li>• Read and interpret a probability distribution.</li> <li>• Apply Bayes' Rule to calculate the probability that of some event given some evidence.</li> </ul> <p><b>Sullivan</b> Chapter 6 Discrete Probability Distributions</p> <p><b>Due 9/28/2016: Problem Set #5</b></p>

<p>Week 6 Class 9/29/16 6:00 pm Pacific Time</p>	<p><b>The Normal Probability Distribution</b></p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• Examine properties of Normal Distribution</li> <li>• Interpret and apply Normal probability distribution.</li> </ul> <p><b>Sullivan</b> Chapter 7 The Normal Probability Distribution</p> <p><b>Due 10/05/2016: Problem Set #6</b></p>
<p>Week 7 Class 10/06/16 6:00 pm Pacific Time</p>	<p><b>Sampling Distributions</b></p> <ul style="list-style-type: none"> <li>• Recognize the difference between a population distribution and a sampling distribution.</li> <li>• Define and explain a sampling distribution.</li> <li>• Understand why the sampling distribution of a sample mean has a normal distribution.</li> </ul> <p><b>Sullivan</b> Chapter 8 Sampling Distributions</p> <p><b>Due 10/12/2016: Problem Set #7</b></p>
<p>Week 8 Class 10/13/16 6:00 pm Pacific Time</p>	<p><b>Midterm Review</b></p> <p><b>Due 10/19/2016: Midterm due at 11:59 PM</b></p>
<p>Week 9 Class 10/20/16 6:00 pm Pacific Time</p>	<p><b>Introduction to Statistical Inference</b></p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• Recognize how most management decisions are made based on sample information</li> <li>• Differentiate a sample and a population.</li> <li>• Define and interpret a Student's t distribution.</li> <li>• Calculate and interpret a confidence interval for a population mean, a proportion, and a population standard deviation.</li> </ul> <p><b>Sullivan</b> Chapter 9 Estimating the Value of a Parameters Using Confidence Intervals; Section 9.5 is optional</p> <p><b>Due 10/26/2016: Problem Set #8</b></p>

<p>Week 10 Class 10/27/16 6:00 pm Pacific Time</p>	<p><b>Hypotheses Concerning a Single Population</b></p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• Understand the logic of hypothesis testing</li> <li>• Define a research hypothesis and a null hypothesis.</li> <li>• Explain Type I and Type II Errors.</li> <li>• Calculate and interpret test statistics</li> </ul> <p><b>Sullivan</b> Chapter 10 Hypothesis Tests Regarding a Single Parameter; Section 10.6 is optional</p> <p><b>Due 11/02/2016: Problem Set #9</b></p>
<p>Week 11 Class 11/03/16 6:00 pm Pacific Time</p>	<p><b>Hypotheses Comparing Two Populations</b></p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• Identify how choices between politics or management practices involve comparisons between populations</li> <li>• Identify what statistical test to employ when comparing populations.</li> <li>• Calculate and interpret appropriate test statistics</li> </ul> <p><b>Sullivan</b> Chapter 11 Inferences on Two Samples</p> <p><b>Due 11/09/2016: Problem Set #10</b></p>
<p>Week 12 Class 11/10/16 6:00 pm Pacific Time</p>	<p><b>Additional Hypothesis Tests</b></p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• Broaden the application of hypothesis testing to encompass new management decisions.</li> <li>• Identify what statistical test to employ when making these comparisons.</li> <li>• Calculate and interpret appropriate test statistics</li> </ul> <p><b>Sullivan</b> Chapter 12 Inferences on Categorical Data</p> <p><b>Due 11/16/2016 Problem Set #11</b></p>
<p>Week 13 Class 11/17/16 6:00 pm Pacific Time</p>	<p><b>Additional Hypothesis Tests (2)</b></p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• Identify management decisions that entail comparisons between population proportions or between 3 or more groups.</li> <li>• Identify what statistical test to employ when making these comparisons.</li> <li>• Calculate and interpret appropriate test statistics</li> </ul> <p><b>Sullivan</b> Chapter 13 Comparing Three or More Means</p> <p><b>Due 11/30/2016: Problem Set #12</b></p>

Week 14 11/24/16	<b>No Lecture</b> <b>Happy Thanksgiving!</b>
Week 15 Class 12/01/16 6:00 pm Pacific Time	<b>Review Lecture</b>
Week 16	<b>EXAM WEEK</b>  <b>Final will be available on 12/07/16 at noon</b>  <b>Comprehensive Take-Home Final will be due on 12/14/16 at noon</b>