Overview

People use quantitative data to present, describe, and explain phenomena in almost every natural and social science field. Even the fields traditionally known to apply qualitative data now increasingly use quantitative data to carryout research and analyses. Political scientists and public administrators, in particular, find use of numbers enormously appealing in research, studies, and managerial decisions (See, for example, how presidents use numbers in their addresses to prove or justify certain decisions, policies, or programs). And obviously, whenever quantitative data are involved, statistics, which is the science of deriving, manipulating, and reporting such data, is invoked. As public administration students, proficiency in basic statistics is not only useful but a must, no matter whether you intend to pursue academic, policy analysis, or other management careers.

Catalogued Course Description

This course is an introduction to quantitative analytical techniques employed by professional administrators in the collection, manipulation, interpretation, and presentation of data utilized to test hypotheses and analyze policy problems. Quantitative methods may include frequency distribution, sampling techniques, measures of central tendency, probability, variability, regression, measures of association, correlation, and various other applied quantitative measures. While it is important to deal with fundamental concepts, the focus will be on applying basic statistical techniques to facilitate research, policy, or decision analyses.

Learning Objectives

- To demonstrate knowledge of the process of collecting, coding, and organizing data;
- To manipulate and analyze quantitative data and clearly, concisely, and consistently present them;
- To identify and interpret bivariate and multivariate associations;
- To describe population and its diversity using a number of statistical tools;
- To apply appropriate software for basic statistical analyses; and
- To demonstrate understanding of reports and publications involving basic statistical techniques.

**Course Materials:**


(Required) SPSS Statistics Software, Version 23.0, SPSS Inc. (any other recent version will do fine if you already have it.) You can buy the full version of GradPack or its six- or twelve-month license at academic prices from e-academy Inc.

(Recommended) Mann, Prem S. (2013). *Introductory Statistics* (8th Edition). John Wiley and Sons. We will use Chapters 4 and 5 from this text (details on accessing the readings to be discussed in the first class).

**Delivery Method**

Classes will include traditional lecture presentation, lab demonstration, and discussion on practice homework exercises. There will be emphasis on using SPSS Statistics to have most of the data manipulation works done. When it comes to using computer software, how much time you spend and how much guided practice you do really matter. I expect you to familiarize yourself with the software as much as possible by using it at home. While the goal here is not necessarily to gain mastery in using the software per se, you would need basic skills to carryout the required assignments and to understand and appropriately interpret the derived analytical results.

**Performance Evaluation**

Practice homework exercises will be assigned in every class. These are individual assignments meant to help you learn by practice. I also encourage students working together to find appropriate strategy to carryout these exercises. But the papers to be turned in should be individual with legible presentation of your own work and interpretive language.

There will be in-class midterm and (non-cumulative) final exams that include multiple choice questions, short answer questions, and short exercises to be completed by hand. Your active participation also counts in this course with regular lab demonstrations and assignments/practice homework exercises. While your grades will depend exclusively on the two exams, select practice exercises, and active class participation, working through both graded and un-graded practice exercises will be essential to prepare yourself for exams and participation.

For one, I will take attendance at the beginning of each class. But the idea of class participation goes beyond one's physical presence and includes active engagement in various class activities. Because classes include discussion on solutions to practice exercises as well as lab procedures
and outputs, when appropriate, there will be various opportunities to demonstrate active engagement or what I call is "informed inquisitiveness."

For grading purposes, following is the distribution of weights for each activity/assignment.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Midterm Exam</td>
<td>35%</td>
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<tr>
<td>Final Exam (non-cumulative)</td>
<td>35</td>
</tr>
<tr>
<td>Assignments</td>
<td>20</td>
</tr>
<tr>
<td>Active Participation</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
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</tbody>
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I will use the following cutoffs (all in percentage terms) to determine your letter grade. Some adjustments (or curving) may occur, however, especially on the exams, depending on the performance of the entire class: A ≥94; 94 > BA ≥ 88; 88 > B ≥ 82; 82 > CB ≥ 76; 76 > C ≥ 70; 70 > DC ≥ 64; 64 > D ≥ 58; D > E (Fail).

**Policies on Student Behavior and Conduct**

Disruptive behaviors can seriously affect student learning and therefore will not be tolerated. Behaviors that show disregard of the class participants and take the attention of students away from the class will impede class activities regardless of whether they involve individuals or groups. They can be in the form of inappropriate verbal or written language or in the form of behavioral or gestural expressions; they can occur in dealing with fellow students or the instructor; and they can occur in or outside of the classroom. While I do not expect these behaviors to take place in this graduate class with serious learners, I will take seriously if and when they occur and report to the Office of Student Conduct.

**Academic Honesty**

You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate and Graduate Catalogs that pertain to Academic Honesty. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. [The policies can be found at http://catalog.wmich.edu under Academic Policies, Student Rights and Responsibilities.] If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Conduct. You will be given the opportunity to review the charge(s). If you believe you are not responsible, you will have the opportunity for a hearing. You should consult with your instructor if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test.

**Other Useful Materials**

1. **Dataset and other learning aides:** We will do almost all of our lab demonstrations and assignments/practice homework exercises using the General Social Survey 2012 dataset. As described in the text, this is a comprehensive dataset representative of the entire country with diverse cross-sections along the lines of social class, marital status, race, gender, religion, age, and education. In addition to examining substantive research hypotheses, the application of these
real-world survey data will increase your preparedness to work in and contribute to diverse workplaces and communities. A workable version of the GSS 2012 dataset is available from the e-Learning page. But I encourage you to visit the textbook's companion site (http://www.cengagebrain.com) for this dataset as well as other useful materials including exams and chapter-by-chapter tutorials and glossaries.

2. **PowerPoint Slides**: PowerPoint slides used in the class will be made available through eLearning.

3. **Assignments/Practice Exercises**: There will be weekly practice exercises, of which I will randomly select up to six for grading. A summary of these exercises, together with the above data and other useful tables, can be accessed from eLearning.
Weekly Modules and Readings

1. 9/14 Basics
   Chs. 1 and 2, Appendix G, and Prologue: Basic Mathematics Review

2. 9/21 Describing Population
   Chs. 3 and 4

3. 9/28 Probability and Probabilities of Discrete Random Variables
   Chs. 4 (from Mann, 2013)

4. 10/05 Probability (continue) and Normal Curve
   Ch. 5 and Ch. 5 (from Mann, 2013; up to pp. 239)

5. 10/12 Sampling and Estimation
   Chs. 6 and 7

6. 10/19 Mid-term Exam

7. 10/26 Hypothesis Testing: One and Two Sample Cases
   Chs. 8 and 9

8. 11/02 Hypothesis Testing: Chi Square
   Ch. 11

9. 11/09 Hypothesis Testing: ANOVA
   Ch. 10

10. 11/16 Bivariate Association
    Ch. 13

11. 11/23 Multivariate Association
    Ch. 15

12. 11/30 Final Exam