

PRE 710  
Statistical Methods I  
Spring 2008

Purpose

This course is designed as an introduction to descriptive and inferential statistics, emphasizing applications in education and related social and behavioral science disciplines. Content covered includes organization and display of data, measures of central tendency and variability, data transformations, correlation and measures of association, problems of estimation and prediction, probability, sampling, assorted sampling distributions, and testing one and two sample statistical hypotheses (means, variances, correlation coefficients, proportions) via z- and t- tests.

Goals

Students should strive toward the following goals:

- 1) Recognize, define and comprehend statistical terms, symbols, and concepts.
- 2) Organize quantitative data descriptively.
- 3) Compute statistical indexes from either raw data or from partially analyzed results.
- 4) Interpret statistical indices and results of inferential procedures.
- 5) Use statistical formulas and tables correctly.
- 6) Select the appropriate descriptive or inferential procedure.
- 7) Reason statistically with reference to problem recognition, application and use of findings.
- 8) Recognize and supply the assumptions underlying statistical procedures.
- 9) Form conclusions based on statistical analyses.

Required Text:

Shavelson, R.J. Statistical Reasoning for the Behavioral Sciences. (3<sup>rd</sup> Ed.), Needham Heights, MA: Allyn and Bacon, Inc., 1998.

All readings in the above named text are required and should be completed before the lectures on the topic.

Graduate Assistants:

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Kevin Welch (PRE 711)

### Supplementary Readings:

Coladarci, T., Cobb, C., Minium, E. & Clarke, R. Fundamentals of Statistical Reasoning in Education. New York: John Wiley, 2006.

Very comparable in coverage to Shavelson. A good companion text for “hearing and seeing” it done another way. A little easier treatment, but good.

Jaeger, R.M. Statistics: A Spectator Sport. (2<sup>nd</sup> Ed.), Newbury Park, CA: Sage, 1990.

The main text (Shavelson) is for *learning and doing* statistics. This book (Jaeger) is geared more towards *understanding* statistics. Provides good conceptual understanding, de-emphasizes mathematical procedures.

Kranzler, G. & Moursund, J. Statistics for the Terrified. Englewood Cliffs, NJ: Prentice Hall, 1995.

Recommended for those who suffer from statistics anxiety and/or need a review of mathematical procedures (algebra). Concise and reader-friendly. Covers the basics of introductory statistics (plus simple, one-way ANOVA). Reviews mathematical procedures (walks through computations) and aims to reduce stat anxiety.

### Assignments

Reading assignments are listed on the following page. I assume that the assigned readings for a topic will be read **prior to** the class. Problem exercises exist throughout and at the end of each chapter. While these problems are not required, it is **strongly recommended** that you work through some of them. Answers are provided at the end of the chapter.

Three (3) assignments will be distributed during the semester. They are to be completed and turned in by the date specified. They are to be completed by the individual; **they are not group projects**. The date they are due will most likely coincided with scheduled examinations.

### Examinations and Grades

Completing the assignments satisfactorily will result in a minimum grade of C for the course. Two in-class and a comprehensive final, will be administered during the semester. Content tested will be that identified by the course objectives (see attached). Both selected and constructed response questions will be used. The in-class exams will count for 60% of your grade, the final the remaining 40%. Grades will be assigned as follows: 88-100% mastery = A, 79-87% mastery = B, 70-78% mastery = C, 69-61% mastery = D, below 61% mastery = F.

## Course Outline and Suggested Readings

1. Introduction and Basic concepts in statistics  
(Chapters 1 and 2)
2. Frequency distributions and graph presentations  
(Chapter 3 + Appendix 1)
- 3) Measures of Central tendency  
(Chapter 4)
- 4) Measures of Variability  
(Chapter 4)

----- **Exam** -----

- 5) Standardized Scores, Score Transformations and the Normal Curve  
(Chapter 5)
- 6) Correlation Methods  
(Chapters 6)
- 7) Linear Regression  
(Chapter 7)

----- **Exam** -----

- 8) Sampling, Probability, Sampling Distributions, and Statistical Inferences  
(Chapters 8 and 9)
- 9) Estimation, Error, Power and Hypothesis Testing: Test of Means  
(Chapters 10 and 11)
- 10) Assorted z and t Tests  
(Chapters 12 and 13)

----- **Final Exam** -----