| CEN 557 | STATISTICS AND SOCIETY | SPRING 1998 |

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WWW: http://www.sinc.sunysb.edu/Stu/mmeffert/CEN557.html
      (enhanced version with additional links to useful resources)

Time: M 6:30-9:30
Place: SBS N-705

Course Description

Information based on numerical data ("numbers") plays an important role in many professions. Whether it is medical research or education, the development of public policies or academic research in a field like social science, statistical information is used to make decisions. As a consequence, statistics often feature prominently in the news (e.g. polls) and academic articles.

The goal of this course is to introduce the students to basic statistical ideas and tools that can be used to make sense out of data. It will enable the students to both read and understand statistical information in the media or academic articles and provide them with the practical skills to apply these tools to data sets of their own choice.

Substantively, the course is structured in two major parts. The first part focuses on descriptive statistics or basic data analysis, in particular how quantitative data can be examined and visualized. Two major forms of producing data, surveys and experiments, will also be covered. The second part introduces the concept of inferential statistics, the process of making inferences from a limited data sample to the appropriate population. A number of practical applications in simple settings will be covered. Instead of memorizing formulas, the two major goals of the course is the development of a conceptual understanding of statistics as well as the ability to apply some basic statistical tools to data.

Prerequisite

One year of college mathematics.

Readings

*Required***: David S. Moore. 1995. *The Basic Practice of Statistics***. New York: W. H. Freeman**.
*Optional***:** Phillips, John L. 1996. *How to Think About Statistics*. New York: W. H. Freeman.
The textbooks are available at the university bookstore and at Stony Books across 25A near the railroad station. They are not available at the university library.

Grading

The final grade will be the weighted average based on:
• 2 exams: 40% (20% each)
• 4 short assignments: 60% (15% each)

Exams - The exams will ask for short definitions of key concepts and solutions for problem sets similar to ones used in class and the text book.

Assignments - The assignments have the purpose of applying some of the procedures covered in class. Students will be able to use data sets of their own choice for these assignments or use data sets offered in class. The assignments should cover both the results of the calculations or graphical representations as well as a substantive interpretation. The assignments should be typed (double-spaced) and follow the usual formal requirements for papers. In particular the sources and material that are used have to be properly identified (as references in footnotes, endnotes, or a bibliography). Instances of plagiarism will automatically lead to a failure of the course.

Important Note - If you have a physical, psychological, medical, or learning disability that may impact on your ability to carry out assigned course work, I would urge that you contact the staff in the Disabled Student Services office (DSS), Room 133, Humanities (phone: 632-6748/TDD). DSS will review your concerns and determine, with you, what accommodations are necessary and appropriate. All information and documentation of disability is confidential.

COURSE SCHEDULE AND READINGS

Note: The following course schedule shows for each week the topic and the required readings in *The Basic Practice of Statistics* by Moore (optional readings in the Phillips' book are given in square brackets). The schedule especially for the second part on inference should be considered as preliminary. Depending on the progress in class, some of the topics might be covered in less detail or even dropped altogether.
The online version of the syllabus (http://www.sinc.sunysb.edu/Stu/mmeffert/CEN557.html) is updated from time to time and provides useful links to additional sources of information.

Date (Week)	Topic & Readings
1/26 (1)	**Introduction** What is statistics? (pp. 1-5) [1 - Introduction (pp. 1-11)]
	DESCRIPTION
2/2 (2)	**Examining Distributions** 1.1 Displaying Distributions with Graphs (pp. 10-34) 1.2. Describing Distributions with Numbers (pp. 34-54) [2 - Frequency Distributions (pp. 12-23)] [3 - Measures of Central Tendency (pp. 24-32)] [4 - Measures of Variability (pp. 25-43)]
2/9 (3)	1.3. The Normal Distributions (pp. 54-88) [5 - Interpreting Individual Measures (pp. 44-55)] *Assignment 1 handed out*
2/16 (4)	**Examining Relations** 2.1. Scatterplots (pp. 92-111) 2.2. Correlation (pp. 111-119) [6 - Correlation (pp. 56-83)]
2/23 (5)	2.3. Least-Square Regression (pp. 119-142) 2.4. Interpreting Correlation and Regression (pp. 142-150) optional: 2.5. Relations in Categorical Data (pp. 150-173) [11 - Correlation, Causation, and Effect Size (pp. 139-152)]

3/2 (6)	**Producing Data** 3.1. Designing Samples (pp. 178-198) 3.2. Designing Experiments (pp. 198-224) *Assignment 2 handed out*
3/9 (7)	*Mid-term Exam*
3/16 (8)	*Spring Break*

INFERENCE

3/23 (9)	**Sampling Distributions and Probability** 4.1. Sampling Distributions (pp. 230-250) 4.2. Probability Distributions (pp. 250-268) [7 - Description to Inference: A Transition (pp. 84-89)]
3/30 (10)	4.3. Sample Proportions (pp. 268-278) 4.5. Sample Means (pp. 292-305)
4/6 (11)	**Introduction to Inference** 5.1. Estimating with Confidence (pp. 324-349) 5.2. Tests of Significance (pp. 349-379) 5.3. Using Significance Tests (pp. 380-387) optional: 5.4. Inference as a Decision (pp. 387-405) [8 - Precision of Inference (pp. 90-101)]
4/13 (12)	**Inference for Distributions** 6.1. Inference for the Mean of a Population (pp. 408-435) 6.2. Comparing two Means (pp. 435-462) [9 - Significance of a Difference between two Means (pp. 102-116)] *Assignment 3 handed out*
4/20 (13)	**Inference for Proportions** 7.1. Inference for a Population Proportion (pp. 484-499) 7.2. Comparing two Proportions (pp. 499-515)
4/27 (14) and 5/4 (15)	**Topics in Inference (exact topics to be determined)** 8. Inference for Two-Way Tables (pp. 521-553) 9. One-Way Analysis of Variance: Comparing Several Means (pp. 555-587) 10. Inference for Regression (pp. 589-624) [10 - More on the Testing of Hypotheses (pp. 117-138)] *Assignment 4 handed out*
5/11 (16)	*Final Exam*