

Instructor: Dr. Brad Thiessen	Phone: 333-6160
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Office Hours: MWF 12–1, 3:30-4:30 (or by appointment)	Website: http://www.bradthiessen.com/

Materials:

Required: *Essentials of Statistics for the Behavioral Sciences (6th edition)* by Gravetter & Wallnau
 Optional: *Study Guide for Gravetter & Wallnau's Essentials of Statistics for the Behavioral Sciences (6th edition)*
 Calculator

Prerequisites:

MATH 151 (College Algebra), higher-level math course, or permission from instructor

Overview:

The general purpose of this course is to teach you how to use a tool - statistics. Statistics is not an answer in-and-of-itself anymore than a computer is an answer to poor writing skills - you have to know how to use the tool. What does this tool do for you? In part, it allows you to develop quantitative and critical thinking skills. It also allows you to make informed decisions and predictions.

Why take this course other than because it is required? "The science of statistics has made great progress in this century, but progress has been accompanied by a corresponding increase in the misuse of statistics...Good statistical practice is an absolute necessity to any advanced society, and we can't afford to neglect this valuable tool because some people misuse it...informed citizens [students], with or without any interest in statistics per se, or in mathematics or probability in general, can enjoy learning some of the ways of distinguishing good statistical reasoning from bad" (Hooke, R. (1983). *How to tell the liars from the statisticians*. New York: Marcel Dekker, pp. vii-viii).

Do you have math anxiety? Don't worry, because statistics is as much of a conceptual/content-based course as it is a mathematics course. While a strong mathematical background facilitates learning, it is possible to meaningfully analyze data without complicated mathematics. If you do not own a calculator, you need to purchase one. While you'll find that a graphing calculator (TI-83, 84, 89) will automate many of our calculations, cheaper calculators with statistical functions (around \$15) will work for this class. Just make sure your calculator has a square-root button.

Course Objectives:

By the end of this course, you should be able to...

- Describe a data set by calculating appropriate descriptive statistics (by hand, with a calculator, and using a pc)
- Determine which inferential statistical methods should be applied to a data set
- Interpret statistics calculated from a data set

More specifically, you should be able to...

- Determine simple probabilities and conditional probabilities
- Identify the level of measurement for a variable and determine which statistics/graphs are appropriate for that level
- Construct histograms, boxplots, and stemplots for a given data set
- Compute measures of central tendency and evaluate which is most appropriate (mean, median, mode, trimmed mean)
- Compute measures of variation (variance, standard deviation, range, IQR)
- Determine normal distribution probabilities
- Describe the relationship between samples and populations
- Collect a simple random sample and stratified random sample
- Explain the conditions and conclusions of the Central Limit Theorem
- Conduct a single-, independent-, and dependent-sample hypothesis test (z tests; t-tests)
- Conduct an analysis of variance and post-hoc tests to compare three or more group means
- List the assumptions necessary to conduct parametric hypothesis tests
- Compute and interpret the correlation between two variables (Pearson's and Spearman's)
- Explain the concept behind least squares linear regression
- Interpret the results of a simple linear regression
- Use nonparametric statistical methods (time permitting)
- Explain the similarities and differences among probability, statistics, Bayesian statistics, and data mining.

Attendance:

Students are expected to attend all scheduled classes. If you miss a class, it will be your responsibility to obtain notes from one of your classmates. If you know that you will be missing a class, please contact me ahead of time if at all possible.

Student Evaluation:

Your final grade will be based on your performance on the exams, homework, and assignments. The exact weights of each exam will depend on the number of assignments in each unit. I tend to assign fewer problems so that you can focus your attention on understanding the concept behind each problem.

It is expected that you will take each exam at the scheduled time. If you **must** miss a scheduled exam, please let me know in advance. Barring any unusual circumstances, I will grade your tests within one day of completion and post your scores on Blackboard.

While the grading scale will shift somewhat, it will not be more stringent than:

- A: 90% – 100%
- B: 80% – 89%
- C: 70% – 79%
- D: 60% – 69%
- F: 0% – 59%

I expect you to actively participate in class discussions. I ask lots of questions in class. Students who attempt to answer those questions tend to get the highest scores on the exams.

I also expect you to take responsibility for your learning. If you don't understand something in class, speak up. Send me an e-mail, visit my office, or visit the Student Success Center (SSC in Ambrose 243). Do not wait until the day of the test to seek assistance.

Plagiarism:

Don't cheat. You can work with other students on the homework, but the exams should only represent your level of understanding. Review the Policy on Academic Dishonesty in the University Catalog.

Accommodations:

Students with disabilities who believe they may need accommodations in this class are encouraged to contact the Office of Services for Students with Disabilities at 333-6275 as soon as possible to better ensure that such accommodations are implemented in a timely fashion.

Week 1 1/14	Introductions; Syllabus review Chapter 1: Variables and their measurement Chapter 2: Frequency Distributions
Week 2 1/21	Chapter 3: Measures of Central Tendency Chapter 4: Measures of Variability
Week 3 1/28	Chapter 5: Using Frequency Distributions Review
Week 4 2/4	Unit 1 Exam
Week 5 2/11	Chapter 6: Probability Chapter 7: Probability & Samples
Week 6 2/18	Chapter 8: Introduction to Hypothesis Testing (permutation tests) Chapter 9: Inferences about means of single samples
Week 7 2/25	Chapter 10: Inferences about means of two independent samples
Week 8 3/4	Chapter 11: Inferences about means of two dependent samples Chapter 12: Estimating
Week 9 3/11	Spring Break
Week 10 3/18	Unit 2 Exam
Week 11 3/25	Chapter 13: Analysis of Variance (ANOVA)
Week 12 4/1 (April Fools')	Assumptions; Post hoc comparisons (ANOVA continued)
Week 13 4/8	Chapter 15: Correlation and Regression
Week 14 4/15 (Tax Day)	Data analysis project (NCME/AERA Conference)
Week 15 4/22 (Earth Day)	Chapter 16: Nonparametric statistical tests
Week 16 4/29	Final comments & review
Final Exam:	