

STAT 200X Syllabus

Prepared by Ron Barry with Dana Thomas, Margaret Short and Julie McIntyre.
Fall 2008

Text: Introductory Statistics (Neil Weiss) Custom Edition [NOTE: Text is likely to change within a year]

Topics covered are listed below. Some are optional, some require more than one class period. The timing also may be modified by the instructor according to their experience with the course.:

* optional, time permitting.

Chapter One: The nature of statistics [2 days].

- Statistics Basics
- Simple Random Sampling and other sampling designs
- Experimental Design

Chapter Two: Organizing data [2 days].

- Variables and Data
- Grouping Data
- Graphs and Charts
- Shapes of Distributions
- Misleading Graphs

Chapter Three: Descriptive Measures [2 days].

- Measures of Center (Mean, Median)
- Measures of Variation
- Five number summary and boxplots
- Descriptive measures for populations (Statistics vs Parameters)

Chapter Four: Probability [3 days].

- Basics of Probability
- Events
- Some Probability Rules
- Contingency Tables (Joint and Marginal Probabilities)
- Conditional Probability
- Independence and the Multiplication Rule
- Bayes's Rule
- Counting Rules*

Chapter Five: Discrete Random Variables [3 days]

- Discrete Random Variables and Probability Distributions
- The Mean and Standard Deviation of a Discrete Random Variable
- The Binomial Distribution
- The Poisson Distribution*

[1 review or catch-up day]

Chapter Six: The Normal Distribution [2 days]

- Normally-Distributed Variables
- Areas under Standard Normal Curves
- Obtaining probabilities and percentiles from normal probabilities
- Normal Probability Plots
- Normal Approximation to the Binomial Distribution

Chapter Seven: The Sampling Distribution of the Mean [3 days]

- Sampling error and sampling distributions

The mean and standard deviation of the sample mean
The sampling distribution of the sample mean (Central Limit Theorem)

Chapter Eight: Confidence Intervals (one population mean) [2 days]

Estimating a Population Mean
Confidence Intervals for One Population Mean (variance known)
Margin of Error
Confidence Intervals for One Population Mean (variances unknown)

Chapter Nine: Hypothesis Tests (one population mean) [2 days]

Hypothesis Testing Basics
Error Types, Hypotheses
Hypothesis Tests for One Population Mean (variance known)
Power
p-values
Hypothesis Tests for One Population Mean (variance unknown)

Chapter Ten: Inferences for Two Population Means [3 days]

Sampling Distribution of the difference of two population means (indep. samples)
Inference for the difference of two population means (indep. samples, equal variances)
Inference for the difference of two population means (indep. samples, unequal variances)
Matched Pairs test

[1 review or catch-up day]

Chapter Twelve: Inferences for Population Proportions [2 days]

Confidence intervals for proportion in one population
Hypothesis tests for proportion in one population

Chapter Thirteen: Chi-Square Tests [2 days]

The Chi-Square distribution
Chi-square goodness of fit test
Chi-square test of association/independence

Chapter Fourteen: Regression and Correlation [3 days]

Linear equations with one independent variable
Scatterplots
The regression equation
The coefficient of determination
Linear correlation

Chapter Fifteen: More Regression [3 days]

The regression model and residuals
Inference for the slope of the population regression line
Estimation and prediction
Inference in Correlation

Chapter Sixteen: ANOVA and Nonparametrics [4 days]

The F-distribution
One-Way ANOVA
Multiple Comparisons
The Kruskal-Wallis Test/Mann-Whitney Test*

The criteria upon which the Stat 200 finals are
evaluated by the Core Assessment Committee are listed below.

- 1) Understand the use and definition of confidence intervals

- 2) Understand the fundamentals of hypothesis tests (examples might include one and two tailed hypotheses, types of errors, significance levels and p-values.)
- 3) Calculate normal distribution probabilities
- 4) Be able to find the mean, variance and compute probabilities for the binomial distribution.
- 5) Be able to interpret an applied problem, selecting the correct hypothesis test or confidence interval
- 6) Be able to perform a two-sample t-test and know the assumptions of this test.
- 7) Be able to compare probabilities in two indep. populations using tests of hypotheses or confidence intervals.
- 8) Understand what a sampling distribution is and how it is used.
- 9) Be able to interpret computer output for a simple linear regression.
- 10) Understand the assumptions of simple linear regression.

These criteria will either be evaluated by inclusion of appropriate questions in the final exam, or else a separate quiz administered in Blackboard.