

*Statistics 200 Syllabus, Winter 2009*

*Introduction to Statistical Inference*

**Course Web Page:** <http://www-stat.stanford.edu/~romano/stat200/>

**Course Description:** Modern statistical concepts and methods developed in a mathematical framework: statistical inference, decision theory, point and interval estimation, hypothesis testing, Neyman-Pearson theory, maximum likelihood, Bayesian analysis, large sample theory.

**Lectures:** The class meets Tuesday and Thursday from 11:00 to 12:15 in McCullough 115.

**Professor:** Joe Romano (romano@stanford.edu). My offices are 142 Sequoia Hall and Room 227 in the Landau Economics Building. My office phone number is 723-6326. Office hours will be announced soon. Check the course webpage for updates.

**Prerequisites:** Statistics 116, or the equivalent (calculus and probability).

**Text:** *Mathematical Statistics and Data Analysis*, 3rd edition, by John Rice, published by Duxbury Press.

**Teaching Assistants:** The teaching assistants for the course, together with their office numbers (all in Sequoia Hall), phone extensions and email addresses are:

Yi Liu: Room 235, 5-5953, yiliu7@stanford.edu

Sarah Emerson: Room 242, 5-5952, semerson@stanford.edu

Nick Annoni: Room 206, 5-6148, ndannoni@stanford.edu

Their office hours will be announced soon. Check the web page for updates.

**Graders:** We will also have separate graders of the homework. Their names will be announced soon.

**Grading:** Your grade will be determined by weekly problem sets (roughly 25 percent weight), a midterm (roughly 25 percent weight), and a final exam (roughly 50 percent weight). The final exam is scheduled for Monday, March 16 from 3:30–6:30.

**Rough Course Outline by Week:**

Week 1. Review of Probability, Random Variables, Distributions, Conditioning; Expectation. Chapters 1-3.

Week 2. Approximations to expected values and variances, the Central Limit Theorem, Law of Large Numbers, Chapters 4-5. Applications to survey sampling (Chapter 7).

Week 3. Point Estimation, Fitting of Probability Distribution, Method of Moments, Maximum Likelihood Estimation, Chapter 8.

Week 4. Estimation continued, Large Sample Theory, Confidence Intervals.

Week 5. Hypothesis Testing, Neyman Pearson Paradigm, Generalized Likelihood Ratio Tests, Chapter 9.

Week 6. Review and Midterm.

Week 7. Goodness of Fit tests, Tests for Normality, Bootstrap, Chapters 9 and 10.

Week 8. Comparing Two Samples, Large Sample Methods, Rank Tests, Experimental Design Issues, Chapter 11.

Week 9. Applications to: Analysis of Categorical Data, Contingency Tables, Chi-squared tests, Chapter 13; Linear Models and multiple regression, Chapter 14.

Week 10. Bayesian Methods.

Week 11. Review.

**Problem Set 1:** Tentatively due on January 13, Tuesday, at the beginning of class: 1.60, 2.64, 3.20, 3.32, 3.33, 3.34, 3.48.