

# Statistics 200B: Intermediate Statistics

Winter 2007

**Class Meetings:** MWF 11:00–11:50 am, Rm 101 ICF

**Instructor:** Yaming Yu, 346A ICS1 (2228 ICS3 after Jan.?), (949) 824-7361

**Email:** yamingy@ics.uci.edu

**Office Hours:** Thur 1:00–2:00 pm, or by appointment.

(Regular office hours may be replaced by a discussion section in Rm 243 ICS1.)

Objectives: This is the second of a three-quarter sequence on probability theory and statistics. Stat 200B aims at treating classical statistics (point estimation, interval estimation, hypothesis testing) in some depth, and providing a firm foundation for the more special topics (such as Bayesian inference) about to be covered in Stat 200C.

Prerequisites: Statistics 200A, or permission of the instructor.

Primary Textbook: *Statistical Inference (2002)*, G. Casella, R. L. Berger, Duxbury Press.

Course Requirements: There will be five assignments in addition to a final exam. Homeworks are due at the beginning of the lectures, tentatively on Fridays Jan. 19, Feb. 2, Feb. 16, Mar. 2, and Mar. 16. The grade is determined as follows:

**Homeworks 75%, Final Exam 25%.**

Tentative Outline of topics:

- *Weeks 1 & 2 – Data reduction:* important concepts in statistical inference including sufficiency and the likelihood principle. (Textbook Chap. 6.)
- *Weeks 3 & 4 – Point estimation:* introduction, method of moments, maximum likelihood, Bayes estimates, invariance. (Chap. 7.1–7.2.)
- *Weeks 5 & 6 – Properties of point estimates:* mean squared error, unbiasedness, consistency, efficiency, Cramer-Rao lower bound, risk functions and Bayes estimates. (Chap. 7.3.)
- *Weeks 7 & 8 – Hypothesis testing:* introduction, likelihood ratio tests, properties of tests (type I error, power), Neyman-Pearson theory, asymptotic properties of tests. (Chap. 8.)
- *Weeks 9 & 10 – Interval estimation:* definition of confidence intervals, pivotal quantities, asymptotic confidence intervals, coverage and size, relationship of tests and confidence intervals. (Chap. 9.)

We may review some probability theory (such as the delta method and multivariate transformations of random variables) at the beginning few lectures.