



Instructor: [Dr. Leilei Zeng](#)

**Prerequisite:**

STAT 330

**Textbook:**

*Statistical Inference 2nd Edition* by Casella and Berger, publisher Duxbury/Thompson Learning, c.2002

**Calendar Description:**

Distribution theory, methods for constructing tests, estimators, and confidence intervals with special attention to likelihood methods. Properties of the procedures including large sample theory. **Quantitative**

**Outline:**

1. Review of probability and distribution theory. Conditional probability, marginal and conditional distributions, independence. Distributions of functions of random variables. Bivariate and multivariate normal.
2. Likelihood methods of inference. Multiparameter likelihoods, maximum relative likelihood, likelihood ratio statistic. Sufficiency.
3. Testing hypotheses. Neyman-Pearson theory. Most powerful and uniformly most powerful tests. Likelihood ratio tests. Acceptance sampling.
4. Interval estimation. Inversion of significance tests.
5. Bayesian estimates, point estimates, predictive distributions.
6. Stochastic convergence. Limiting distributions. Continuity theorem. Central limit theorem.
7. Theory of likelihood functions, regularity conditions, properties of information matrix, information in summary statistics, sufficient statistics, parameter transformations, efficiency, consistency. Maximum likelihood large sample theory.

**Grading Scheme:**

Assignments-30%  
Midterm-30%  
Final Exam-40%

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*Students should be aware that they have certain rights to confidentiality concerning the return of course papers and the posting of marks. Please pay careful attention to the options discussed in class at the beginning of the semester. Students are reminded that Academic Honesty is a cornerstone of the acquisition of knowledge. Scholarly integrity is required of all members of the University. Please consult the General Guidelines of the calendar for more details.*

Revised September 4, 2007