

## MATH 596 A: Special Topics Course for Spring, 2004

**Title:** Large Sample Theory of Statistics

**Text(s):** 1. Elements of Large Sample Theory- E.L.Lehmann. (1998). Springer,  
2. Lecture Notes on Large Sample Theory- Rabi Bhattacharya

**Prerequisites:** MATH 466 or equivalent, or consent of instructor

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**Course Description:** Statistical inference is generally not very reliable, unless the sample size is at least moderately large. In addition, with large samples, statistical methodology becomes remarkably unified and simple to use.

The following is a list of topics for the course.

1. *Basic notions of statistical inference.*
2. *Convergence in probability and in distribution* and applications to “consistency” and asymptotic distribution of an estimator. The “delta method”
3. *Estimation in parametric models.* Maximum likelihood and M-estimators, Bayes estimators. Cramer-Rao lower bound and asymptotic efficiency.
4. *Tests in parametric models.* Likelihood ratio tests, Wald,s tests, Rao’s score tests and chisquare tests for contingency tables. Asymptotic relative efficiency of tests.
5. *Nonparametric tests of location.* Sign test in one sample and Mann-Whitney Wilcoxon test in two-samples.
5. *Regression models* with and without the assumption of “normality” of errors.
6. *Nonparametric bootstrap.*
7. *Some topics in biostatistics:* bioassay and elementary survival analysis.
8. *Some topics in time series:* autoregressive models.