

Mathematical Statistics

With the advent of powerful computing and the availability of massive sets of data, statistics has become a valuable tool in many of the applied sciences. This course covers the basics of advanced mathematical statistics, both classical and modern.

Course Prerequisite: One upper division course in probability, and some basic statistics.

Instructors:

- Larry Goldstein, University of Southern California, Los Angeles, USA
- Uwe Schmock, Vienna University of Technology, Austria

Course Content:

- Review of basic probability and statistics
- Parametric models
- Estimation: criteria and construction of estimators, maximum likelihood, asymptotics
- Hypothesis testing, multiple hypotheses testing
- Non parametric models, empirical distribution function, jackknife and bootstrap, non-parametric testing, density and regression estimation
- Classification: discriminant analysis, support vector machines, multivariate statistics, EM algorithm and simulation including Monte Carlo Markov Chain

Evaluation;

- Midterm, 30%
- Final Exam, 45%
- Course participation, 25%

Course Text, and two additional references:

- All of Statistics: A concise course in Statistical Inference, by Larry Wasserman.
- Mathematical Statistics: Basic Ideas and Selected Topics, by Peter Bickel and Kjell Doksum
- A Course in Large Sample Theory, by Thomas Ferguson