
Fall 2014 Course Announcement
Stat 512: Advanced Statistical Theory II

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LECTURES. MWF 9:00–9:50am (probably).

TARGET AUDIENCE. PhD students in statistics, mathematics, computer science, bio-statistics, economics, and other related fields.

PREREQUISITE. Stat 511 and some computing background (e.g., Stat 451).

TEXTBOOK. Some good books from which some course material will be taken are listed below. The (★) marks the book with probably the broadest coverage, and will be the “required text.” The others are available for free electronically (with UIC netid).

van der Vaart, *Asymptotic Statistics*, 1998. (★)

Ghosh and Ramamoorthi, *Bayesian Nonparametrics*, 2003.

Tsybakov, *Introduction to Nonparametric Estimation*, 2004.

Kosorok, *Introduction to Empirical Processes and Semiparametric Inference*, 2008.

DasGupta, *Asymptotic Theory of Statistics and Probability*, 2008.

Bühlmann and van de Geer, *Statistics for High-Dimensional Data*, 2010.

COURSE OBJECTIVE. Students successfully completing this course will be well prepared for research in statistical theory and methodology.

TENTATIVE COURSE PLAN. Lectures will cover some select topics in modern statistical theory. For example, large-sample theory for general M-estimators, empirical process theory, and non- and semi-parametric problems from both Bayesian and non-Bayesian perspectives, and more, depending on time and interests.

GRADES. Grades will be based on homework, a project, and “class participation.”

COURSE PROJECT. Students will review existing literature on a particular topic of interest and present a summary of this review both orally and in writing. Details about the project will be given later. A number of suggested topics are given in the box.

<i>empirical likelihood</i>	<i>composite likelihood</i>	<i>bootstrap</i>
<i>error-in-variables</i>	<i>high-dim decision theory</i>	<i>multiple testing</i>
<i>variable/model selection</i>	<i>nonparametric regression</i>	<i>density estimation</i>
<i>mixture models</i>	<i>local asymptotic normality</i>	<i>empirical processes</i>
<i>semiparametric inference</i>	<i>foundations</i>	<i>model misspecification</i>
<i>constrained inference</i>	<i>Gaussian processes, RKHS</i>	<i>higher-order likelihood</i>
<i>machine learning</i>	<i>stochastic processes</i>	<i>Bayesian priors</i>