



Statistics 542

Spring 2009

Course Description: Bayesian Methods and Computation

The goal of this course is to develop sophisticated tools for probability modeling and data analysis from the Bayesian perspective. Key topics covered in the course include hierarchical models, optimization algorithms and Monte Carlo simulation techniques.

Prerequisites: Probability (Statistics 430, 510 or equivalent) or permission of instructor

Professor:

Dr. Shane Jensen
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JMHH 463
215-573-2211

Lectures: TTh 10:30-12:00 Location TBA

Required Textbook:

Bayesian Data Analysis (2nd Edition) by A. Gelman, J. Carlin, H. Stern, and D. Rubin.

Required Software:

The R statistical package is needed and can be downloaded at www.r-project.org

Course Topics

1. Introduction to Bayesian Inference (Ch.1)
2. Simple Parametric Models (Ch. 2, 3)
3. Regression Models from the Bayesian Perspective (Ch. 14,15)
4. Frequentist properties of Bayesian methods (Ch. 4)
5. Hierarchical and Mixture Models (Ch. 5,18)
6. Optimization Algorithms for Model Estimation (Ch. 12)
7. Monte Carlo Simulation Algorithms for Model Estimation (Ch. 10,11,13)
8. Model Checking (Ch. 6)
10. Nonparametric and Semiparametric Bayesian models
11. Hidden Markov Models

Other Course Information

Office hour: Tuesday 5:00-6:00 JMHH 463

Course Website: stat.wharton.upenn.edu/~stjensen/stat542.html

Evaluation:

Your course grade will be calculated from homeworks. Homework assignments will be assigned every two weeks or so and will be turned in for grading. *No late homework will be accepted, for any reason whatsoever.*

Important Dates:

Thursday, January 15

Tuesday, March 10

Thursday, March 12

Tuesday, April 28

First day of class

No Class -- Spring Break

No Class -- Spring Break

Last day of class