



## Statistics 542 Spring 2015

### **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, mixture models and Monte Carlo simulation techniques.

**Prerequisites:** Probability (Statistics 430, 510 or equivalent) or permission of instructor. Statistics 541 is also highly recommended but not required.

#### **Professor:**

Dr. Shane Jensen  
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JMHH 463  
215-573-2211

**Lectures:** TuTh 12:00-1:30pm LOCATION TBA

#### **Required Textbook:**

Bayesian Data Analysis (3<sup>rd</sup> Edition) by Gelman, et.al.

#### **Required Software:**

The R statistical package is needed and can be downloaded at [www.r-project.org](http://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. Hierarchical and Mixture Models (Ch. 5)
6. Optimization Algorithms for Model Estimation (Ch. 13)
7. Monte Carlo Simulation Algorithms for Model Estimation (Ch. 10,12,13)
8. Model Checking (Ch. 6,7)
10. Nonparametric and Semiparametric Bayesian models (Ch. 23)
11. Hidden Markov Models

### **Other Course Information**

**My office hour:** Tu 5-6pm JMHH 463

**TA office hour:** TBA

**Course Website:** [stat.wharton.upenn.edu/~stjensen/stat542.html](http://stat.wharton.upenn.edu/~stjensen/stat542.html)

**Evaluation:**

Your course grade will be calculated from homeworks. Homework assignments will be assigned every three 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