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  
stjensen@wharton.upenn.edu  
JMHH 463  
215-573-2211

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

Required Textbook:  

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)  
9. Nonparametric and Semiparametric Bayesian models  
10. 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:**

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<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>Thursday, January 15</td>
<td>First day of class</td>
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<tr>
<td>Tuesday, March 10</td>
<td>No Class -- Spring Break</td>
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<tr>
<td>Thursday, March 12</td>
<td>No Class -- Spring Break</td>
</tr>
<tr>
<td>Tuesday, April 28</td>
<td>Last day of class</td>
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