

Bayesian Data Analysis

Instructor: John Staudenmayer

Mail: jstauden at math.umass.edu

Web: www.math.umass.edu/~jstauden/BDA.html

Phone: 545 0999

Required Text: Bayesian Data Analysis, 2nd Edition by Gelman, Carlin, Stern, and Rubin, Chapman Hall / CRC. We will cover chapters 1-6, 9-13.

Other Texts:

Statistical Inference (Casella and Berger) General statistics and probability.

All of Statistics (Wasserman) General statistics and probability.

Bayesian Statistics: An Introduction (Lee) Similar to our book, but a bit easier.

Bayesian Computation with R (Albert) Similar to our book, a bit easier, and includes many computational examples.

The Bayesian Choice (Robert) Bayesian textbook with more theoretical foundation

The Bayesian Core (Marin and Robert) Similar to our book more focus on algorithms.

Statistical Decision Theory and Bayesian Analysis (Berger) Bayesian textbook with more theoretical foundation

Markov Chain Monte Carlo in Practice (Gilks, Richardson, and Spiegelhalter) Focus on modeling and fitting with Bayesian methods.

Computing: We will use R. Approximately every fourth class will focus on “hands-on” computing. These classes may meet in a computer lab. (I’m negotiating for space...) Resources will be made available to help people learn R.

Goals: Learn how to model and analyze data in the Bayesian framework. Become familiar with some computational techniques that are useful for Bayesian methods and learn how to implement them in R. Have fun.

Grading:

40% approximately bi-weekly problem sets

40% end of semester project & presentation

20% final exam

Project: The projects will be done in groups of 2-3 people (negotiable). The focus will be on data modeling, analysis, and a careful write-up.

Tentative Schedule (This will be updated as the semester goes on.)

Note: You are expected to do the reading. You will get more out of this class if you do the reading.

Class	Coverage and Reading	Other
Sept 8	Chapter 1, Chapters 2.1-2.5	
Sept 10	Chapter 1, Chapters 2.1-2.5	PS 1 Assigned
Sept 15	Chapters 2.6-2.9	
Sept 17	<i>Computing tutorial</i>	PS 1 due / PS 2 Assigned
Sept 22	Chapter 3	
Sept 24	Chapter 3	
Sept 29	Chapter 4	
Oct 1	<i>Computing tutorial</i>	PS 2 due / PS 3 Assigned
Oct 6	Chapter 5	
Oct 8	Chapter 5	
Oct 13	No Class. Columbus Day	
Oct 15	Chapter 6	PS 3 due
Oct 20	Chapter 6	
Oct 22	<i>Computing tutorial</i>	
Oct 27	Chapter 9	
Oct 29	Chapter 10	PS 4 Assigned
Nov 3	Chapter 11	
Nov 5	Chapter 11	Project Proposal Due
Nov 10	Chapter 11	
Nov 12	<i>Computing tutorial</i>	
Nov 17	no class	
Nov 19	no class	
Nov 24	Problem Session / Review Class	PS 4 due
Nov 26	No Class, Thanksgiving	
Dec 1	Project Presentations: [Burrell] and [Chen & Yuan]	
Dec 3	Project Presentations: [Cai & Lopez] and [Gambino & Harrison]	
Dec 8	Project Presentations: [Knoll & Wang] and [Fleyshman & Tencza]	
Dec 10	Project Presentations: [Krafft & McDonough] and [Ding, Song, & Zhang]	

Finals: The 24-hour take home final exam will be due on the last day of final exams. The exam will be available starting on Dec 11th.