

Statistics 237

Bayesian Computation Spring 2017

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Goal: The goal of this course is to teach you the fundamental ideas of Bayesian statistics and to help you develop skill in conducting Bayesian analyses with the aid of a computer.

Text and Software:

The text is *Doing Bayesian Data Analysis, 2nd edition*; by John Kruschke. For software we will use the statistical package R, specifically the implementation RStudio. (Regular R is also available, for free, at <http://www.r-project.org/>)

Office Hours: 10-11 MWF, 1:30-2:20 MW

Note: During office hours I will almost certainly be in or near my office. I am usually in my office between 9 and 5:30, except when I am in class or at a meeting; *you should feel free to drop in and see me at any time*. You only need an appointment if you want to guarantee that I will be in at a time other than an office hour.

Bb: Course information is available on Blackboard. I'll post homework sets and announcements here as well.

Course Outline:

For decades the world of statistics was dominated by “frequentist” methods. Bayesian statistics is a different school of thought that was held back by mathematical intractability of common inference problems. Computers have changed that. Today, Markov chain Monte Carlo (MCMC) methods are used by Bayesians to conduct statistical inference. We will study the Bayesian paradigm, learn a bit about how and why MCMC works, and use MCMC to conduct Bayesian analyses in the most common statistical settings, including one-sample inference, two-sample inference, and regression.

Computers:

We want to do Bayesian statistics and not just talk about it, which means learning how to use software effectively. We will use R, and often the R package rjags, during some class meetings and for homework. We may meet from time to time in a computer lab, with everyone on a computer.

Exams/Homework/Grades:

My plan is to make heavy use of homework. Once per week or so I will assign problems from the book to “Do” but not turn in. Solutions to all exercises in the book can be found at

<https://sites.google.com/site/doingbayesiandataanalysis/exercises>.

I will also assign “Hand in” problems that I will grade; this work will determine half of the semester grade. HW is due in the electronic drop-box in Blackboard prior to the start of class on the due-date. I also plan to give a midterm exam and a take-home final, for the other half of the semester grade.

Honor System: The Honor System applies to all graded work. I encourage you to study with others, but all you must submit your own work.