

Statistics 6570: Applied Bayesian Analysis - Spring Semester 2016

Instructor

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Course Description

This course aims to provide a practical introduction to Bayesian data analysis. Students will be exposed to a variety of Bayesian models including the Bayesian linear model for normal and non-normal data. Bayesian hierarchical modeling will be discussed as a strategy for modeling complex data and as a means of assimilating a variety of sources of data. Simulation-based methods for model-fitting will be introduced, and students will learn to use the JAGS software in addition to programming basic MCMC algorithms in R.

Prerequisites

Prerequisites: STAT 6301 or STAT 6801, or permission of instructor.

Prerequisites or concurrence: STAT 6450 or STAT 6950, and STAT 6302 [with 6301 prerequisite] or STAT 6802 [with 6801 prerequisite].

Students who do not have the prerequisites or do not have permission from the instructor are not permitted to enroll in the course.

Carmen

The class schedule, important announcements, lecture notes, homework problems and solutions, and other information about the course will be posted on **Carmen** (<http://www.carmen.osu.edu>).

Lectures

TTh 12:40-2:30pm in McPherson Chemical Lab (MP), Room 2019

Lecture notes will be posted on Carmen. Please read the sections of the textbook that will be covered, and print out a copy of the lecture notes. There may be parts of the notes that you should fill in during lecture, and you may need to take separate notes on examples that are not in the lecture notes. Unless instructed otherwise, you are responsible for all of the material in the sections of the book that are covered in lecture even if some of the material in the book section is not covered in class. If you are unsure if you are responsible for a particular topic, be sure to ask the instructor.

Required Textbook

Gelman, A., Carlin, J.B., Stern, H., Dunson, D., Vehtari, A., and Rubin, D. *Bayesian Data Analysis, Third Edition*. Chapman and Hall, 2014.

Midterm Exam

There will be an in-class midterm given on Tuesday, April 12th (tentatively).

Final Exam

There will be a final take-home exam that will be due on Monday, May 2nd (tentatively).

Homework Assignments

There will be four homework assignments for the course. You are encouraged to work together on the problems, but each student must hand in his or her own work. **DO NOT COPY** any part of another student's homework including computer output. Use of homework solutions distributed in previous offerings of the course or solutions available on the web constitutes academic misconduct and will be handled according to university rules.

For grading purposes, a *hard copy* of the homework solutions should be submitted at the beginning of class on the due date. The solutions may be handwritten or typed. Please be sure that the questions are clearly labeled, all supporting work (including computer code) can be easily identified, and that all figures/tables are referenced and interpreted in the text. Electronic versions of homework solutions *will not be accepted* unless permission from the instructor is obtained in advance.

Solutions to the homework problems will be posted on Carmen. You should assume that solutions to the homework assignments will be posted after class on the day the homework is due, unless you are notified otherwise. Once the solutions have been posted, late homework will not be accepted. If you are unable to come to class the day a homework assignment is due, please contact the instructor. Re-grade requests on the homework problems must be submitted in writing to the course grader within one week of the day homeworks are returned.

Attendance

Regular attendance and class participation is required. Please let the instructor know by email if you will miss any lectures.

Grading

The following is a breakdown of the final course grade:

Midterm 35% Final 35% Homework 30%

Final course grades may be curved if necessary.

Computing

We will be using the R statistical computing package. No prior knowledge of R is necessary, although previous experience may be helpful. R is available in the Department of Statistics computing laboratory and may be downloaded for free. Links to the website where R can be downloaded and reference manuals are available on Carmen. Most homework assignments will require some computing. Please cut and paste your computer output and graphs into your homework solutions or provide them in a clearly referenced appendix.

Special Accommodations

If you need any accommodations based on the impact of a documented disability contact the instructor privately to discuss your specific needs. You should also contact the Office of Disability Services to coordinate special accommodations.

Academic Misconduct

Academic misconduct *will not be tolerated* and will be dealt with procedurally in accordance with university policy. Please see the Committee on Academic Misconduct's website for details: <http://oaa.osu.edu/coam.html>