Bayesian Analysis, STAT:7520 (22S:238)
Spring 2012

1 General Information

Instructor:	Aixin Tan, 259 SH, 335-0821, aixin-tan@uiowa.edu
Office hours:	MWF 2:30 - 3:20 p.m.
Lectures:	MWF 12:30 - 1:20 p.m. 75 SH

Department:	Statistics and Actuarial Science, 241 SH
DEO:	Luke Tierney, 241 SH, 335-0712
Web page:	`https://icon.uiowa.edu`
	Lecture notes, homework assignments, datasets, etc. will be posted in ICON.

Special note (for this spring only): This course will end before the week of Apr 30. Make-up lectures will be arranged early in the semester.

Textbooks:

- Robert, C.P. (2007) *The Bayesian Choice*, Second Edition. Springer Texts in Statistics. (Available online `infohawk.uiowa.edu`)

- Marin J.M. and Robert C.P. (2007) *Bayesian Core: A Practical Approach to Computational Bayesian Statistics*, Springer Texts in Statistics. (Available online `infohawk.uiowa.edu`)

Supplementary:

- Gelman A., Carlin, J.B., Stren, H.S. and Rubin, D.B. (2003). *Bayesian Data Analysis*, Second Edition. Chapman & Hall, CRC Press.

- Robert, C.P. and Casella, G. (2005). *Monte Carlo Statistical Methods*, Second Edition. Springer Texts in Statistics.

2 Course goals and objectives

●   To introduce the theoretical foundations of Bayesian statistical inference, with emphasize on the Bayesian way of thinking and decision making.

●   To present theoretical and practical aspects of Bayesian computational methods. A main focus is on various Markov chain Monte Carlo (MCMC) algorithms, their application in hierarchical models, variable selection, etc., as well as reliable and effective implementation of these computational methods.

3 Evaluation of students

3.1 Homework

Homework problems will be assigned about every other week, each likely to include both theoretical and computational problems.

Late homework will not be accepted except as required by university policy, i.e. because of "illness, mandatory religious obligations, or other unavoidable circumstances or University activities."

3.2 Projects

Each student must complete a class project on a topic of his/her choice involving Bayesian theory, Bayesian methodology, and/or Bayesian computation. The project should represent roughly 20 hours of new work.

Projects will be carried out in two phases:

- Project proposal (due Fri Mar 19)

  This is a detailed description of what you plan to do, including question(s) to be addressed, dataset to be used (if any), methods and software to be applied, etc. It should be 2 pages in length, including references.

- The final product of the project will be a written report (10 pages or less, graph and R code can be extra) OR a 20-minute oral presentation (no more than 30 slides). You will turn in your report or presentation slides by Fri Apr 6. Examples of past reports will be posted in ICON. During the week of Apr 9, we will have student presentations and go over written reports in groups.

  Note: Scoring of the final project will be based on quality of the analysis and/or methodology, professional appearance and clarity of the report/slides, and the in-class presentation if applicable. One chance to learn how to give presentations is by attending weekly department seminars. There are also many video resources online (such as `http://videolectures.net`) where you can find famous statisticians giving talks related to our course.

3.3 Exams

There will be two 1-hour midterm exams. The **tentative** exam dates and times are

Exam 1	the week of March 5
Exam 2	the week of April 23

3.4 Grading

The course components will be weighted as follows:

Homework	25 %
Midterm 1	25 %
Midterm 2	25 %
Project	25 %

Grading will be on a curve, with $+/-$ grades used. A grade of $A+$ represents exceptional work and rarely is awarded.

4 College of Liberal Arts and Sciences: Policies and Procedures

4.1 Administrative Home of the Course

The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS Academic Policies Handbook: `www.clas.uiowa.edu/students/academic_handbook/index.shtml`

4.2 Electronic Communication

University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences. (Operations Manual, III.15.2. Scroll down to k.11.)

4.3 Accommodations for Disabilities

A student seeking academic accommodations should first register with Student Disability Services and then meet privately with the course instructor to make particular arrangements. See `www.uiowa.edu/~sds/` for more information.

4.4 Academic Honesty

All CLAS students have, in essence, agreed to the College's Code of Academic Honesty: "I pledge to do my own academic work and to excel to the best of my abilities, upholding the IOWA Challenge. I promise not to lie about my academic work, to cheat, or to steal the words or ideas of others; nor will I help fellow students to violate the Code of Academic Honesty." Any student committing academic misconduct is reported to the College and

placed on disciplinary probation or may be suspended or expelled (CLAS Academic Policies Handbook).

4.5   Making a Suggestion or a Complaint

Students with a suggestion or complaint should first visit with the instructor (and the course supervisor), and then with the departmental DEO. Complaints must be made within six months of the incident (CLAS Academic Policies Handbook).

4.6   Understanding Sexual Harassment

Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Comprehensive Guide on Sexual Harassment for assistance, definitions, and the full University policy. Visit `www.uiowa.edu/~eod/policies/sexual-harassment-guide/index.html` for definitions, assistance, and the full policy.

4.7   Reacting Safely to Severe Weather

In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Public Safety web site at `www.uiowa.edu/~pubsfty/intlinks.htm`.