COURSE INFORMATION
Course: STAT 6289-16 (Bayesian Computation)
Semester: Fall 2012 (September 10-December 4)
Time: Monday 6:10-8:40pm
Location: 569 Rome Hall

INSTRUCTOR
Name: Dr. Alyson Wilson
E-mail: agw@gwu.edu
Office hours: Wednesday 5-6pm, 511 Rome Hall (Dr. Stroud’s office) or by appointment

COURSE DESCRIPTION
This is a course about applied Bayesian methods with special emphasis on Bayesian computational tools. We will revisit many of the ideas and models you have seen in your previous courses—including estimation, intervals, inference, hypothesis testing, linear and generalized linear models—and explore how they are approached from a Bayesian perspective.

The course will have four sections.
- Introduction to Bayesian Thinking. This section covers basic definitions, techniques for characterizing posterior distributions, Bayes’ Theorem, and Jeffreys’ Rule.
- Multiparameter Inference. This section covers normal and multinomial models and techniques for random sampling.
- Markov Chain Monte Carlo. This section covers the implementation of Gibbs sampling, random-walk Metropolis, Metropolis-Hastings, and Metropolis-in-Gibbs algorithms. It also covers MCMC diagnostics.
- Linear Models, Hierarchical Models, and Model Checking. This section covers the Bayesian approach for linear regression and hierarchical models. It also considers posterior predictive checking, sensitivity analysis, and goodness-of-fit statistics.

LEARNING OBJECTIVES
- Derive posterior distributions for a variety of statistical models.
- Conduct a Bayesian analysis and create appropriate summaries of results.
- Implement Markov chain Monte Carlo techniques and diagnostics.

COURSE PREREQUISITES
While there are no formal prerequisites for the course, I assume familiarity with the material in STAT 6202 and 2118/6214. I also assume basic familiarity with R.
**TEXTBOOKS (Required)**
- *A First Course in Bayesian Statistical Methods* (2009), Peter Hoff
- Additional course materials will be posted on BlackBoard

**GRADING**
- 45% Homework
- 25% Midterm
- 25% Quizzes
- 5% Class participation

**SCHEDULE**
**Homework:** Ten homework assignments will be made.
**Quizzes:** Five unannounced quizzes will be given in class.
**Midterm:** The midterm exam will be given on October 22.
**Holiday Changes:** No class on Monday, September 3 (Labor Day). We will have class on November 19 (the Monday before Thanksgiving). Class will meet on Tuesday, December 4, a GWU Designated Monday.

**CLASS POLICIES**
**Attendance:** I do not formally take attendance, but there is a class participation component to your grade. If you miss a class and a quiz is given, you will not have the opportunity to make up the quiz.

**Incompletes:** Grades of incomplete can be considered only when you are passing the course and cannot complete the course due to illness or other circumstances beyond your control.

**Late work:** Late work is accepted only in exceptional circumstances and with prior arrangement. I understand that emergencies happen, but my strong preference is for at least 24 hours prior notice. In particular, homework is due at the beginning of class. You can hand in assignments in class, leave them in my Statistics Department mailbox, e-mail them to me, or upload them to Blackboard.

**Make-up exams:** Make-up exams are given only in exceptional circumstances and with prior arrangement. I understand that emergencies happen, but my strong preference is for at least 24 hours prior notice.

**Religious holidays:** Please notify me during the first week of class if you will be absent for a religious holiday during the semester. We will schedule appropriate make-up work without penalty.

**GWU RESOURCES and POLICIES**
**Academic integrity:** Academic integrity is one of my priorities. The GW Code of Academic Integrity states: “Academic dishonesty is defined as cheating of any kind,
including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information.” The entire code is available at http://www.gwu.edu/~ntegrity/code.html.

**Disability Support Services, Rome Hall, Suite 102:** Any student who needs an accommodation based on the potential impact of a disability should contact the Disability Support Services (DSS) office at 202-994-8250, dss@gwu.edu, to establish eligibility and to coordinate reasonable accommodations. If you will require accommodations for this class, please coordinate with DSS and notify me during the first two weeks of classes. For additional information please refer to http://gwired.gwu.edu/dss/.

**Security:** In any incident, the immediate response should be to shelter in place. If the building is affected, evacuate to the front of John Quincy Adams House (across I Street) so that I can be sure that everyone has safely left the building. In case of emergency, call 202-994-6111.

**University Counseling Center:** The University Counseling Center, 202-994-5300, offers 24/7 assistance and referral to address students’ personal, social, career, and study skills problems. Services for students include: crisis and emergency mental health consultations, confidential assessment, counseling services (individual and small group), and referrals. For additional information, please refer to http://gwired.gwu.edu/counsel/CounselingServices/AcademicSupportServices.