

COURSE SYLLABUS

06E: 223 Econometric Theory
22S: 238 Bayesian Analysis
1:05-2:20 p.m. Tuesdays and Thursdays
Classroom 2, Information Arcade, The Library
Fall Semester 2007

COURSE OBJECTIVES

1. To provide a fairly rigorous presentation of the theoretical foundations of Bayesian statistical inference, with emphasis on its use in decision making.
2. To develop an acquaintance with simulation methods for the implementation of Bayesian inference in statistics and econometrics.

PREREQUISITES

The formal prerequisite for Economics 223 is Economics 221. The formal prerequisites for Statistics 238 are Statistics 190, 193 and 194. Students with different preparation should consult with the instructor during the first week of classes.

OFFICE HOURS

Office hours are Mondays 2:00-3:00 p.m. in W382 PBB and Thursdays 9:00-10:00 a.m. in 259 SH, and by appointment. Appointments outside these times are set up by email (john-geweke@uiowa.edu) and usually can be made within 24 hours of request

EARNING CREDIT

The course grade will be based on:
Regular completion of problems (25%);
October 4 midterm (20%);
November 15 midterm (20%);
Final exam (35%).

Students are encouraged to work together on problem sets, but must turn in their own work.

COURSE ORGANIZATION

The course will be conducted in lecture format. At the close of each lecture a problem will be assigned. Answers are due at the start of the next lecture, and will be discussed at the start of the following lecture. For example, the first problem will be assigned August 28, answers will be due on August 30, and will be discussed on September 4.

Problem sets will not be marked in detail. However failure to submit an answer to a problem, or an answer that is clearly not a serious attempt to solve the problem, will be penalized. Late answers will never be accepted.

Lecture notes will usually be available on ICON 24 hours before the lecture.

The topics in this course are primarily in the theory of Bayesian econometrics and statistics, and in the theory of the simulation techniques that are used in the application of Bayesian methods.

POLICY STATEMENTS

1. Course policies are governed by the Tippie College of Business (Economics 223) or the College of Liberal Arts and Sciences (Statistics 238).
2. University policies regarding Student Rights and Responsibilities can be found at http://www.clas.uiowa.edu/students/academic_handbook/.
3. I would like to hear from anyone who has a disability that may require some modification of seating, testing, or other class requirements so that appropriate arrangements may be made. Please contact me after class or during my office hours.
4. The DEO of the Department of Economics is B. Ravikumar, W210 PBB, 335-0831, beth-ingram@uiowa.edu. The DEO of the Department of Statistics and Actuarial Science is L. Tierney, 241 SH, 335-0712, luke-tierney@uiowa.edu.
5. Students wishing to add or drop Economics 223 after the official deadline must receive the approval of the Dean of the Tippie College of Business. Students wishing to add or drop Statistics 238 after the official deadline must receive the approval of the Dean of the College of Liberal Arts. The University policy on cross enrollments may be found at <http://www.uiowa.edu/~provost/deos/crossenroll.doc>.
6. The University of Iowa is committed to providing students with an environment free from sexual harassment. If you feel that you are being or have been harassed or you are not sure what constitutes sexual harassment, we encourage you to visit the University [website](http://www.sexualharassment.uiowa.edu/index.php), <http://www.sexualharassment.uiowa.edu/index.php>, and to seek assistance from department chairs, the Dean's Office, the University Ombuds Office, or the Office of Equal Opportunity and Diversity

READINGS

The course will closely follow the text *Contemporary Bayesian Econometrics* by John Geweke (Wiley, 2005). All students taking the course for credit are expected to purchase this text, which is available in the bookstore. The course outline indicates section numbers in the text corresponding to each lecture.

COURSE OUTLINE

Date	Topic	Text sections
Aug 28	Motivation, observables and conditioning	1.1 - 1.3
Aug 30	Simulators, modeling and decision making	1.4 - 1.6
Sept 4	Basic principles	2.1
Sept 6	Linear model	2.1
Sept 11	Sufficiency, ancillarity and nuisance parameters	2.2
Sept 13	Conjugate prior distributions	2.3
Sept 18	Decision theory and point estimation	2.4
Sept 20	Credible sets	2.5
Sept 25	Marginal likelihoods	2.6.1
Sept 27	Predictive densities	2.6.2
Oct 2	Hierarchical priors and latent variables	3.1
Oct 4	First midterm exam (through Sept 27)	
Oct 9	Improper prior distributions	3.2
Oct 11	Asymptotic analysis	3.4
Oct 16	Direct sampling	4.1
Oct 18	Acceptance and importance sampling	4.2
Oct 23	Gibbs sampler: introduction	4.3.1
Oct 25	Metropolis-Hastings algorithm: introduction	4.3.2
Oct 30	Variance reduction	4.4
Nov 1	Gibbs sampler: convergence theory	4.5.1
Nov 6	Metropolis-Hastings algorithm: convergence theory	4.5.2
Nov 8	Hybrid MCMC methods	4.6
Nov 13	Numerical accuracy in MCMC	4.7
Nov 15	Second midterm exam (through Nov 13)	
Nov 27	Density ratio and joint distribution tests	8.1
Nov 29	Computation of Bayes factors	8.2.1 - 8.2.2
Dec 4	Computation of Bayes factors	8.2.3 - 8.2.4
Dec 6	Model specification	8.3
Dec 11	Applications	
Dec 13	Applications / Review	