Introduction to Bayesian Statistics
Honors STA 4930
Spring 2011

Instructor: Rebecca Steorts, 218 Griffin-Floyd Hall, rsteorts@stat.ufl.edu
Course Time: T 10:40 a.m. - 11:30 a.m.
R 10:40 a.m. - 12:35 p.m.
Course Location: 230 Griffin Floyd Hall

Office Hours: TBA in class or appointment via e-mail
Course webpage: http://www.stat.ufl.edu/%7Ersteorts/

Course description: Bayesian methods are increasingly used in many areas today such as medicine, law, physics, economics, politics, sports, as well as many other areas of study. The objective is to review classical or frequentist concepts that students are already familiar with and then spend the remainder of the course on Bayesian concepts and examples so they can see probability and problems from a different and equally important perspective. We will contrast the classical methods with Bayesian methods in many of our examples so as to emphasize the difference.

A major component for the course will be introducing students to R so they will be familiar with basic statistical functions available to them. Another large part of the course will be class participation and group work since the class will be structured to be interactive to maximize student learning. The students will be responsible for completing an end of course project so they can apply methodology from the course to a real data scenario and provide some sort of implementation in R. This course is specifically designed for honors students at UF. Any student not in the honors program will need to request permission of the instructor to take the course.

Prerequisites: STA 2023.

Credit Hours: 3.

Required Texts: Course textbook: *Statistics: A Bayesian Perspective*, Donald A. Berry, (1996), 1st edition, Duxbury Press.

Recommended Texts: Using R for Introductory Statistics, John Verzani, (2005), 1st edition, Springer.

Reference Texts:

Using R for Introductory Statistics, Peter Dalgaard, (2005), CRC Press.

Modern Statistics with S, W.N. Veneables and B.D. Ripley, (2002), 4th edition, Springer.

Why Flip a Coin: The Art and Science of Good Decisions, H.W. Lewis, (1997), 1st edition, John-Wiley & Sons.

Calculated Risks: How to Know When Numbers Deceive You, Gerd Gigerenzer, (2002), 1st edition, Simon & Schuster.

Course Requirements: For exams, quizzes, and homework exercises, you will need a scientific calculator such as a TI-83 or higher. You will also be expected to access R or download this onto your computer (freeware). You can download R for free from http://www.r-project.org.

Grading Policy:

Attendance/Participation	5%
Homework	15%
Quizzes	10%
Exam 1	15%
Exam 2	15%
Exam 3	15%
Final Exam	15%
Final Project	10%

Topics:

- Motivations of Bayesian inference
- Review of classical inference and how it contrasts with Bayesian inference
- Review of Probability
- Bayes' Rule (and introduction to Bayes' Rule from a Bayesian framework)
- Conjugate Priors and Posterior Distributions
- Introduction to R
- Analyzing Posterior Distributions
- Bayesian Credible Intervals and contrast with frequentist confidence intervals
- Introduction to Loss Functions and Risk

Course Policies: Homework must be turned in at the beginning of the lecture on the due date. Late homework will not be accepted.

All quizzes and exams are closed-book, closed-notes. You should bring a calculator to the quizzes and exams. Makeup exams must be approved before the time of the exam and will be given only in case of medical or family emergencies (which must be appropriately documented). All work must be entirely your own. You are responsible for everything from lecture. Do not depend on the course web page for announcements regarding due dates for homework, changes in schedules, etc. Such announcements will be made in class.

Cell phones should be turned off (or set on silent).

Academic Honesty: The University of Florida requires all members of its community to be honest in all endeavors. Cheating, plagiarism, and other acts diminish the process of learning. When students enroll at UF they commit themselves to honesty and integrity. Your instructor fully expects you to adhere to the academic honesty guidelines you signed when you were admitted to UF. As a result of completing the registration form at the University of Florida, every student makes the the following pledge: *We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: On my honor, I have neither given nor received unauthorized aid in doing this assignment.* This policy will be vigorously upheld at all times in this course. For more information on the UF Honor Code, please go to http://www.dso.ufl.edu/studentguide/studentrights.php#studenthonorcode.

Students with Disabilities: Students who require special accommodations in class or during exams should follow the procedures outlined by the Disability Resources Program http://www.dso.ufl.edu/drp/. Please see the instructor during office hours early in the semester to discuss your accommodation letter confidentially.

Privacy Policies: Student records are condential. Only information designated as UF directory information may be released without your written consent. This includes requests from parents or anyone else who contacts me about your performance in the class.