

Applied Bayesian Analysis
STAT 6366 – Fall 2017
MW 12:30–1:50 pm, LDB 407

Instructor: Dr. Melinda Holt
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Office Hrs: MW 10:30-11:30 am
and by appointment

Texts: *Introduction to Bayesian Statistics, 3rd Edition* by Bolstad and Curran

Software: R Studio, Win-Bugs and JAGS (These may be downloaded from the Internet at no cost.)

Course Objective: To develop an understanding of and a facility for the concepts and applications of Bayesian statistical methods and their relationship to classical inference.

Course Description: This course presents Bayesian methods and their application to fields such as agriculture, biology, criminal justice and medicine. Topics include basic models that use the binomial, normal, poisson and gamma distributions; complex models that apply Markov Chain Monte Carlo methods like the Gibbs sampler and the Metropolis-Hastings algorithm; model selection and evaluation of model adequacy. Software current to the discipline will be used to analyze data.

Prerequisites: STAT 4372 or departmental approval

Exams: There will be two exams and a mandatory comprehensive final exam. Exams are scheduled on Sept 20, Oct 25 and Dec 4 (1 – 3 pm). Make-up exams will be given *only* in extreme circumstances for excused absences.

Homework: Homework assignments will be made regularly. These will be collected for a grade and should be presented in an organized, readable format.

Project: Each student will select a topic to explore and develop lecture notes for approximately two days of coverage, including examples. Students may work in pairs. If so, the lecture notes should assume three days of coverage. No one will actually teach the topic – just fully develop detailed notes to be shared with the class. Students will submit two questions on their chosen topic to be considered for the final exam. Due Nov 20. Possible topics include

- Empirical Bayes
- Calibrated Bayes
- Decision Theory
- Meta-analysis
- Power Priors
- Bayesian Neural Networks
- Bayesian Information Criterion and/or Deviance Information Criterion
- Comparison of Bayesian Software
- Additional MCMC Procedures
- Additional Convergence Diagnostics
- Bayesian Methods using SAS

Grades:	Exam	100 pts/each	A	90% – 100%
	HWK	100 pts	B	80% – 89%
	Lecture Notes	100 pts	C	70% – 79%
	Final Exam	<u>100 pts</u>	D	60% – 69%
		500 pts	F	below 60%

Notes:

- **Attendance** -You should attend all classes; success in the course depends on this. Students are solely responsible for any missed material.
- **Drop Date** – The last day to drop any full term class is *November 10*.
- **Classroom Etiquette** - Free discussion, inquiry, and expression are encouraged in this class. Classroom behavior that interferes with either (a) the instructor's ability to conduct the class or (b) the ability of students to benefit from the instruction is not acceptable. Examples of such behavior may include routinely entering the class late or departing early; use of beepers, cellular telephones, or other electronic devices; repeatedly talking in class without being recognized; talking while others are speaking; or arguing in a way that is perceived as "crossing the line of civility." In the event of a situation in which a student legitimately needs to carry a beeper/cell phone to class, prior notice and approval of the instructor is required.
- **Academic Dishonesty** - All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials. For a complete listing of the university policy, see: <http://www.shsu.edu/administrative/faculty/sectionb.html#dishonesty>
- **Disability Issues**- It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance should register with the Office of Services for Students with Disabilities located in the Lee Drain Annex (telephone 936-294-3512, TDD 936-294-3786, and e-mail disability@shsu.edu). They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired. SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Services for Students with Disabilities and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can be made until you register with the Services for Students with Disabilities. For a complete listing of the university policy, see: <http://www.shsu.edu/~vaf/www/aps/811006.pdf>
- **Student Absences On Religious Holy Days Policy** – Students are excused from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. For a complete listing of the university policy, see: <http://www.shsu.edu/~vaf/www/aps/documents/861001.pdf>
- **Visitors In The Classroom** - Only registered students may attend class. Exceptions can be made on a case-by-case basis by the professor. In all cases, visitors must not present a disruption to the class by their attendance.
- **Use of Cell Phones and Text Messaging in the Classroom** – The university policy may be found at <http://www.shsu.edu/~vaf/www/aps/documents/100728.pdf>. Use is prohibited in class. In an emergency, you may step out of class to answer a call. Use during exams may result in a grade of zero.