

## Stat 544 Spring 2008

**Instructor :** Prof. Stephen Vardeman  
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Office Hours: 12 MWF, 9:30 T/R (all in Black Engineering) and as arranged  
(for time and location)

**Course Assistant:** Opal Hsu  
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Office Hours: 11 M,F (0113 Pearson)

**Course Web Page:** <http://www.public.iastate.edu/~vardeman/stat544/stat544.html>

**Textbook:** *Bayesian Data Analysis* 2<sup>nd</sup> Edition by Gelman, Carlin, Stern, and Rubin  
*Bayesian Computation With R* by Albert (recommended only)

**Other Useful Books:** A list of a number of other useful Bayes books can be found on the  
course web page.

**Class Schedule:** 8-9:20 AM T/R 1160 Sweeney Hall

**Final Exam:** 5/5/08 7:30-9:30 AM

<b>Course Grading:</b>	Mid-Term Exam	25%	(R 3/13/08	7-9 PM	1116 Sweeney)
	Final Exam	25%	(M 5/5/08	7:30-9:30 AM)	
	Homework	10%			
	Mini-Projects	20%			
	Final Project	20%			

**Schedule:** Vardeman will be out of town March 4<sup>th</sup>. In order to make up one class  
session for this, the 8 AM lecture on the day of the mid-term exam (R March 13)  
will NOT be cancelled (unless so announced in class). If other make-ups are  
needed, those will be arranged during the term.

**Software:** We will use some mix of WinBUGS and R. These may be downloaded from  
<http://www.mrc-bsu.cam.ac.uk/bugs/winbugs/contents.shtml>  
and  
<http://www.r-project.org/>  
respectively.

**Assignments:** Three kinds of assignments will be made (to be turned in):

- From time to time, Vardeman will make some fairly "routine," very explicitly stated **Homework** exercise assignments that will be marked by the course assistant.

- A few (3-4) more substantial/less well defined (but nevertheless not completely "free form") Bayes data analyses will be assigned and called **Mini-Projects**. These will be written up in "6-page short formal report" form and will be read and marked fairly carefully by Vardeman.
- A **Final Project** will be self-selected by students and amount to some substantial non-standard Bayes analysis of a real data set taken from some subject matter literature, a consulting project or other RA project, or some other real source. This will be written up in professional quality "tech report" style, and a short presentation given in class during the week before finals. (More details on what is expected follow below.)

Individual students will prepare and turn in the **Homework** and **Mini-Projects**. You may discuss these assignments with fellow students. But each individual must do his or her own coding and independently write up his or her own assignments for turning in. **This is an integrity issue.** Do **not** copy what someone else has written and turn it in as your own. If some computations are needed, do **not** use someone else's code. Each student will attach a cover sheet to his or her assignment with the following **written out, signed, and dated** in his or her own handwriting:

*I have neither given nor received unauthorized assistance on this assignment.*

The **Final Project** will be a collaboration among 2-3 students. Your written report needs to conform to accepted US academic standards of proper attribution--you must fully reference any part of the report that is not completely your own, to avoid plagiarism. **EVERYONE:** In this regard, please see the "**USE INFORMATION ETHICALLY: Ethical / Legal Issues**" sections of the web site

<http://www.lib.iastate.edu/commons/guides/index.html>

(in particular, the sections on plagiarism) and the Academic Dishonesty section of the ISU Catalog

<http://www.public.iastate.edu/~catalog/2007-2009/geninfo/dishonesty.html>

**You may not borrow any language/prose directly from another source without proper attribution!**

### **Accommodation for Students with Disabilities**

Iowa State University complies with the American with Disabilities Act and Sect 504 of the Rehabilitation Act.

If you have a disability and anticipate needing accommodations in this course, please contact Vardeman before the end of the 2<sup>nd</sup> week of the semester. Later requests for accommodations may not be honored. Anyone requesting an accommodation will need to obtain a SAAR form with recommendations for accommodations from the Disability Resources Office, located in Room 1076 of the Student Services Building.

## Stat 544 Course Project Spring 2008

As announced on the course syllabus, 20% of your grade in Stat 544 will be based on a Final Project. This is to be a serious/complete Bayes data analysis associated with a real problem of your choosing. You will work in teams of 2 or 3 people.

Ideally, the subject of your work will be a problem of real independent interest to you. It could come from a consulting project, a subject-matter paper you have read, something from your work as an RA, or from subject-matter work of a friend in another department. If you don't have anything of this type available to you, I can probably help you find something related to engineering or physical science. Or, I'm willing to let you take a substantial problem/example from a non-Bayesian statistical methods text and do a complete Bayes analysis (and make comparisons to what the non-Bayes analysis yields). In any case, the subject-matter problem should be more substantial than any treated on one of Mini-Projects (for example involving more than one factor potentially influencing the response or involving non-normal responses).

You will report on your work in two forms:

1) You will write a professional quality technical report describing the real problem, your data analysis, and what your analysis reveals about the real problem (and potentially, how your analysis and conclusions compare to non-Bayesian results). As indicated on the course syllabus, this must follow academic standards for attribution and clarity of exposition. A reader must be able to start with no knowledge of your subject-matter problem and get a complete understanding of exactly what you've done and learned about the problem through the analysis, AND know exactly what parts of what you've written are yours and what (if any) parts are essentially borrowed from (exactly what) other sources.

Limit what you type up to turn in to a cover page plus at most 15 typewritten pages (including whatever figures you want to include and a reference section). Use at least 11 point fonts, 1.5 line spacing, and 1 inch left and right margins. Also include an Appendix with "commented" WinBUGS and/or R code that you have used. (This Appendix does not count in the above "15 typewritten pages" limit.) If you do not put the entire data set in the main body of the report, include it in another Appendix.

This paper/technical report is due in my office at **5 PM Thursday May 1**. (And I'll be grateful if you can get it to me earlier than that!)

You will find some information about technical writing that may be of help to you at <http://www.public.iastate.edu/~vardeman/RTGWritingStuff.html>

2) You will give a professional quality presentation on your project in class on **April 29** or **May 1** (we'll "draw straws" to see who presents when). The length of these presentations will depend upon how many projects in total are adopted by the class, but I'm guessing that they will be either 15 or 20 minute presentations. (I'll let you know exactly what to plan for when I know how many projects there will be.) All group members will take part in the presentation. You will make professional quality "slides" to project through the system in the classroom. ("Powerpoint" or other .pdf slides are needed unless you bring your own computer and are sure that it can be connected and used in the room.)

If you get your slides to me far enough ahead of time for me to turn them around, I'll mark them and make suggestions in time for you to revise before your oral presentation. A paper copy of the set of final slides is to be given to me as you begin your presentation.

While most of your grade on this project will come from my assessment of your written report, if your oral presentation is either stellar or awful, I will also take its quality into account in arriving at a mark for the project.

As soon as you have settled on how you intend to organize this project (who you intend to work with) please send me an e-mail stating your intentions (so that I can get together a plan for the last week of class, and let you know how long to plan for on the presentations). At the very latest, send me this e-mail by **March 28**.

I will keep the written reports (you'll be able to see my mark-up, but I want to end up with them).

Have fun!