Math 8790 – Introduction to Bayesian Statistics – Spring 2013

**Instructor:** Jesse Frey

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**Office Hours:** 5 – 6 PM Monday and by appointment

**Textbook:** *A First Course in Bayesian Statistical Methods*, by Peter Hoff. This book is available through the Falvey Library as an e-book so that you can read online or print out chapters as needed. It is also possible to order an inexpensive paper copy by going through the library first. Please see the webpage for a link.

**Course topics:** One-parameter Bayesian models; Prior distributions; Posterior distributions; Monte Carlo studies; Markov chain Monte Carlo; Metropolis-Hastings algorithm; Conjugate priors; Gibbs sampler; Convergence diagnostics

**Course prerequisites:** Statistical Methods I (Math 4310 or Math 7404) and Statistical Theory I (Math 5700 or Math 8400).

**Course webpage:** Start at [www.homepage.villanova.edu/jesse.frey/](http://www.homepage.villanova.edu/jesse.frey/) and follow the link for our course. Assignments and homework solutions will be posted on this page.

**Grading:** Your grade will be determined by your homework average (40%), your score on the test (30%), and your score on the course project (30%). Grades will be assigned either according to the following scale or according to one more favorable to you:

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<tr>
<th>Grade</th>
<th>Percentage</th>
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<tr>
<td>A</td>
<td>92-100</td>
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<td>A-</td>
<td>89-91</td>
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<tr>
<td>B</td>
<td>82-85</td>
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<td>B-</td>
<td>79-81</td>
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<tr>
<td>C</td>
<td>70-75</td>
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<tr>
<td>C+</td>
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<td>B+</td>
<td>86-88</td>
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<td>F</td>
<td>&lt; 70</td>
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**Computing:** We will use R for our computing needs. R is a freely available statistical programming language. To download R to your computer, visit [www.r-project.org](http://www.r-project.org).

**Homework:** Homework will be assigned and collected on a weekly basis. You are encouraged to consult with others in the class, but you must submit your own solutions. Assignments should be written up neatly, and multiple-page submissions should be stapled. Typically, you must show your work to receive full credit. Homework assignments will be due at an announced class time, and late assignments will not be accepted without prior arrangements. If you know you will be absent on a day when an assignment is due, please talk with me to arrange an alternate submission plan.

**Tentative Date for Test:** March 25. You may bring a formula sheet to the test.
**Course Project:** Part of your grade in the course will be based on a data analysis project that you complete during the semester, write up as a short paper, and present to the class in a short talk near the end of the semester. The project must be your own work, and it must include a full Bayesian analysis using the methods from the course. More details on the project will be given soon. Please discuss your plan with me to ensure that your data set is appropriate. Bayesian projects that don’t involve a data analysis are also possible, but please contact me first to ensure that your topic is appropriate.

**Other Important Dates:**

January 21 (Martin Luther King, Jr. holiday) – No class.
March 4 (Spring break) – No class.
April 1 (Easter break) – No class.
April 29 and May 6 – Course project presentations.

**Academic Integrity:** All work that you submit must be your own. Violations of the University Code of Academic Integrity will be addressed in accordance with the university-wide procedure.

**Students with disabilities:** Appropriate accommodations will be made for individuals with disabilities. Before I can make these accommodations, however, you must contact the Office of Learning Support Services. Please do this early in the semester.

**Make-up Tests:** Make-up tests will be given only in the case of an excused absence. If you have an excused absence, you should contact me as soon as you are able.

**Attendance:** Attendance is essential if you wish to do well in this course, and you are expected to attend each class meeting. If you do miss a class, it is your responsibility to find out what was covered and what was assigned. The course website can help with this.