

STAT 422 & GS01 0013: Bayesian Data Analysis

Fall 2007

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Room: MD Anderson Cancer Center,
Department of Biostatistics Conference Room (FC2.3031)

Time: Wed. & Fri. 10:30 AM – 12:00 PM

Grade: Grades will be based on 3 homework sets, one exam, and a student presentation.

Course Text:

An Introduction to Bayesian Analysis: Theory and Methods by Jayanta K. Ghosh, Mohan Delampady, and Tapas Samanta, New York, NY: Springer, 2006.

Other texts:

Bayesian Data Analysis, Second Edition by Andrew Gelman, John B. Carlin, Hal S. Stern, & Donald B. Rubin, Boca Raton, FL:Chapman & Hall/CRC, 2003.

Bayesian Theory by José Bernardo & Adrian F.M. Smith, Chichester:John Wiley and Sons, 2000.

Bayes and Empirical Bayes Methods for Data Analysis by Bradley P.Carlin and Thomas A. Louis. London, U.K.:Chapman & Hall/CRC, 2000.

Bayesian Inference in Statistical Analysis by George E. P. Box and George C. Tiao. New York, N.Y.: John Wiley and Sons, Inc., 1973.

Bayesian Statistical Modeling by Peter Congdon, Chichester, U.K.: John Wiley & Sons, Ltd, 2001.

Kendall's Advanced Theory of Statistics, Volume 2B: Bayesian Inference by Anthony O'Hagan. London, Edward Arnold, 1994.

Statistics: A Bayesian Perspective by Donald A. Berry. Belmont, Mass.: Wadsworth Publishing Company, 1996.

| | Date | Topic | Chapter |
|--------|--------|--|---------|
| Week 1 | 29-Aug | Course overview / Overview of Bayesian inference | 1 |
| | 31-Aug | Review of basic concepts | 1 |
| Week 2 | 5-Sep | Bayesian Inference and Decision Theory | 2 |
| | 7-Sep | | 2 |
| Week 3 | 12-Sep | | 2 |
| | 14-Sep | Utility theory | 3 |
| Week 4 | 19-Sep | | 3 |
| | 21-Sep | | 3 |
| Week 5 | 26-Sep | Parametric inference and choice of priors | 5 |
| | 28-Sep | | 5 |

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| Week 6 | 3-Oct | | 5 |
| | 5-Oct | Bayesian hypothesis testing and model selection | 6 |
| Week 7 | 10-Oct | | 6 |
| | 12-Oct | | 6 |
| Week 8 | 17-Oct | <i>Midsemester recess—no class</i> | - |
| | 19-Oct | Large-sample inference | 4 |
| Week 9 | 24-Oct | Introduction to Gibbs sampling and Markov chain Monte Carlo methods | 7 |
| | 26-Oct | | 7 |
| Week 10 | 31-Oct | WinBUGS | |
| | 2-Nov | | |
| Week 11 | 7-Nov | Regression models | 8 |
| | 9-Nov | Model checking | 8 |
| Week 12 | 14-Nov | | 8 |
| | 16-Nov | Hierarchical linear models | 9 |
| Week 13 | 21-Nov | Thanksgiving—no class | |
| | 23-Nov | Thanksgiving—no class | |
| Week 14 | 28-Nov | Generalized linear models | 8 |
| | 30-Nov | Generalized linear models | 8 |
| Week 15 | 5-Dec | Mixture models & student presentations | other |
| | 7-Dec | Student presentations | other |