BUS 41913-01: Bayesian Inference

Instructor: Robert B. Gramacy (Bobby)
e–mail: rbgramacy@chicagobooth.edu
web: http://bobby.gramacy.com
Office hours: by appointment in Harper 338

Lectures: W F 1:30–2:50pm in Harper 3SW

Prerequisites:
Undergraduate level Statistics, Probability, Calculus, Linear Algebra,
and a familiarity with a programming language (e.g, R, Matlab, C or Fortran)

Grading Breakdown:
45% Homework, 5% Quiz (week 3), 30% Midterm (week 7), 20% Take home exam (week 10)
There will not be an in–class final exam.

Required Text:
P.D. Hoff. *A First Course in Bayesian Statistical Methods.* Springer. 2009

Optional Texts:
J. Albert. *Bayesian Computation with* R. Springer. 2nd ed. 2009
A. Gelman, J.B. Carlin, H.S. Stern and D.B. Rubin. *Bayesian Data Analysis.* 2nd ed. 2004

Synopsis: This course will cover the basics of the Bayesian approach to practical and coherent statistical inference. Particular attention will be paid to computational aspects, including MCMC. Examples will the run gamut from toy illustration to real-world data analysis from the social, biological, physical, and engineering sciences, with R implementations provided.

Tentative Schedule:

		Chapters		
Wk	Topic	H	A	GCSR
1	Intro and Fundamentals of Prob & Stats	1,2	–	1
2	One–parameter models	3	3	2
3	Monte Carlo Inference	4	1,5.7-5.10	11.1,13.2-13.4
4	Multi–parameter and normal models	5	4	3
5	MCMC: Metropolis and Gibbs samplers	6,10.2-10.4	6	11
6	Multivariate normal and linear models (LMs)	7,9.1-9.2	9	14
7	Hierarchical models	8	7	5
8	Model criticism, selection and averaging	9.3	8	6,15.5-15.6
9	GLMs and hierarchical LMs & GLMs	10.1,10.5,11	–	15.1-15.4,16
10*	Robust inference, latent variables, missing data	7.5,12	–	17,21

*– time permitting