

1314-ST417

Introduction to Bayesian Modelling

Lecture times and locations

Wednesday 14:00-14:50, 1020 Aras de Brun (ADB-1020)

Thursday 10:00-10:50 (ADB-1020) (Lectures start on Wednesday, 4-Sep, 2013)

Course lecturer

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Course description

This is an introductory course to statistical modelling focusing in part on simulation-based inference and Bayesian methods. A prerequisite for this course is basic knowledge of probability and a year of calculus. Helpful but not necessary for successful study would be if students have already taken an introductory course in statistics or regression analysis. As a programming tool we shall use and learn statistical package R.

Topics will include: Review of basic probability concepts (events, sample spaces, concept of random variable, distributions, expectation and variance, central limit theorem); Likelihood based inference; Priors, posteriors, predictive models. Bayesian inference in simple hierarchical models; Basic sampling techniques; Markov Chain Monte Carlo and Gibbs sampling; Bayesian hierarchical models for regression analysis;

Course work and examination

Final mark will be based on an exam and continuous assessment (CA) which may include a combination of homework problem assignments, take-home projects and in-class quizzes. Details will be given as we progress through the semester.

Reference books

Peter Hoff, *A First Course in Bayesian Statistical Methods*, Springer (2009).

William Bolstad, *Introduction to Bayesian Statistics*, Wiley (2007).

Gelman, Carlin, Stern and Rubin, *Bayesian Data Analysis*, Chapman & Hall / CRC (2004).

Michael Lavine, *Introduction to Statistical Thought*

NOTE: Available online at <http://www.math.umass.edu/~lavine/Book/book.html>