

Advanced Topics in Bayesian Statistics

Instructor: Dr. Hongxiao Zhu
Office: Hutcheson Hall 403H
Email: hongxiao@vt.edu
<https://hongxiao-zhu.github.io/>

Location: Hutcheson Hall 207

Time: Mon. and Wed. 2:30 PM-3:45PM

Office hour: By appointment

Canvas site: All course materials will be posted on canvas site. Homework will be collected and graded through canvas.

Description: This course covers advanced topics in Bayesian analysis, including MCMC theory (e.g., posterior consistency), advanced MCMC computation (e.g., simulated tempering, sequential Monte Carlo), Approximation method (e.g., Laplace approximation, variational inference, variational autoencoder), Gaussian process regression, Bayesian nonparametric methods (Dirichlet process mixtures), and other selected topics.

Prerequisites: Statistical Inference (STAT5114), Bayesian statistics (STAT5444).

Reference/textbook: this course combines diverse topics. Reference will be provided when material are taught.

Software: R/Matlab/Python or others.

Grading: Homework: 45%; Midterm: 20%; Final: 30%; Additional credits: 2 credits = 5%

Homework: There will be 4-5 homework assignments; students who volunteer to help grade homework will receive 2 bonus credits for each grading.

Midterm exam: There will be one take-home midterm exam, which involves modeling and coding.

Final projects: final projects involve two modules: presenting a paper (10%), repeat some result and writing a review of that paper as a report (20%). You need to hand in your report, code to canvas.

Submission policy: Homework will be submitted and graded through canvas site. If the homework involves coding, students are required to submit the original code (e.g., R, python, or Matlab script) together with their reports. If derivation is involved, it is suggested to scan the hand-written copy to transfer it to PDF formats. Please make sure the submitted document is clear enough to be graded.

Homework policy: A due date is shown on each homework assignment. Late homework is only accepted when it is submitted no later than three days after the deadline. Late homework is subject to an extra deduction of 20% per late day. Class attendance is required. If you have an obligation that will result in missing a class, let me know ahead of time.

Honor code: Graduate students enrolled in this course are responsible for abiding by the Graduate Honor Code. For additional information about the Honor Code, please visit: <http://graduateschool.vt.edu/academics/expectations/graduate-honor-system.html>.