

Spring 2021 STAT 6474

Advanced Topics in Bayesian Statistics

Instructor: Dr. Hongxiao Zhu
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<http://www.apps.stat.vt.edu/zhu/>

Format: online synchronously: lectures are given during the scheduled class meeting time

Time: Tuesday and Thursday 11:00 AM-12:15PM

Office hour: By appointment (online through zoom)

Canvas site: This course has a canvas site through Virginia Tech's Canvas system (<http://canvas.vt.edu>). All course materials will be posted on canvas site. Homework will be collected and graded through canvas.

Description: This course covers selected advanced topics in Bayesian analysis, including MCMC theory (e.g., posterior consistency), advanced MCMC computation (e.g., simulated tempering, sequential Monte Carlo), Bayesian variable selection, Gaussian process regression, Non-MCMC computation (e.g., Laplace approximation, variational inference), approximate Bayesian computation, Bayesian nonparametric methods (Dirichlet process mixtures), Bayesian networks, graphical models, 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 or others.

Grading: Students will earn a letter grade of A, B, C, D, F with the plus/minus adjustments based on performance on written homework assignments, midterm, and the final project. The grading break-down is: Homework: 40%; Midterm: 25%; Final: 30%; bonus credits: 5 credits = 5%.

Homework: There will be 4-5 homework assignments; students who volunteer to help grade others' 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 three modules: presenting a paper (10%), repeating some results of that paper and writing 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 or Matlab script) together with their reports. If derivation is involved, it is suggested to scan the hand-written copy to transfer it to electronic 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>.