

STAT 644: Advanced Bayesian Theory

Fall 2020

Instructor: V. Roy
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Course Website: Canvas

Lecture: T/R 2:10 - 3:25 PM, (lectures will be made available to view at your convenience)

Office Hours: M 10-11 am, T 2:10 - 3 PM at zoom
or by appointment

Grader: Dongjin Li (email: dongjl@iastate.edu)
Office Hours: W 11:00 am -12 noon, H 2:30 pm - 3:30pm
Zoom links are mentioned on canvas

Prerequisites: Stat 544 and Stat 642

References:

For Bayes theory

An introduction to Bayesian analysis Theory and Methods by J.K. Ghosh, M. Delampady
and T. Samanta, Springer 2006 edition

Theory of Statistics by M. J. Schervish, Springer 1996 edition

Bayesian Nonparametrics by J.K. Ghosh and R. V. Ramamoorthi,
Springer 2003 edition

The Bayesian Choice by C. P. Robert, Springer 2001 edition

For general state space Markov chain theory

Markov Chains and Stochastic Stability by S. P. Meyn and R. L. Tweedie,
Springer 1993 edition (Available at <http://probability.ca/MT/>)

Measure Theory and Probability Theory by K. B. Athreya and S. N. Lahiri,
Springer 2006 edition

Course Description: The course will generally cover the following topics:

Bayes Theory

Exchangeability, Parametric models
Consistency and asymptotic normality of posterior distributions,
Posterior robustness
Selection of priors using formal rules
Improper priors and posterior propriety
Bayes factors, Model selection, Sensitivity analysis

MCMC Theory

Irreducibility, Harris recurrence, Regeneration
Minorization, Drift, Ergodicity, SLLN and CLT for Markov chains
MCMC and convergence rates of Metropolis Hastings and Gibbs sampler chains
Techniques for speeding up convergence of certain MCMC algorithms

Grading: Homework assignment(40%), final project and presentation (60%)

General ISU Policies for this Course

Academic Dishonesty

The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office.
<http://www.dso.iastate.edu/ja/academic/misconduct.html>

Disability Accommodation

Iowa State University complies with the Americans with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact (instructor name) to set up a meeting within the first two weeks of the semester or as soon as you become aware of your need. Before meeting with (instructor name), you will need to obtain a SAAR form with recommendations for accommodations from the Disability Resources Office, located in Room 1076 on the main floor of the Student Services Building. Their telephone number is 515-294-7220 or email disabilityresources@iastate.edu . Retroactive requests for accommodations will not be honored.

Prep Week (the last week of the semester prior to final exam week)

This class follows the Iowa State University Dead Week policy as noted in section 10.6.4 of the Faculty Handbook
<http://www.provost.iastate.edu/resources/faculty-handbook>.

Harassment and Discrimination

Iowa State University strives to maintain our campus as a place of work and study

for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact his/her instructor, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation

If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Contact Information for any Issues Above

If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.