Introduction to Bayesian Statistics - STAT 4XX/6XX

Teaching Methods

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1 Learning outcome 1

Recall the axioms, basic terms/algebra of probability, including Bayes' Theorem.

Cognitive level: Remember

Appropriate methods: Lecture, interactive lecture, recitation, just-in-time teaching, inquiry based[1], problem-based learning[1], project-based learning[1], fieldwork

2 Learning outcome 2

Model parameters and data using discrete and continuous random variables.

Cognitive level: Apply

Appropriate methods: Interactive lecture[2], directed discussion[2], writing/speaking exercises, classroom assessment techniques, group work or learning[2], cookbook labs, case method, inquiry based, problem-based, project-based, role plays/simulation, service learning with reflection, fieldwork

3 Learning outcome 3

Conduct Bayesian inference for parameters of discrete and continuous random variables.

Cognitive level: Apply and Analyze

Appropriate methods: Same as above LO 3

4 Learning outcome 4

Conduct Bayesian inference parameters in linear regression.

Cognitive level: Apply and Analyze

Appropriate methods: Same as above LO 3

5 Learning outcome 5

Apply computational techniques to conduct Bayesian inference, including Markov Chain Monte Carlo.

Cognitive level: Apply and Analyze

Appropriate methods: Same as above LO 3

6 Learning outcome 6

Compare Frequentist/Bayesian approaches in statistical inference.

Cognitive level: Understand Appropriate methods: Interactive lecture, directed discussion, writing/speaking exercises, classroom assessment techniques, group work or learning, student-peer feedback, cookbook labs, inquiry based, project-based, role plays/simulation

7 Learning outcome 7, Graduate only

Develop and evaluate a Bayesian model for real world data.

[1] Depends on the lecture-break tasks, the discussion questions, or the group tasks assigned.

[2] The knowledge acquired may be narrowly focused on the problem or project.

Cognitive level: Evaluate and Create

Appropriate methods: Writing/speaking exercises, group work, case method, inquiry based, problem-based, project-based, service learning with reflection, fieldwork