

Course Syllabus

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INSTRUCTOR:

Lurdes Y.T. Inoue, PhD

Professor

Department of Biostatistics

University of Washington

CONTACT INFORMATION:

Office Hours: Fridays, 1:00pm-2:00pm or by appointment

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CLASS MEETING TIMES: Lectures: Wed/Fri 11:30am-12:50pm

CLASS LOCATION: Health Sciences Building, T474

COURSE DESCRIPTION:

This course provides an overview of Bayesian methods applied to statistical problems in biomedical sciences. We discuss prior elicitation, Bayesian inference and Bayesian decision making, and Bayesian analysis of problems ranging from medical diagnosis; design and monitoring of clinical trials; meta-analysis and comparative effectiveness; survival analysis. Implementation of models via Inla, Jags, or R is presented as appropriate.

COURSE LEARNING OBJECTIVES:

In this course we discuss basic concepts and methods of statistical inference under the Bayesian approach. Upon completion of the course, students should be able to: 1) use these methods to analyze their own data, 2) interpret the results from their analysis, 3) recognize and assess the role of prior information on Bayesian inference and decision making and 4) use a statistical software package to perform Bayesian analysis.

PRE-REQUISITES: BIostatistics 511-513; or BIostatistics 514-515; or BIostatistics 517-518; or instructor's permission. Familiarity with R is assumed.

HOMEWORK: Homework will (typically) be handed out every week. Homework will be handed in and returned online using the course dropbox available on Canvas. Homework should be submitted in .pdf format. Late homework will not be accepted. The homework in this class will be used to improve the learning process. Homework will be marked credit/no credit based on whether or not it represents a good faith effort to answer all questions. You do not need to give a correct answer for the questions, but you do need to provide evidence of your thought processes on each question so that we can tell that you made an effort. We encourage students to work together or in small groups on the homework problems. A good strategy is for everyone in the group to work on the problems individually and then get together to discuss the more difficult ones. However, unless you have a group assignment, the final version you hand in should reflect your own interpretation and understanding. That is, support and assistance with developing answers is encouraged; copying answers is not (copied assignments will not receive credit). Finally, except where we explicitly request it, no unedited computer output should be included in your answers to the homework questions.

GRADING will be based on:

- Class Participation (10%)
- Homework Assignments (20%)
- Midterm Project (30%)
- Final Project (40%)

OPTIONAL TEXTBOOKS:

1. Applied Bayesian statistics : with R and OpenBUGS examples

Author: Mary Kathryn Cowles

Publisher: New York : Springer, 2013.

Series: Springer texts in statistics.

2. Evidence synthesis for decision making in healthcare

Author: Nicky J Welton; et al

Publisher: Chichester, West Sussex : John Wiley & Sons, 2012.

Series: Statistics in practice.

3. Methods for meta-analysis in medical research

Author: A J Sutton; et al

Publisher: Chichester ; New York : J. Wiley, 2000

Series: Wiley series in probability and mathematical statistics.

4. Bayesian approaches to clinical trials and health care evaluation

Author: D J Spiegelhalter; K R Abrams; Jonathan P Myles

Publisher: Chichester ; Hoboken, NJ : Wiley, ©2004.

Series: Statistics in practice.

5. Bayesian computation with R

Author: Jim Albert

Publisher: New York ; London : Springer, ©2007.

Series: Use R!

6. Bayesian modeling using WinBUGS

Author: Ioannis Ntzoufras

Publisher: Hoboken, N.J. : Wiley, ©2009.

Series: Wiley series in computational statistics.

7. The BUGS book

Author: Lunn et al.

Publisher: CRC Press, 2013.

Series: Texts in Statistical Science.

8. A first course in Bayesian statistical methods

Author: Peter D Hoff

Publisher: New York ; London : Springer, ©2009.

Series: Springer texts in statistics.

9. Bayesian data analysis

Author: Andrew Gelman; et al

Publisher: Boca Raton, Fla. : Chapman & Hall/CRC, ©2004.

Series: Texts in statistical science.

Reserves: Recommended textbooks are available at the Health Sciences Library on reserve or in a "Library use only" section.

SOFTWARE: We will use R (and some specific packages) as well as INLA and Jags.

Learning Environment

To provide a supportive learning environment, I ask your commitment to showing respect to each other and to your instructor both inside and outside of class by avoiding behavior that might be offensive or distracting to others.

Disability Statement

Access and Accommodations: Your experience in this class is important to us, and it is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. If you experience barriers based on disability, please seek a meeting with DRS to discuss and address them. If you have already established accommodations with DRS, please communicate your approved accommodations to your instructor at your earliest convenience so we can discuss your needs in this course.

Disability Resources for Students (DRS) offers resources and coordinates reasonable accommodations for students with disabilities. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. If you have not yet established services through DRS, but have a temporary or permanent disability that requires accommodations (this can include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206-543-8924 or [uwdrs@uw.edu \(mailto:uwdrs@uw.edu\)](mailto:uwdrs@uw.edu) or [disability.uw.edu \(http://depts.washington.edu/uwdrs/\)](http://depts.washington.edu/uwdrs/).

Academic Integrity

Students at the University of Washington (UW) are expected to maintain the highest standards of academic conduct, professional honesty, and personal integrity.

The UW School of Public Health (SPH) is committed to upholding standards of academic integrity consistent with the academic and professional communities of which it is a part. Plagiarism, cheating, and other misconduct are serious violations of the University of Washington **Student Conduct Code** (WAC 478-120). We expect you to know and follow the university's policies on cheating and plagiarism, and the **SPH Academic Integrity Policy**.

Any suspected cases of academic misconduct will be handled according to University of Washington regulations. For more information, see the University of Washington **Community Standards and Student Conduct** website.

Here are links for the text that is highlighted above in boldface:

UW Student Conduct Code (WAC 478-120)

<http://www.washington.edu/cssc/student-conduct-overview/student-code-of-conduct/>
[\(http://www.washington.edu/cssc/student-conduct-overview/student-code-of-conduct/\)](http://www.washington.edu/cssc/student-conduct-overview/student-code-of-conduct/)








SPH Academic Integrity Policy




<http://sph.washington.edu/students/academicintegrity/>
[\(http://sph.washington.edu/students/academicintegrity/\)](http://sph.washington.edu/students/academicintegrity/)

Community Standards and Student Conduct

<http://www.washington.edu/cssc/>

Course Summary:

Date	Details	
Fri Apr 6, 2018	 Homework 1 (https://canvas.uw.edu/courses/1203587/assignments/4121499)	due by 11:59pm
Fri Apr 13, 2018	 Homework 2 (https://canvas.uw.edu/courses/1203587/assignments/4121500)	due by 11:59pm
Fri Apr 20, 2018	 Homework 3 (https://canvas.uw.edu/courses/1203587/assignments/4121501)	due by 11:30am
Fri Apr 27, 2018	 Homework 4 (https://canvas.uw.edu/courses/1203587/assignments/4121502)	due by 11:59pm
Fri May 4, 2018	 Project 1 (https://canvas.uw.edu/courses/1203587/assignments/4126734)	due by 11:59pm
Fri May 11, 2018	 Homework 5 (https://canvas.uw.edu/courses/1203587/assignments/4121503)	due by 11:59pm
Wed May 23, 2018	 Homework 6 (https://canvas.uw.edu/courses/1203587/assignments/4126744)	due by 11:59pm

Date	Details	
Fri May 25, 2018	 Homework 7 (https://canvas.uw.edu/courses/1203587/assignments/4126745)	due by 11:59pm
Fri Jun 1, 2018	 Project 2 (https://canvas.uw.edu/courses/1203587/assignments/4126740)	due by 11:59pm
	 Discussion (https://canvas.uw.edu/courses/1203587/assignments/4126741)	