Course Syllabus

Jump to Today ✎ Edit

INSTRUCTOR:

Lurdes Y.T. Inoue, PhD

Professor

Graduate Program Director & Associate Chair

Department of Biostatistics

University of Washington

CONTACT INFORMATION:

Office Hours: Thursdays, 2:30pm-3:30pm or by appointment

Office: HSB F-658

Phone: (206)616-6398

E-mail: linoue@uw.edu (mailto:linoue@uw.edu)

CLASS MEETING TIMES: Lectures: Tue/Thu 1:00pm-2:20pm

CLASS LOCATION: Health Sciences Building, T639

CLASS WEBPAGE: Course materials (lecture notes) will be posted on the canvas webpage. Hard copies of the lecture notes are only provided for the first lecture. After that, we expect you to download and make your own hard copies of the course materials.

RECORDED LECTURES: We strongly recommend you attend the lectures in person. We will, however, also use mediasite to record the lectures. Please note that recordings may not be available in the event of software failure and we may not be able to control quality of sound, video, etc during the lecture.

https://mediasite.hs.washington.edu/Mediasite/Catalog/catalogs/biost-540-spring-2019 (https://mediasite.hs.washington.edu/Mediasite/Catalog/catalogs/biost-540-spring-2019)

TEACHING ASSISTANT:

Jiacheng Wu, wuj92@uw.edu

Office hour: Wednesday 3:30pm - 4:30pm at Health science library third floor lobby.

Jiacheng will also monitor and answer questions in the discussion board.

COURSE DESCRIPTION:

Correlated data are common in public health and medicine and they typically arise with the natural grouping of observations in “clusters”, or with a collection of observations on individual units over time. Longitudinal data analysis refers to methods for repeated measures data. Multi-level analysis refers to methods that characterize systematic and random variation when data have a hierarchical (nested) organization. This course will first focus on longitudinal data where the element of time is crucial for the formulation of mean models and for characterization of random variation (correlation). We will then focus on issues and methods for data that come in clusters, and data which may involve multiple levels of clustering.

The intended audience for this course is graduate students who have had an introduction to biostatistics, and who a) understand basic probability concepts, such as random variables, expectation, variance and correlation; b) understand basic statistical concepts such as the distinction between populations and samples from a population, parameter estimation, standard errors, hypothesis tests and confidence intervals, and c) are able to carry out statistical analyses such as linear regression, analysis of covariance and logistic regression, and explain them to an epidemiological audience. Familiarity with standard epidemiologic study designs and their analysis is beneficial, as is previous experience with the statistical software package R.

The aims of this course are:

1. to introduce the concepts of correlated data, to describe the basic structures of correlated data, and to explain how correlation arises in common study designs;
2. to contrast the behavior of correlated data with uncorrelated data and to show how the behavior of correlated data influences design and statistical analysis;

3. to show how to analyze correlated data arising from several common correlated data structures using R for statistical computing and analysis; and
4. to introduce more advanced topics in the analysis of correlated data.

COURSE LEARNING OBJECTIVES:

The course seeks to develop an *understanding* of correlated data, including how it arises, its implications for statistical inference, and how to accommodate it in statistical analysis. At the end of the course, the student should be able to:

1. Recognize correlated data and explain how it arises;
2. Describe the impact of correlated data on design and statistical analysis;
3. Describe the basic structures of correlated data;
4. Formulate models for real-life correlated data and correctly interpret the parameters of the model;
5. Choose appropriate analysis methods for correlated data and explain them to a non-statistical audience;
6. Perform several methods of analysis of correlated data using statistical packages and recognize situations that cannot be addressed by these techniques and that require expert assistance; and
7. Recognize some of the key references on correlated data and be prepared for the study of more advanced correlated data methods.

PRE-REQUISITES:

BIOST515/BIOST518 and BIOST/EPI536 or instructor's permission. Familiarity with R is assumed.

GRADING will be based on:

- Homework Assignments (20%)
- Midterm Exam (30%)
- Final Exam (50%)

Assignments will be handed in and returned online (by 5pm) using the canvas course dropbox. Late assignments will not be accepted.

Key dates to remember:

Midterm Exam: May 2

Final Exam: June 6

TEXTBOOKS:

Recommended Books:

1. Fitzmaurice, G.M., Laird, N.M., Ware, J.H. (2004). *Applied Longitudinal Analysis*

This text provides an introductory presentation of longitudinal data methods suitable for graduate level work. It is available online via our UW library.

2. Diggle, P.J., Heagerty, P.J., Liang, K.-Y., and Zeger, S.L. (2002). *Analysis of Longitudinal Data (2nd ed.)*. Oxford: Oxford University Press.

This is an excellent text that gives some mathematical theory as well as practical aspects and applications of methods for the analysis of longitudinal data. If you have the first edition, that will work well, though there are two excellent new chapters in the second edition on advanced material.

SOFTWARE:

The standard software package for the class will be R, which is available on the machines in the Health Sciences Library computer lab. We note that you are not required to use R. You can use other statistical packages, but we will not be able to provide support.

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.

*If you have any concerns about the class or your TA, please see the TA about these concerns as soon as possible. If you are not comfortable talking with the TA or not satisfied with the response that you receive, you may contact the Department of Biostatistics Associate Director of Academic Affairs (**biostgp@uw.edu (mailto:biostgp@uw.edu)**). If you are still not satisfied with the response that you receive, you may contact the Department of Biostatistics Chair (**bchair@uw.edu (mailto:bchair@uw.edu)**). You may also contact the*

Graduate School at G-1 Communications Building, by phone at 206-543-5139 or by email at raan@uw.edu (mailto:raan@uw.edu) .

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)** or **disability.uw.edu (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 478-121) (http://www.washington.edu/cssc/for-students/student-code-of-conduct/)** . We expect you to know and follow the university's policies on cheating and plagiarism, and the **SPH Academic Integrity Policy (http://sph.washington.edu/students/academicintegrity/)** . 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 (http://www.washington.edu/cssc/)** .

Course Summary:

Date	Details	
Thu Apr 18, 2019	Homework 1 (https://canvas.uw.edu/courses/1291435/assignments/4769052)	due by 11:59pm
Thu Apr 25, 2019	Homework 2 (https://canvas.uw.edu/courses/1291435/assignments/4794294)	due by 11:59pm
Thu May 2, 2019	Midterm (https://canvas.uw.edu/courses/1291435/assignments/4761610)	due by 11:59pm
Thu May 16, 2019	Homework 3 (https://canvas.uw.edu/courses/1291435/assignments/4807830)	due by 11:59pm
Thu Jun 6, 2019	Final (https://canvas.uw.edu/courses/1291435/assignments/4761611)	due by 11:59pm