

BIOST 311
Regression Methods in the Health Sciences
Spring 2015

Instructor: Andrew Spieker (HSH H-655C)
Email: ajspiek@uw.edu

Class Sessions: Monday 1:30 - 2:20 PM (HSE E-214)
Wednesday 1:30 - 2:20 PM (HSE E-214)
Friday 1:30 - 2:20 PM (SOCC 346)

Quiz Section: Tuesday, 12:30 - 1:20 PM (HST T-473)

Office Hour: Monday, 12:30 - 1:20 PM (HSH H-655C)

Course Website: <http://www.canvas.uw.edu/courses/1038836>

Course Description: “Introduces regression methods for analysis of continuous, binary, and time-to-event (survival) data. Covers linear regression; logistic regression; and proportional hazards regression, all at an introductory level. Makes use of examples drawn from the biomedical and health sciences literature.”

Recommended Textbooks: There is no required textbook for this course. However, the following texts are available electronically through UW libraries. I will refer to certain sections that may be of use. The second two books (Kleinbaum and Klein) are generally at a more advanced level than will be covered in this class.

- Dupont, WD. Statistical Modeling for Biomedical Researchers: A Simple Introduction to the Analysis of Complex Data. Cambridge (2009). Electronic version available through UW Libraries. [SMBR]
- Kleinbaum and Klein. Logistic Regression: A Self-Learning Text (Third Edition) Springer, New York 2010. Electronic version available through UW Libraries. [LRSLT]
- Kleinbaum and Klein. Survival Analysis: A Self-Learning Text (Third Edition) Springer, New York, 2012. Electronic version available through UW Libraries. [SASLT]

Required Notes: The course notes (lecture slides) will be made available on the course website. The slides will generally be posted in advance, and then extended slides posted at the end of each set of lecture notes.

Prerequisite: The equivalent of BIOSST 310, and college algebra.

Learning Objectives: By the end of the course, students should ordinarily be able to do the following:

- Use a statistical packages to:
 - Enter data
 - Calculate summary statistics
 - Perform basic statistical inference procedures
 - Fit linear, logistic, and Cox regression models
- Use diagnostic procedures to determine if key assumptions are violated in a linear regression model
- Interpret coefficients in linear, logistic, and Cox regression models in the context of health outcomes
- Develop confidence intervals for model parameters and test relevant hypotheses for linear, logistic, and Cox regression models
- Use linear and logistic regression models to make predictions
- Describe how the purpose of data analysis affects the strategy used to select an appropriate regression model

General Expectations: This is a small class; sitting in the front of the room will greatly simplify distribution of materials and will be easier on my voice. Ringers on cell phones should be off. It is acceptable to follow along the course notes and/or demonstrations on your own computer/tablet, as long as the volume is turned off.

You can expect me to have assignments graded in a timely fashion. I will alert you of changes in the course schedule in class or electronically. I will also do my best to answer your questions about course material and/or grading by email, before/after class, or during office hours.

Assignments and Grades: You will be assessed in a number of ways throughout the quarter, so that no single assignment can make or break a final grade.

Homework: 35%

There will be seven homework assignments, all equally weighted and graded out of 10. Homework assignments will typically be 2-4 multi-part problems. There will be a mix of conceptual, analytic, and data analysis problems. Homework scoring will be a combination of good-faith effort and correctness: assignments that do not show a good faith effort will receive 0/10. Assignments that do show a good faith effort will receive a minimum of 7/10, and additional points will be earned based on correctness.

Midst-Term Exams: 25%

There will be two “midst-term” exams, scheduled for 4/20 and 5/18 (each being 12.5% of the total grade). Exams will be closed book/notes/calculator/phone/laptop/tablet. I will post practice exams in advance.

Final Exam: 15%

There will be a cumulative closed book/notes/calculator/phone/laptop/tablet final exam, scheduled for 6/6, at 2:30 PM. I will post a practice exam in advance.

Project: 15%

There will be one data analysis project; the final draft is due on Friday, 6/3. More information to come later in the course.

Reflections: 5%

You will be periodically asked to complete reflections. I will give you a prompt and you will respond to it in a paragraph or two. These will be done online, generally.

Course Participation: 5%

Your participation is key. I will periodically have a short index-card response problems to determine informally whether students are mastering the material. Index card responses will not be graded for correctness, but you must hand in fifteen of twenty index cards to receive the participation credit (it is all/nothing). Index card prompts may be given in either lecture or discussion section.

At the end of the quarter, I will sensibly convert your percentage to the UW 0.0-4.0 scale. If you earn 94% or greater of the possible points, I will guarantee you a 4.0 in the course, and 65% of the total possible points will guarantee at least a 1.8 in the course. The actual grades assigned may be more lenient, but I am providing you with a minimum guarantee.

Course Policies:

On Collaboration: Collaboration is a key component of the course. You are encouraged to work together on homework assignments, but your write-up should be in your own words. All exams are an individual effort, not a collaborative effort. The project is an individual effort, and you are not authorized to collaborate with other students.

On Grading: Grading concerns should be directed to me. If you believe there was an grading error, see me. I reserve the right to change or not change the grade. I may photocopy exams.

On Academic Honesty: Students are encouraged to familiarize themselves with the academic honesty policies (see the section on Academic Integrity). If you hand in homework that is not in your own words, I will not give you credit for the assignment. Issues surrounding academic integrity will be handled in accordance with university policies.

On Extra Help: You are not expected to understand all of the concepts the very first time you see them. Some concepts we cover in this course may be challenging. If you cannot attend my office hours, I strongly encourage you to make an arrangement with me to get extra help.

On Late Work: Late work will not be accepted, except in the most extraordinary of circumstances, approved by me. If you have an exam conflict, you must see me in advance so that we may work something out.

On Computing: This course has a computer-intensive component. You are also expected to have access to a laptop during discussion sections. (You may borrow one from UW Libraries if need be; see the following link: <http://www.lib.washington.edu/ougl/learning-spaces/macbook>).

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

Access and Accommodation: Your experience in this class is important to us. If you have already established accommodations with Disability Resources for Students (DRS), please communicate your approved accommodations to me at your earliest convenience so we can discuss your needs in this course. If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (conditions 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 or disability.uw.edu. DRS offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. (<http://depts.washington.edu/uwdrs/faculty-resources/syllabus-statement/>)

Tentative Topic Outline: This is a proposed outline of course topics. I will speed up and slow down as necessary, so I reserve the right to change this as the course progresses. It will be my responsibility to alert the class of changes.

Unit 0: Review and Background (\approx one week)

Unit 1: Linear Regression (\approx three weeks)

Unit 2: Binary Outcome Regression (\approx two-three weeks)

Unit 3: Survival Analysis (\approx two-three weeks)

Unit 4: Wrapping Up! (\approx one week)

Important Dates: Homework/project due dates and exams dates are listed on the following page.

	Work Due	Exams	Literature by Week
M - 3/28 W - 3/30 F - 4/1			SMBR Ch. 1
M - 4/4 W - 4/6 F - 4/8	HW 1 Reflection 1		SMBR Ch. 2.1 - 2.6
M - 4/11 W - 4/13 F - 4/15	HW 2		SMBR Ch. 3.1 - 3.7
M - 4/18 W - 4/20 F - 4/22	Reflection 2	Exam 1	SMBR Ch. 3.10
M - 4/25 W - 4/27 F - 4/29	HW 3		SMBR Ch. 4.4 - 4.5 SMBR Ch. 4.19 - 4.20 LRSLT Ch. 1
M - 5/2 W - 5/4 F - 5/6	HW 4 Reflection 3		SMBR Ch. 5.6 LRSLT Ch. 2-3
M - 5/9 W - 5/11 F - 5/13	HW 5		SMBR Ch. 5.8 LRSLT Ch. 2-3
M - 5/16 W - 5/18 F - 5/20	Reflection 4	Exam 2	SMBR Ch. 7.1 - 7.2 SASLT Ch. 1
M - 5/23 W - 5/25 F - 5/27	Project Intro HW 6 Reflection 5		SASLT Ch. 2-3
W - 6/1 F - 6/3	HW 7 Final Project		
M - 6/6		Final Exam (2:30 PM)	

Exam 1 covers 3/28 to 4/18

Exam 2 covers 4/22 to 5/16

Final Exam covers 3/28 to 6/3