

Course Syllabus

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Biostat/Stat 533

Welcome to BIOST533/STAT533 "Theory of linear models"

This course discusses the theory of the general linear model (GLM), and related estimation and inference. We will heavily rely on technical skills in linear algebra and probability theory, including matrix decompositions (e.g., singular value decomposition, eigendecomposition) and convergence theorems (e.g., weak laws of large numbers, central limit theorems (plural), Slutsky's theorem).

We will discuss the implications of the theory that we develop on the use of linear models in the wild, but the emphasis of this class is on the theory rather than applications of the GLM.

We will heavily rely on material from STAT 513, a matrix algebra class, and an understanding of using the GLM in practice ((BIOST 515 + STAT 421) or (BIOST 515 + STAT 423) would provide this).

Logistics (Subject to change)

- Instructor: Prof. Amy Willis, Ph.D.
- TA: David Clausen, M.S.
- Lectures: Tuesdays and Thursdays 10:00am - 11:20am, HSB T-wing, room 359.
- Materials: I will distribute materials using Canvas
- Assessment:
- Weekly homeworks: 35%
- Mid-term exam (in class: May 7 10:00am - 11:20am): 20%
- Final exam: 40%
- Attendance: Attendance will not be recorded, but it will be hard to be successful in the class without consistently attending lectures.
- Homework: There will be a homework problem set made available each Friday. Your responses are to be produced in LaTeX and a hard copy is to be handed in at 9:55am the following Thursday (i.e. just before the beginning of class). Late homeworks will not be accepted.
- Exams: Exams are closed book.
- Instructor office hours: Tuesdays 3pm-4pm in Health Sciences F657 (my office).
- TA office hours: Mondays 4pm-5pm in Health Sciences Library
- Accessibility: Please contact me as soon as possible to let me know what accommodations you need

Instructor email: ad[my-last-name]@uw.edu

TA email: dsc24@uw.edu

Syllabus

Model structure; least squares estimation; Gauss-Markov theorem; central limit theorems for linear regression; weighted and generalized least squares; fixed and random effects; analysis of variance; blocking and stratification; applications in experimental design.

Inclusivity

Diverse backgrounds and experiences are essential to the critical thinking endeavor at the heart of university education. I expect you to follow the UW Student Conduct Code in your interactions with your colleagues and me in this course by respecting the many social and cultural differences among us. Please talk with me right away if you experience disrespect in this class, and I will work to address it as best I can. I hope you will feel comfortable speaking with me if you feel that I could make my classroom more inclusive. If you do not feel comfortable speaking with me, I encourage you to contact DCinfo@uw.edu, a resource for students with classroom climate concerns.

Access and Accommodations

Your experience in this class is important to me and I will do my best to create an environment where you can do your best work and your best learning. If you have accessibility needs, please contact me as soon as possible to let me know how I can accommodate you.

I acknowledge that I sometimes speak very fast, especially when presenting in public on a topic that I am enthusiastic about. I recognize that this makes it very difficult for non-native English speakers. I will ****never**** be offended if you ask me to repeat an explanation, or if you ask me to speak more slowly. Please let me know if my accent or speaking pace is difficult for you and I will try to modify.

There is also formal infrastructure for arranging accessibility on campus, and I encourage you to contact them: Disability Resources for Students (DRS, uwdrs@uw.edu, 206-543-8924). If you have already established accommodations with 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 also welcome to contact DRS. 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, me (as your instructor) and DRS. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments, and I will do my best to uphold the standards in and outside of my classroom.

Academic Integrity

UW students are expected to maintain the highest standards of academic conduct, professional honesty, and personal integrity. The 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). I 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.

In this class, the following specific expectations apply:

- You are strongly encouraged to seriously attempt homework problems before seeking assistance (from the TA, professor, or online).
- Discussing homework with classmates without taking notes is acceptable.
- Discussing homework with classmates while taking notes is not permitted. This includes classmates who have taken this class in previous years.
- Conversations regarding homework should **never** involve emailing or sharing materials.

Course Summary:

Date

Details
