a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

Department of Statistics
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STAT 536 E
2025 Winter Term 2
Instructor: Vivian Meng

Description: The course covers basic ideas of some commonly used statistical models and methods in practice, especially in epidemiologic studies and health research. Since this course covers a wide variety of topics, the emphasis will be on understanding of the basic ideas and mathematical/theoretical foundations, applications of the models/methods, and data analysis and writing skills in general. Some other goals of this course include training students to help in the design of a research study with a health/ epidemiological/ pharmaceutical outcome, and to critically read a published research article for a health/ epidemiological/ pharmaceutical research study, and do all of the statistical analyses (if data are available).

Prerequisites: Open to any interested graduate students in the Department of Statistics. Graduate students from other departments are welcome, provided they have sufficient statistical and mathematical backgrounds (roughly, mathematical statistics to the level of UBC STAT 460/461). Such students should consult the instructor about suitability. This course is aimed at training statisticians or biostatisticians, so understanding the math and computing behind the methods is the central part of the course.

Textbook/course material: No required textbook. Some lecture notes will be posted on the course web site. References will be given to books electronically available at www.library.ubc.ca

Website: canvas.ubc.ca

Classes: M/W 12:30 – 2:00 am, Jan 5- April 8, 24 class meetings.

Assessment:
In-class participation 10%,
In-class activities 25%,
Homework questions 35%,
Project 30%

List of Topics:

- **Intro lecture in biostatistics** (1 lecture) starting up. Statistical considerations in epidemiologic studies and health research.
- **Slicing and dicing exposure-disease data** (~4 lectures): issues of retrospective versus prospective study data, dichotomization, stratification, and matching.
- **Meta-analysis** (~3 lectures): key concepts of statistically combining results from multiple studies.
- **Longitudinal data** (~3 lectures) and clustered data, including mixed effects or random effects models and GEE models

- **Analysis of survival data** (~5 lectures): including censoring, KM estimator, log-rank test, Cox models, and AFT models
- **Causal inference** (~6 lectures): propensity scores, instrumental variables, models based on counterfactuals, time-dependent confounding.

Extra topics if time permits.

*The above list is tentative; topics may be removed/added depending on course progression.