STAT 536E : January 10 – March 10, 2022 (2 credits)

Statistical theory for the design and analysis of clinical studies — Biostatistical methods

Instructor: Harry Joe, Dept of Statistics

Lectures: Tuesday & Thursday, 16:00 – 17:30, ESB 4192

Prerequisite: 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.

Text: 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

Descriptions: 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 theory, applications of the models/methods, and data analysis and writing skills in general.

Topics:

- Types of studies/designs in biostatistics, especially for pharmaceutical and vaccine trials in the current COVID-19 pandemic.

- Analysis of binary data, including 2×2 tables.

- Analysis of survival data, including censoring, Kaplan-Meier estimator, log-rank test, Cox regression, and Weibull regression.

- Analysis of longitudinal data and clustered data.

- Other topics that are used in COVID-19 studies.

Evaluation: Class participation & in-class activities.

Homework, such as verifying results in publications of COVID-19 studies.

Final project: analysis of some COVID-19 data (project proposal due in week 3).

Comments: This course will be taught differently than the past. The style consists of *case studies*, using readable papers in NEJM (New England J Medicine), Lancet, JAMA (J American Medical Association), NatureMed, etc., for COVID-19 drug and vaccine trials, and COVID-19 observational studies. The important statistical methodology topics to be covered in the course are those that appear most frequently in these papers.