536C, Statistical Theory for the Design and Analysis of Clinical Studies
2017/18. Term 2
Instructor: Lang Wu

Time and Place:  T/TR, 9:30-11:00 AM, ESB 4192

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. To be clear, 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 materials: Readings will be assigned from e-books and journal articles
available in the UBC library. A main reference will be Regression Methods in Biostatistics:
Linear, Logistic, Survival, and Repeated Measures Models by Vittinghoff, Glidden, Shiboski and
McCulloch.

Assessment: Evaluation will be based on class participation, homework, and a final project.

Notes: This course is not for credit for students who have taken Stat 536A/B.

Topics: In particular we will consider methods of analysis for:
- binary response data, including contingency tables, logistic regression, case-control and
  matched case control studies,
- survival data, including censoring, KM estimator, log-rank test, Cox models, and AFT
  models.
- longitudinal data, including linear mixed effects models and GEE models.
- Model selection, including AIC/BIC criteria.
- Confounding in observational data - regression, matching stratification, propensity score,
counterfactual variables, instrumental variables, and time-varying confounding.

Since this course covers a wide variety of topics, the emphasis will be on understanding of the basic concepts and
methods (rather than detailed mathematical derivations) and application of the methods to real world problems.