RESCH-GE 2997

Course Title: Advanced Data Analysis in Health and Policy Research (Biostatistics III)

Instructor: Ying Lu

Number of Credits: 3

Meeting Pattern: Thursdays 4:55-7:35, Spring 2012

Course Description:

This course is a second year course in advanced statistical techniques that covers useful quantitative tools in health and policy research. Assuming a strong foundation in regression and the general linear model, this course focuses on data analysis that utilizes models for categorical, discrete or limited outcomes that are commonly seen in health and policy studies. Examples include health status, number of clinic visits, etc. In this course students will also learn the principles of likelihood-based inference, which will assist them in some of the more advanced statistics courses offered through the IDRS program.

Course Prerequisites:

- STRONGLY RECOMMENDED: E10.2003 Intermediate Statistical Methods

Learning Objectives:

By the end of the course, students will be able to:

1. Understand various aspects of categorical, discrete and survival outcomes and their inherent challenges in data analysis.
2. Understand a wide range of statistical models that deal with categorical, discrete and limited outcomes such as logistic/probit regression, log-linear model and event history model through examples in public health and policy studies.
3. Have practical skills to apply appropriate statistical models and analyze data using statistical software.
4. Develop writing skills for quantitative research through class projects.
5. Gain deeper understanding of the statistical theory, specifically likelihood-based inference that underlies statistical practices.

Course Format: (Lecture, lab, seminar, recitation or combination)

2 hours of lecture followed immediately by 1 hour lab

Course Outline (list of lectures/topics each session)

Week 1-2 Introduction to likelihood theory
Week 3 Linear regression review
Week 4-5  Logistic model
Week 6    Probit model
Week 7    Ordinal and multinomial model
Week 8    Contingency tables and the loglinear model
Week 9    Poisson Regression and overdispersion
Week 10   Writing Quantitative Article
Week 11   Survival: describing survival data and K-M
Week 12   Survival: parametric survival models
Week 13   Survival: Cox model
Week 14   Survival: discrete time approaches

Course Requirements
The grade for this course will be determined as follows: four problem sets (10% each for a total of 40%), two data analysis projects (30% each).

The problem sets are designed to give students practice with the analytical tools and statistical software introduced in class. Roughly the problem sets will be assigned during weeks 6, 9, 12 and 14.

The data analysis projects are designed to give students experience analyzing real data and writing quantitative articles. The project reports need to be typed (in word processor) and should be professional in appearance. The first project will be due around 11th week. The second project will be due at the final exam week. Students are expected to work on the projects independently. They are equivalent to take-home exams and there will be no in-class exams.

Required Readings and/or Text (partial reading list)
Brian F. Manly, *Multivariate Statistical Methods, A Primer (2nd Ed.)*;
Chap T. Le, *Applied Categorical Data Analysis*
Pual Allison. *Event history analysis*