Prerequisite:

STAT 450

Textbook (References):

> *Applied Longitudinal Analysis,* Authors: Garrett M. Fitzmaurice, Nan M. Laird, James H. Ware, Publisher: Wiley, Year: 2004.
> *Analysis of Longitudinal Data, 2nd ed.,* Authors: Peter Diggle, Patrick Heagerty, Kung-Yee Liang, Scott Zeger, Publisher: Oxford University Press, Year: 2002

There are a few copies of each book available in the bookstore and there will be 1 copy of each book on reserve in the library.

Course Description:

This course covers methods for the analysis of repeated measures, correlated outcomes and longitudinal data, including unbalanced and incomplete data sets, characteristic of biomedical research. Topics include covariance pattern models, random or mixed-effects models, multilevel models, generalized estimating equations (GEE), inference for multistate processes and counting processes, and methods for handling missing data.

Outline:

1. Examples of longitudinal studies and approaches to longitudinal analysis.
2. Exploring correlation structures; parametric models for correlation
3. Contrasting marginal, random effects and transitional models
4. Random effects and conditional models
5. Marginal models using generalized estimation equations
6. Unbalanced and incomplete data
7. Multilevel models
8. Multi-state and transition models and methods for prospective cohort data
9. Counting processes
10. Fitting smooth curves

Grading Scheme:

Homework Assignments – 20%
Two Tests (in-class), or One Test & One Presentation (in-class) – 25% each
Data Analysis Project ("closed" take-home) – 30%

Students should be aware that they have certain rights to confidentiality concerning the return of course papers and the posting of marks. Please pay careful attention to the options discussed in class at the beginning of the semester. Students are reminded that Academic Honesty is a cornerstone of the acquisition of knowledge. Scholarly integrity is required of all members of the University. Please consult the General Guidelines of the calendar for more details.

Revised November 2010