Course Syllabus

Adjunct Professor : Garrett Fitzmaurice

Course	Biostatistics : Applied Longitudinal Analysis		
Credit	1	Method of Teaching	Lecture

Objective

The emphasis of this course is on understanding basic concepts and methods and how they can be applied in the health sciences.

Outline

The aim of the course is to introduce modern methods for the analysis of longitudinal data when the response variable is a continuous or quantitative measurement. Data of this type commonly arise in epidemiological studies and in clinical trials. Topics include an introduction to the analysis of longitudinal data, the analysis of response profiles, fitting parametric curves, covariance pattern models, random effects and growth curve models. The course is intended for all students interested in epidemiology, biostatistics and public health. The course is intended for all students interested in epidemiology, biostatistics and public health.

Prerequisites: An introductory course in biostatistics and basic knowledge of linear regression analysis will be assumed of students entering this course. Students without this background will have the opportunity to review videos of lectures (approx. 3 hours) by Professor Fitzmaurice on linear regression during the week prior to start of the course.

Class Schedule (90 minutes each)

<u>Day 1 (Wednesday, January 9, 2019)</u>

1. **Introduction; Review of Basic Concepts; Examples; Notation; Introduction to Correlated Data**. *Readings: FLW, Chapters 1 and 2.* (9.00-10.30 am)
2. **Modelling the Mean: Analysis of Response Profiles**. *Readings: FLW, Chapter 5 (Sections 5.1-5.4, 5.8-5.9).* (10.45-12.15pm)

<u>Day 2 (Thursday, January 10, 2019)</u>

3. **Modelling the Mean: Parametric & Semi-Parametric Trends**. *Readings: FLW, Chapter 6.* (9.00-10.30 am)
4. **Case Study: Modelling the Mean – Application to Weight Loss Study**. (10.45-12.15pm)

Day 3 (Friday, January 11, 2019)

5. **Modelling the Covariance, Strategies for Modelling the Mean and Covariance**. (9:00-10:30am)
   Readings: FLW, Chapter 7.
6. **Case Study: Jointly Modelling Mean & Covariance – Application to Dental Growth Study**. (10.45-12.15pm)

Day 4 (Saturday, January 12, 2019)

7. **Linear Mixed Effects Models for Longitudinal Data**. (9:00-10:30am)
   Readings: FLW, Chapter 8
8. **Case Study: Linear Mixed Models – Application to Menarche Study**. (10.45-12.15pm)

Written Exam (Saturday, January 12, 2019): (13.30-15.00pm)

We may add seminars by Japanese teachers for each to assist students with difficulty in language/background knowledge

Text

Fitzmaurice, G.M., Laird, N.M., and Ware, J.H. (2011). Applied Longitudinal Analysis, 2nd Ed. Wiley & Sons. (FLW)

Related readings

Will be made available prior to the lecture.

Achievement evaluation

There will be a written final exam about conternts in the class upon completion of the course.