

PREV 801
Analysis of Longitudinal and Clustered Data

<i>Faculty</i>	Roumen Vesselinov RVesselinov@som.umaryland.edu
<i>Class time/place</i>	Wednesdays, 9:30 AM - 12:25 PM via ZOOM or in person (TBD)
<i>Grading</i>	Weekly Homework: 30% (graded on effort) Two data analysis projects: 20% each Final Exam: 30%
<i>Course Objectives</i>	Students will learn: 1) To recognize clustering, and understand the impact of clustering on estimates of statistical summaries 2) Methods to explore clustered and longitudinal data 3) A large menu of options for analysis of quantitative longitudinal data. 4) Extensions of these methods for binary and count data 5) How to use SAS to implement the methods
<i>Text</i>	Applied Longitudinal Analysis, Fitzmaurice GM, Laird NM, and Ware JH, 2nd edition, Wiley, 2011, ISBN 978-0-470-38027-7.
Software:	SAS 9.3 or 9.4. Students who do not have SAS can get a copy from the DEPH academic office. SAS is also available on the computers in the HH mezzanine, and in the new GPLS computer lab.
On-line materials:	Power Point slides from upcoming lessons will be posted on Blackboard. All assignments and data sets will be posted on Blackboard. Classes will be recorded, and recordings made available on Blackboard. All course materials, slides and recordings are for students enrolled in this class. No materials can be distributed or published online or on other media.
University Policies:	Student policies https://www.umaryland.edu/university-life/student-policies/ Academic affairs policies https://www.umaryland.edu/policies-and-procedures/library/academic-affairs/policies/

Schedule (Tentative, subject to change):

Lesson		Dates	Textbook
1	Types of clustered and longitudinal data	Feb. 2	Ch. 1
2	Mathematics of Covariance	Feb. 9	App. B & Ch. 2
3	Exploratory Data Analysis		Sec. 3.3
4	Summary Measures Approach	Feb. 16 HW#1 due	pp. 83-86
5	Basic Matrix Notation		App. A
6	Multivariate Normal Distributions		pp. 57-62
7	Classic methods for analysis of clustered data.	Feb 23	pp. 76-83
8	General Linear Models: Introduction.	HW#2,3 due	Ch. 4
9	General Linear Models: Mean structure for data with common time points	March 2 HW#4 due	Ch. 5
10	General Linear Models: Smooth models for mean structure	March 9 HW#5 due	Ch. 6
12	General Linear Models: Modeling covariance structure		Ch. 7
	<i>Project 1 Instructions.</i>		
11	General Linear Models: Comparing groups for change from baseline	March 16 HW# 6 & 7 due	Sec. 5.7
Spring Break		March 20 – 27	
13	Random or Mixed effects models for clustered quantitative data	March 30	Ch. 8
14	Multi-level models	April 6 HW# 8 due	Ch. 22
15	Estimating Random Effects		pp. 209-213
16	Generalized Estimating Equations (GEE) for fitting marginal models to clustered data	April 13 HW# 9 due	Chs.11-13
	<i>Project 2 instructions.</i>	Project 1 due	
17	Generalized Linear Mixed Models	April 20 HW # 10 due	Ch. 14
18	Assessing properties of statistical methods using simulation.	April 27 HW # 11 due	
19	Missing Data		Ch.17-18
22	Power and sample size for clustered data	May 4 HW # 12 & 13 due	Ch. 20
	Project 1 Review		
20, 21, 23	Latent Class growth modeling Review for Final Exam	May 11 Project 2 due	
	Final Exam	May 18	