Child Language Doctoral Program (CLDP) 944:
Multilevel Models for Longitudinal and Repeated Measures Data

Instructor:	Dr. Lesa Hoffman	Website:		http://www.lesahoffman.com/CLDP944/index.html
Email:	Lesa@ku.edu	Phone:		(785) 864-0638
Room:	3049 Dole	Office:		3042 Dole
Time:	MW 1:15–2:30	Office Hours:		MW 2:30–4:00 in 3049 or 3042 Dole; also by appt.

Schedule of Topics and Events:

The online syllabus at the web address provided above will always have the most current information.

Course Objectives, Materials, and Pre-Requisites:

This course will illustrate the uses of multilevel models (i.e., general linear mixed models, hierarchical linear models) for the analysis of longitudinal and repeated measures data. The course is organized to take participants through each of the cumulative steps in a multilevel analysis involving time-invariant predictors: deciding which type of model is appropriate, organizing the data and coding predictor variables, evaluating fixed and random effects and/or alternative covariance structures, predicting multiple sources of variation, and interpreting and presenting empirical findings. Class time will be devoted primarily to lectures and examples; opportunities to earn participation points via in-class assessments will also occur throughout the semester. Lecture materials in .pdf format will be available for download at the website above the day prior to class, or else paper copies will be provided in class. Video recordings of the class lectures will also be available online, but are not intended to take the place of class attendance. Selected book chapters and journal articles will be assigned for each specific topic; the initial list of readings below may be updated if needed. Because the course will have an applied focus using SAS software, instructor office hours will also be held in the 3049 Dole computer lab, in which participants will have opportunities to work on course assignments and receive immediate software assistance. This course will be a pre-requisite for CLDP 945, Advanced Multilevel Models, to be offered Spring 2018. Participants should be comfortable with the general linear model (analysis of variance, regression) prior to enrolling in this course.

Academic Honesty:

As a reminder, the University of Kansas has a formal policy on academic honesty. All course assignments should be done individually without exception.

Accommodating Students with Disabilities:

Students with disabilities or who have other special needs are encouraged to contact the instructor for a confidential discussion of their individual needs for academic accommodation.

Course Requirements:

Participants will have the opportunity to earn **up to 100 total points** in this course. Up to **84 points** can be earned from **homework assignments** (approximately 8 in total). Up to **16 points** may be earned from participating in **in-class quizzes** on course material, but you must be present on the day the quiz is administered to earn those points. Please note there will also be an opportunity to earn up to **6 points of extra credit** (labeled as homework 0 and homework 0B; see the online syllabus for more information).

Policy on Late Homework Assignments and Incompletes:

In order to be able to provide the entire class with prompt feedback, **late homework assignments will incur a 3-point penalty.** However, extensions will be granted as needed for extenuating circumstances (e.g., conferences, comprehensive exams, family obligations) if requested **at least two weeks in advance of the**

Last updated 8/21/2017

due date. As noted above, missed in-class quizzes cannot be made up. Finally, a final grade of "incomplete" will only be given in the event of extremely dire circumstances and at the instructor's discretion.

Final grades will be determined by the *proportion* earned out of the total possible points:

>92 = A, 90–92 = A−, 87–89 = B+, 83–86 = B, 80–82 = B−, < 80 = C or no pass

Course Software:

Participants will also need to have access to SAS software, which is freely available in 3049 Dole and in other computer labs across campus, as well as online through the KU Academic Computing Facility and by downloading the SAS University Edition (see course website for more info). Individual licenses can also be purchased from the KU software store ($150 each; yearly renewal required).

Course Textbook:

Hoffman, L. (2015). *Longitudinal analysis: Modeling within-person fluctuation and change*. New York, NY: Routledge Academic.

Other Course Readings (all will be available via "Course Documents" on Blackboard):

Enders, C. K. (2010; chapters 3–5). *Applied missing data analysis*. New York, NY: Guilford.

Willett, J.B. (1989). Some results on reliability for the longitudinal measurement of change: Implications for the design of studies of individual growth. *Educational and Psychological Measurement, 49,* 587-602.

Planned Schedule of Events:

Week	Date	Topics	Readings
1	8/21	Course Introduction Lecture 1: Introduction to Analysis of Longitudinal and Repeated Measures Data	Hoffman ch. 1; Willett (1989)
	8/23	Make Friends with SAS Part 1	
	8/25	**HOMEWORK #0A DUE: Extra Credit from Online**	
2	8/28	Make Friends with SAS Part 2	Hoffman ch. 2 sec. 1
	8/30	Lecture 2a: Review of General Linear Models Example 2a: Review of General Linear Models	
	9/1	**HOMEWORK #0B DUE: Extra Credit for Demonstrating Home SAS Access**	
3	9/4	**NO CLASS OR OFFICE HOURS**	
	9/6	Lecture 2a and Example 2a, continued	
	9/8	**HOMEWORK #1 DUE: Make Friends with SAS**	
4	9/11	Lecture 3: Introduction to Within-Person Analysis and RM ANOVA Example 3a: Between vs. Within-Person Models	Hoffman ch. 3 sec. 1
	9/13	Lecture 3, continued Example 3b: Repeated Measures Analysis of Variance	Hoffman ch. 3 sec. 2+
	9/15	**HOMEWORK #2 DUE: Review of General Linear Models**	
5	9/18	Lecture 4: Describing Within-Person Fluctuation over Time via ACS Models Example 4: Describing Within-Person Fluctuation over Time	Hoffman ch. 4 sec. 1-2
	9/20	Lecture 4 and Example 4, continued	Hoffman ch. 4 sec. 3+
	9/22	**NO HOMEWORK DUE**	

Last updated 8/21/2017

Week	Date		Readings
6	9/25	Lecture 5: Introduction to Random Effects of Time and Model Estimation Example 5: Practice with Random Effects of Time	Hoffman ch. 5 sec. 1-2
	9/27	Lecture 5 and Example 5, continued	Hoffman ch. 5 sec. 3+
	9/29	**HOMEWORK #3 DUE: ACS models**	
7	10/2	Lecture 5 and Example 5, continued	Enders ch. 3-5
	10/4	**NO CLASS OR OFFICE HOURS**	
	10/6	**REVISIONS TO HOMEWORK #1 DUE**	
8	10/9	Lecture 6: Describing Within-Person Change Example 6a: Polynomial Models of Change	Hoffman ch. 6 sec. 1-2A
	10/11	Lecture 6 and Example 6a, continued	
	10/13	**HOMEWORK #4 DUE: Linear Time Random Effects Models**	
9	10/16	**NO CLASS OR OFFICE HOURS**	
	10/18	Lecture 6, continued Example 6b: Piecewise Models of Change	Hoffman ch. 6 sec. 2B
	10/20	**NO HOMEWORK DUE**	
10	10/23	Lecture 6 and Example 6b, continued	
	10/25	Example 6c: Negative Exponential and Other Nonlinear Change	Hoffman ch. 6 sec. 2C+
	10/27	**HOMEWORK #5 DUE: Quadratic Time Random Effects Models**	
11	10/30	Lecture 6 and Examples, continued	
	11/1	Review of Unconditional Models of Time	
	11/3	**NO HOMEWORK DUE**	
12	11/6	Lecture 2b: Interactions among Continuous Predictors Example 2b: Interactions among Continuous Predictors	Hoffman ch. 2 sec. 2
	11/8	Lecture 2b and Example 2b, continued	
	11/10	**HOMEWORK #6 DUE: Piecewise Time Random Effects Models**	
13	11/13	Lecture 2c: Interactions among Continuous Predictors Example 2c: Interactions among Continuous Predictors	Hoffman ch. 2 sec. 3+
	11/15	Lecture 2c and Example 2c, continued	
	11/17	**NO HOMEWORK DUE**	
14	11/20	**NO CLASS OR OFFICE HOURS**	
	11/22	**NO CLASS OR OFFICE HOURS**	
	11/24	**NO HOMEWORK DUE**	
15	11/27	Lecture 7: Time-Invariant Predictors in Longitudinal Models Example 7: Time-Invariant Predictors in Models of Change	Hoffman ch. 7
	11/29	Lecture 7 and Example 7, continued	
	12/1	**HOMEWORK #7 DUE: Interactions among Continuous Predictors**	
16	12/4	Lecture 7 and Example 7, continued	
	12/6	Course Evaluations; Preview of CLDP 945	
	12/8	**STOP DAY**	
17	12/11	**OPEN LAB DAY 1:15-4:00 PM**	
	12/15	**HOMEWORK #8 DUE: Time-Invariant Predictors**	

Last updated 8/21/2017