APSTA-GE 2042 Advanced Topics in Quantitative Methods: Marc Scott
Multi-Level Modeling – Nested Data (2 points)   Spring 2014

Lecture:	Tuesdays 3:30-6:10 pm	Office: 801W Kimball Hall
	1st class meets March 25th	
Location:	194 Mercer Rm 304	Phone: 212-992-9407
Office Hours:	Tuesdays 2:30-3:30 pm, and by appointment	email: marc.scott@nyu.edu
Optional Texts:	Bryk and Raudenbush, *Hierarchical Linear Models: Applications and Data Analysis Methods;* Rabe-Hesketh and Anders Skrondal, *Multilevel and Longitudinal Modeling Using Stata*	
Software:	STATA	

Note: This course will use NYU Classes. Email is the preferred form of communication. If you call my office phone, it is best to email me as well.

COURSE OVERVIEW: This is a course on models for multilevel nested data. These data arise in nested designs, which are quite common to education and applied social, behavioral and policy science. Traditional methods, such as OLS regression, are not appropriate in this setting, as they fail to model the complex correlational structure that is induced by these designs. Proper inference requires that we include aspects of the design in the model itself. Moreover, these more sophisticated techniques allow the researcher to learn new and important characteristics of the social and behavioral processes under study. In this module, we will develop and fit a set of models for nested designs (these are sometimes called hierarchical linear models). The course assignments will use state of the art statistical software to explore, fit and interpret the models.

COURSE PREREQUISITE: RESCH-GE 2004 (Advanced Modeling I: Topics in Multivariate Analysis) or equivalent. RESCH-GE 2040 (Advanced Topics in Quantitative Methods: Multi-Level Modeling – Growth Curves) is recommended. *At least one of these prerequisites is strongly encouraged. Consult with the instructor if you wish to substitute an alternative.*

COURSE REQUIREMENTS:

Participation:	10%	You are expected to attend class and participate in class discussions
Homework problems:	50%	There will be 5 problem sets that will require some computing, analysis, and interpretation.
Project:	40%	There will be a moderate-length data analysis project (and write-up) instead of a final exam.

COURSE HANDOUTS: Handouts will be available on NYU Classes by the Monday preceding class. It is the student's responsibility to download and review the notes before coming to class.

COURSE READINGS: There is no assigned text for this course, but students are encouraged to purchase AT LEAST ONE of the two optional texts mentioned above. Bryk & Raudenbush (BR) is considered one of the 'classic' texts in MLMs. Suggested readings from this book are posted in the schedule – they are useful readings, *but only roughly match* the weekly topics. Rabe-Hesketh & Skrondal (RS) is a newer book that is linked to the STATA package, and thus could prove a very useful reference. It has good discussion of the topics as well, but in more technical terms. Chapter 1 of RS is a good review of regression, and we will cover parts of chapters 2-4, 10 & 11. Readings from two chapters of an unpublished MLM Handbook will be made available through Blackboard – you are asked not to distribute these chapters.

Late assignment policy: Assignments are to be handed in on time.

SCHEDULE

Date		Topic	Book chapters	Readings
Mar	25	The logic of hierarchical models; Model specification; variance components	BR 1,2; RH 2	
Apr	1	What are random effects? Different notations/conceptualizations; **HW 1 due**	RH 2,3	Chap. 2 MLM Handbook
	8	Model selection using likelihood ratio tests; Random slopes/implicit interactions; **HW 2 due**	BR 3,4; RH 4	Peugh
	15	Random slopes (redux), BLUPs, types of residuals; **HW 3 due**	BR 4,5; RH 2,4	Cheng, et al.
	22	Non-linearity; non-nested models; **HW 4 due**	RH 10,11	
	29	Nested longitudinal data	BR 8	
May	6	Centering; hybrid models; The choice between fixed and random effects; **HW 5 due**	BR 5; RH 3	Chap. 5 MLM Handbook; Enders & Tofighi; Allison
	13	**FINAL PROJECT due**		