RMTD 484
Hierarchical Linear Modeling

Instructor: Meng-Jia Wu, Associate professor
Classroom: Lewis Towers, Room 710
Class time: Tuesdays, 4:15-6:45pm
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Course Description

This course is designed for graduate students with considerable experience with linear models (i.e., the topics introduced in RMTD 482 or equivalence) and abilities to conduct statistical analyses using computer software. The major topics of this course includes two-level models for continuous, categorical, and count outcomes, three level models, growth models, and multilevel approach to meta-analysis. The assumptions and other critical issues related to using hierarchical linear models will also be discussed. The focus of this course is on estimating models and interpreting the results, along with understanding fundamental theories behind the multilevel modeling techniques. Students will have chance to critically evaluate contemporary social research using this technique.

School of Education conceptual framework (www.luc.edu/education/mission/)

Our School's conceptual framework is "social action through education". This course contributes to this framework by equipping students with knowledge and experience in statistics used in quantitative research. Through conducting, interpreting, and reporting reliable social science studies, researchers can help further the scholarly understanding of the events and practices that influence the field of education. The ultimate outcome of this understanding is to ensure that that all individuals, no matter their ability, race, religion, socioeconomic status, age or gender benefit from effective research.

Couse objectives

Students are expected to understand
      Research designs where HLM most useful;
      Basic structure of HLM models, both nested and longitudinal;
      Data assumptions and requirements of HLM models; and
      Similarities and differences between HLM models and other statistical models for nested and longitudinal data.

Students are expected to be able to
      Use SPSS to create level 1 and level 2 data files for nested and longitudinal data (if using HLM 6 or earlier version) and read SPSS files into HLM program;
      Analyze nested and longitudinal models in HLM program;
      Examine output from HLM program;

Interpret and write the results of the data analysis;
Exporting residual files from HLM program into SPSS; and
Critique a peer-reviewed journal article that uses HLM.

Required texts
Hox, J. J. (2010). *Multilevel analysis: Techniques and applications* (2nd ed.). New York, NY: Routledge.

HLM 7 manual: The PDF of the HLM 7 manual is available via the HLM 7 Manual option on the Help menu.

Strongly recommended
Some concepts and examples from the following book are adopted in this class.
Raudenbush, S. W. & Bryk, A. S. (2002). *Hierarchical linear models*. Thousand Oaks, CA: Sage Publications.

Snijders, T. A. B. & Bosker, R. J. (1999). *Multilevel analysis*. Thousand Oaks, CA: Sage Publications. (Available at: http://www.sagepub.com/book.aspx?pid=6642)

Recommended
The following books are good resources, and not required:
Kreft, I. G. G. & de Leeuw, J. (1998). *Introducing multilevel modeling*. Thousand Oaks, CA: Sage Publications. (Available at:
http://www.sagepub.com/book.aspx?pid=6341)
Singer, J. D. & Willett, J. B. (2003). A*pplied longitudinal data analysis: Modeling change and event occurrence*. New York: Oxford University Press. (Info at:
http://gseacademic.harvard.edu/alda/)
Useful resources are also available here: http://ssicentral.com/hlm/resources.html

Technology
The use of technology is a major requirement of this course. Students will use the computer packages SPSS and HLM 7 during class and to complete assignments at home.
The student version of HLM 7 is available free from the website for Scientific Software International
http://www.ssicentral.com/hlm/student.html

Course expectations
Students are expected to use the Sakai website for accessing course materials and submitting assignments, and to check their LUC email account for important updates about the course. Students are also expected to use the statistical computing packages SPSS and HLM 7 to complete class exercises both in and outside of class. Weekly readings should be finished either before or right after the class.

Evaluation

Grades will be based on points accumulated on homework assignments, a group exercise, and a final presentation. There will be 100 total possible points, distributed as follows:

Homework assignments	60%
Group exercise	10%
Final presentation	10%
Participation	10%
Final exam	10%

The grade ranges in terms of percentage are:

100.0-90.0 = A	84.9-80.0 = B+	69.9-65.0 = C+	54.9 and below= F
89.9-85.0 = A-	79.9-75.0 = B	64.9-60.0 = C	
	74.9-70.0 = B-	59.9-55.0= C-	

Diversity

The School of Education is committed to diversity including but not limited to race, gender, sexual orientation, social class, ethnicity, and ability. Through this course, students will learn how to interpret and critique fundamental research methods used in the social sciences. The course is designed to provide students with the knowledge necessary to evaluate research concerning the social dimensions mentioned above.

SOE ACADEMIC POLICIES

IDEA Objectives

Each course you take in the School of Education is evaluated through the IDEA Campus Labs system. We ask that when you receive an email alerting you that the evaluation is available that you promptly complete it. To learn more about IDEA or to access the website directly to complete your course evaluation go to: http://luc.edu/idea/ and click on *STUDENT IDEA LOGIN* on the left hand side of the page.

The essential objectives for this course are:

- Gaining a basic understanding of the subject (e.g., factual knowledge, methods, principles, generalizations, theories)
- Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course
- Learning appropriate methods for collecting, analyzing, and interpreting numerical information

Dispositions

All students are assessed on one or more dispositional areas of growth across our programs: ***Professionalism, Fairness, and the Belief that All Students Can Learn.*** The instructor in your course will identify the dispositions assessed in this course and you can find the rubrics related to these dispositions in the end of this syllabus as well as in LiveText (see below). Disposition data is reviewed by program faculty on a regular basis. This allows faculty to work with students to develop throughout their program and address any issues as they arise.

The expected behaviors for the specific dispositions for this class and the evaluation rubric are listed below:

Area	Target	Acceptable	Unacceptable
Systematic Inquiry	Candidate communicates effectively and appropriately with faculty and peers.	Candidate is working on communicating effectively and appropriately with faculty and peers.	Candidate is unable to communicate effectively and appropriately with faculty and peers.
Responsibilities for General and Public Welfare	Candidate's written work is appropriate and effective for the course.	Candidate's written work is sometimes appropriate and effective for the course.	Candidate's written work is inappropriate and ineffective for the course.
Timeliness	Candidate is able to meet all deadlines.	Candidate is sometimes able to meet all deadlines.	Candidate is unable to meet all deadlines.
Accountability	Candidate attends all classes and fulfills all professional obligations.	Candidate sometimes attends classes and fulfills professional obligations.	Candidate's attendance to class is inconsistent and is unable to fulfill all professional obligations.
Collegiality	Candidate is able to work with peers.	Candidate is sometimes able to work with peers.	Candidate is unable to work with peers.
Integrity/Honesty	Candidate respects the viewpoints of others.	Candidate sometimes respects the viewpoints of others.	Candidate has difficulty respecting the viewpoints of others.

Integrity/Honesty	Candidate recognizes potential conflicts and handles them appropriately.	Candidate sometimes recognizes potential conflicts and handles them appropriately.	Candidate has difficulty recognizing potential conflicts and handling them appropriately.
Integrity/Honesty	Candidates appropriately represent procedures, data, and findings – attempting to prevent misuse of their results.	Candidates represent procedures, data, and findings in a manner that is likely to allow the misuse of their results.	Candidates misrepresent procedures, data, and findings. There is minimal attempt to prevent misuse of their results.

LiveText

All SOE students, except those who are non-degree, must have access to LiveText to complete the benchmark assessments aligned to the Conceptual Framework Standards and all other accreditation, school-wide and/or program-wide related assessments. You can access more information on LiveText here: LiveText.

Addendum Link

- www.luc.edu/education/syllabus-addendum/

This link directs students to statements on essential policies regarding *academic honesty*, *accessibility*, *ethics line reporting* and *electronic communication policies and guidelines*. We ask that you read each policy carefully.

This link will also bring you to the full text of our conceptual framework that guides the work of the School of Education – ***Social Action through Education.***

Tentative schedule

Week	Dates	Topics	Readings
1	8/30	Introduction to HLM	
2	9/6	HLM Software & Data Preparation	Hox, Ch. 1 HLM 7 Manual, Ch.2
3	9/13	Colloquium (Search for HLM study in your field)	Intro to HLM (Woltman, Feldstain, MacKay, & Rocch , 2012)
4	9/20	Basic two-level model	Hox, Ch. 2
5	9/27	HLM issues	Hox, Chs. 3 & 4
6	10/4	SPSS example; HLM Example	(R & B, pp. 31-35, 68-75, 99-117, 134-149).
7	10/11	Fall break – no class	
8	10/18	Longitudinal HLM	Hox, Ch. 5
9	10/25	Example of Longitudinal HLM	(R&B, Ch.6)
10	11/1	HGLM: Dichotomous Data & proportion	Hox, Ch. 6
11	11/8	HGLM: Categorical & Count data	Hox, Ch. 7 (R & B, Ch. 10)
12	11/15	Three-Level models Cross-classified multilevel models	Hox, Ch. 9 (R & B, Ch. 8)
13	11/22	Missing data & other critical topic Theories: Real cases/more hands-on examples	TBA
14	11/29	Multilevel approach to meta-analysis	Hox, Ch. 11
15	12/6	Presentations	
16	12/13	Final Exam Week	