RMTD 484
Hierarchical Linear Modeling

Instructor: Meng-Jia Wu, Associate professor
Classroom: Corboy Law Center, Room 710
Class time: Mondays, 1:30-4:00pm
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Course Description

This course is designed for graduate students with considerable experience with linear modeling (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 critical issues related to using hierarchical linear models will 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 import 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

Raudenbush, S. W. & Bryk, A. S. (2002). *Hierarchical linear models*. Thousand Oaks, CA: Sage Publications.

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.

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

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. Attending classes online is expected.

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:

Assignments	60%
Final presentation	10%
Participation	10%
Final exam	20%

Assignments: There are totally six assignments for this classes. They are different in length. You can work individually or with another student in this class and submit a group work. You are encouraged to run the analyses and discuss the results orally with other students/groups. However, each student/group should write up the answers independently. Do not circulate your work through e-mails to avoid intentional or unintentional plagiarism. Late work is not acceptable unless prior arrangements have been made with the instructor. Late Assignment will automatically be worth half of their original point value. Please note that there will be no makeup work for the points you lost in the assignments.

Final presentation: This activity is designed for you to be able to talk about HLM studies conducted in your field. You will search and present the paper of your as if you were the researcher in that project. A specific guideline will be posted.

Participation: Class participation includes but is not limited to, attending class on time, participating in class activities and discussions, asking and answering questions, listening to and respecting the views, thoughts, and opinions of your classmates. If you must be absent from class because of illness or emergency, notify the instructor as early as possible. Miss more than one class throughout the semester may impact your final grade.

Final exam: An online exam will be given in the end of the semester. Students are expected to work on the exam independently. More details will be discussed in the class.

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-	

Loyola University Chicago
School of Education
Syllabus Addendum

IDEA Course Evaluation Link for Students

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, Inquiry, and Social Justice.*** The instructor in your course will identify the dispositions assessed in this course and you can find the rubrics related to these dispositions in LiveText. *For those students in non-degree programs, the rubric for dispositions may be available through Sakai, TaskStream or another platform.* 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.

LiveText

All 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.

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	Candidate is unable to communicate effectively and

		appropriately with faculty and peers.	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.

Syllabus 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.

Tentative schedule

R & B: Raudenbush, S. W. & Bryk, A. S. (2002); Hox: Hox, J. J. (2010).

Week	Dates	Topics	Readings *
1	8/28	Introduction to HLM	
2	9/4	~*~*~ Labor Day – no class ~*~*~	
3	9/11	HLM Software & Data Preparation	Hox: Ch. 1 HLM 7 Manual, Ch.2
4	9/18	Basic two-level model: Null Models & random intercept Models	Intro to HLM (Woltman, Feldstain, MacKay, & Rocch , 2012)
5	9/25	Basic two-level model: Centering & interaction	R & B: Ch.2; Hox: Ch. 2
6	10/2	Basic two-level model: Statistical issues	Hox: Chs. 3 & 4 R & B: Chs.3 & 9
7	10/9	~*~*~ Fall break – no class ~*~*~	
8	10/16	HLM Example	R & B: pp. 31-35, 68-75, 99-117, 134-149
9	10/23	Longitudinal HLM: Linear	R&B, Ch.6; Hox, Ch. 5
10	10/30	Longitudinal HLM: Non- Linear	
11	11/6	HGLM: Dichotomous Data & proportion	Hox, Ch. 6
12	11/13	HGLM: Categorical & Count data	R & B: Ch. 10 Hox: Ch. 7
13	11/20	Three-Level models Cross-classified multilevel models	Hox, Ch. 9; R & B, Ch. 8
14	11/27	Multilevel approach to meta-analysis	R & B: Ch. 7; Hox, Ch. 11
15	12/4	Presentations	
16	12/11	Final Exam Week	

*More specific readings are listed in the end of the PPT slides for each topic.