RMTD 484
Hierarchical Linear Modeling

Instructor: Meng-Jia Wu, Associate professor
Classroom: Lewis Towers, Room 410
Class time: Wednesdays, 4:15-6:45pm
Office: Lewis Towers, Room 1040
Office hours: Fridays 1:00-3:00pm (By appointment)
Email: mwu2@luc.edu

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
Our School’s conceptual framework is “professionalism in service of social justice”. This course contributes to this framework by equipping students with knowledge and experience for conducting valid 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 social science research.

Course 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**

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.

**Recommended**
The following books are good resources, and not required:

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: 20%
- Final presentation: 10%
- Participation: 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

SOE ACADEMIC POLICIES

Academic Honesty
Academic honesty is an expression of interpersonal justice, responsibility and care, applicable to Loyola University faculty, students, and staff, which demands that the pursuit of knowledge in the university community be carried out with sincerity and integrity. The School of Education’s Policy on Academic Integrity can be found at: [http://www.luc.edu/education/academics_policies_integrity.shtml](http://www.luc.edu/education/academics_policies_integrity.shtml). For additional academic policies and procedures refer to: [http://www.luc.edu/education/academics_policies_main.shtml](http://www.luc.edu/education/academics_policies_main.shtml)

Accessibility
Students who have disabilities which they believe entitle them to accommodations under the Americans with Disabilities Act should register with the Services for Students with Disabilities (SSWD) office. To request accommodations, students must schedule an appointment with an SSWD coordinator. Students should contact SSWD at least four weeks before their first semester or term at Loyola. Returning students should schedule an appointment within the first two weeks of the semester or term. The University policy on accommodations and participation in courses is available at: [http://www.luc.edu/sswd/](http://www.luc.edu/sswd/)

Harassment (Bias Reporting)
It is unacceptable and a violation of university policy to harass, discriminate against or abuse any person because of his or her race, color, national origin, gender, sexual orientation, disability, religion, age or any other characteristic protected by applicable law. Such behavior threatens to destroy the environment of tolerance and mutual respect that must prevail for this university to fulfill its educational and health care mission. For this reason, every incident of harassment, discrimination or abuse undermines the aspirations and attacks the ideals of our community. The university
qualifies these incidents as incidents of bias. In order to uphold our mission of being Chicago's Jesuit Catholic University-- a diverse community seeking God in all things and working to expand knowledge in the service of humanity through learning, justice and faith, any incident(s) of bias must be reported and appropriately addressed. Therefore, the Bias Response (BR) Team was created to assist members of the Loyola University Chicago community in bringing incidents of bias to the attention of the university. If you believe you are subject to such bias, you should notify the Bias Response Team at this link: http://webapps.luc.edu/biasreporting/

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.

Electronic Communication Policies and Guidelines
The School of Education faculty, students and staff respect each other’s rights, privacy and access to electronic resources, services, and communications while in the pursuit of academic and professional growth, networking and research. All members of the university community are expected to demonstrate the highest standards of integrity, communication, and responsibility while accessing and utilizing technology, information resources, and computing facilities. A link to the Loyola University Chicago and School of Education official policies and guidelines can be found at: http://www.luc.edu/media/lucedu/education/pdfs/SOE_Cyberbullying_Policy.pdf

IDEA Objectives
IDEA is an evaluation system that our School uses to assess whether a class reaches the major goals in the end of the semester. The essential objectives for this course are:
1. Gaining factual knowledge (terminology, classifications, methods, trends)
2. Learning fundamental principles, generalizations, or theories
3. Learning to apply course material (to improve thinking, problem solving, and decisions)
4. Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course

Dispositions
The School of Education has three dispositions—Professionalism, Fairness, and the Belief that all students can learn—as indicators of students’ growth for different levels in their program. For Research Methodology courses, including this one, the dispositions have been defined based on professional standards (i.e., American Evaluation Association Guiding Principles, which we will be discussing in this course). Please review a complete list of the dispositions and corresponding rubric in Livetext. Your status on these dispositions are a piece of evidence considered in your overall progress
in your program of study, and they also overlap with expectations for participation in the course.
The expected behaviors for the specific dispositions for this class and the evaluation rubric are listed below:

<table>
<thead>
<tr>
<th>Area</th>
<th>Target</th>
<th>Acceptable</th>
<th>Unacceptable</th>
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<tbody>
<tr>
<td><strong>Systematic Inquiry</strong></td>
<td>Candidate communicates effectively and appropriately with faculty and peers.</td>
<td>Candidate is working on communicating effectively and appropriately with faculty and peers.</td>
<td>Candidate is unable to communicate effectively and appropriately with faculty and peers.</td>
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<tr>
<td><strong>Responsibilities for General and Public Welfare</strong></td>
<td>Candidate’s written work is appropriate and effective for the course.</td>
<td>Candidate’s written work is sometimes appropriate and effective for the course.</td>
<td>Candidate’s written work is inappropriate and ineffective for the course.</td>
</tr>
<tr>
<td><strong>Timeliness</strong></td>
<td>Candidate is able to meet all deadlines.</td>
<td>Candidate is sometimes able to meet all deadlines.</td>
<td>Candidate is unable to meet all deadlines.</td>
</tr>
<tr>
<td><strong>Accountability</strong></td>
<td>Candidate attends all classes and fulfills all professional obligations.</td>
<td>Candidate sometimes attends classes and fulfills professional obligations.</td>
<td>Candidate’s attendance to class is inconsistent and is unable to fulfill all professional obligations.</td>
</tr>
<tr>
<td><strong>Collegiality</strong></td>
<td>Candidate is able to work with peers.</td>
<td>Candidate is sometimes able to work with peers.</td>
<td>Candidate is unable to work with peers.</td>
</tr>
<tr>
<td><strong>Integrity/Honesty</strong></td>
<td>Candidate respects the viewpoints of others.</td>
<td>Candidate sometimes respects the viewpoints of others.</td>
<td>Candidate has difficulty respecting the viewpoints of others.</td>
</tr>
<tr>
<td><strong>Integrity/Honesty</strong></td>
<td>Candidate recognizes potential conflicts and handles them appropriately.</td>
<td>Candidate sometimes recognizes potential conflicts and handles them appropriately.</td>
<td>Candidate has difficulty recognizing potential conflicts and handling them appropriately.</td>
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<tr>
<td>Integrity/Honesty</td>
<td>Candidates appropriately represent procedures, data, and findings – attempting to prevent misuse of their results.</td>
<td>Candidates represent procedures, data, and findings in a manner that is likely to allow the misuse of their results.</td>
<td>Candidates misrepresent procedures, data, and findings. There is minimal attempt to prevent misuse of their results.</td>
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<tr>
<td>Week</td>
<td>Dates</td>
<td>Topics</td>
<td>Readings</td>
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<td>1</td>
<td>8/27</td>
<td>Introduction to HLM</td>
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| 2    | 9/3   | HLM Software & Data Preparation | Hox, Ch. 1  
|      |       |                    | HLM 7 Manual, Ch.2 |
| 3    | 9/10  | Basic two-level model | Hox, Ch. 2 |
| 4    | 9/17  | HLM issues | Hox, Chs. 3 & 4 |
| 5    | 9/24  | SPSS example; HLM Example | (R & B, pp. 31-35, 68-75, 99-117, 134-149). Real case |
| 6    | 10/1  | Longitudinal HLM | Hox, Ch. 5 |
| 7    | 10/8  | Example of Longitudinal HLM | (R&B, Ch.6)  
|      |       |                    | Real case |
| 8    | 10/15 | HGLM: Dichotomous Data & proportion | Hox, Ch. 6 |
| 9    | 10/22 | ~*~*~ Out of town for colloquium – No Class ~*~*~ | *Group Exercise* |
| 10   | 10/29 | HGLM: Categorical & Count data | Hox, Ch. 7  
|      |       |                    | (R & B, Ch. 10) |
| 11   | 11/5  | Three-Level models  
|      |       | Cross-classified multilevel models | Hox, Ch. 9  
|      |       |                    | (R & B, Ch. 8)  
|      |       |                    | Real case |
| 12   | 11/12 | Missing data & other critical topic  
|      |       | Theories: Real cases/more hands-on examples | TBA |
| 13   | 11/19 | Multilevel approach to meta-analysis | Hox, Ch. 11 |
| 14   | 11/26 | ~*~* Thanksgiving break - No class ~*~* |  |
| 15   | 12/3  | Presentations |  |