COURSE SYLLABUS
CPSE 730 and IP&T 730
Spring Term, 2016

INSTRUCTORS:
Dr. Richard Sudweeks, 150-M MCKB, 801-422-7078
Office Hours:

CLASS MEETING SCHEDULE
T & Th, 12:00 p.m. – 2:50 p.m.

REQUIRED TEXTBOOK

EXPECTED LEARNING OUTCOMES
As a result of successfully completing this course, students should be able to do the following:
1. Explain the similarities and differences between ordinary least squares regression and multilevel regression in terms of (a) the kinds of data structures that can be most appropriately be analyzed by each, (b) the kinds of research questions that can be addressed by each, (c) the main features that distinguish between single-level and multilevel models, and (d) the likely consequences of using each approach when the other would be more appropriate.
2. Understand the basic concepts and notational conventions used in multilevel modeling (e.g., nested units of analysis and within-level dependencies; estimated intercept and slope parameters and residuals; within-group versus between-group variance; intraclass correlation coefficients; conditional versus unconditional models; fixed versus random model components; within-level versus cross-level interactions; cross-sectional versus longitudinal designs; time-varying versus time invariant predictors; growth trajectories; etc).
3. Demonstrate proficiency in using multilevel software to analyze hierarchically structured data including (a) preparing the data files, (b) generating the input commands, (c) executing analyses, and (d) interpreting and evaluating the output.
4. Apply appropriate strategies to analyze hierarchically structured data sets by building and testing alternative models.
5. Write a proposal to conduct an original, multilevel study including a description of (a) the purpose of the study, (b) the primary research questions or hypotheses, (c) procedures for collecting relevant data, and (d) appropriate strategies for building models and analyzing the data.
6. Prepare written reports of completed multilevel research studies in accordance with the reporting guidelines in the published literature on multilevel research and the stylistic prescriptions presented in the Publication Manual of the American Psychological Association.
7. Summarize, interpret, and critique written reports of completed multilevel studies completed by other researchers.
SOFTWARE

The use of Multilevel/Hierarchical Modeling techniques is not feasible or practical without modern computers and software. General purpose statistics packages such as SAS, SPSS, and Stata each include specific procedures and routines that can be used to perform multilevel analyses. In addition, more specialized programs such as HLM, Mplus, and MLWin can also be used for this purpose. However, in this class we will focus on learning to use Stata to conduct multilevel analyses. Each student is expected to become proficient in using this procedures. The course textbook includes relevant guidelines and examples.

COURSE OUTLINE

The topics included in this course will be taught in the following order:

1. The nature of hierarchical data structures and the meaning of nesting
2. The disadvantages of using Ordinary Least Squares regression models to analyze hierarchical data and the advantages of multilevel modeling
3. Preparing data files for multilevel analysis
4. Basic concepts and notational symbols used in multilevel models with two levels
5. Analyzing two-level models using Stata
6. Checking assumptions and assessing model-data fit
7. Strategies for building and testing alternative models
8. Analyzing models with three levels
9. Issues to consider when designing multilevel studies
10. Using multilevel models to analyze longitudinal data
11. Alternative covariance structures
12. Multilevel structural equation models

GRADING POLICY

Grades will be allocated based on students’ performance on the homework exercises (20%), the two examinations (40%), and the two projects (40%).

COURSE PROJECTS

Each student is expected to successfully complete two projects:

1. Prepare a written summary-review of a published journal article reporting the results of a research study that used MLM. The report should include a description of the purpose and context of the study plus your analysis and critique of how well multilevel modeling techniques were used in this study.
2. Analyze a multilevel data set and write a report describing the purpose for which the study was conducted, how the data were collected and analyzed, and the findings and results of the study.
PUBLISHED TUTORIALS, PRIMERS, OVERVIEWS, AND OTHER INTRODUCTORY ARTICLES

The articles and other materials in this list focus on basic concepts, logic, and procedures used in multilevel/hierarchical modeling. They are listed here for your reference.


SUPPLEMENTARY RESOURCE MATERIALS

The following books and articles are useful supplementary materials for students who desire to examine published applications of multilevel analysis or desire to gain a more in depth understanding of specific concepts or procedures used in multilevel/hierarchical linear modeling.


