Instructor Name: Catherine Cubbin, PhD

Course Name: Applied Hierarchical Linear Modeling

Course Description: This applied, hands-on course provides an introduction to the basic concepts and applications of hierarchical linear models. The course will cover applications in social sciences research (e.g., neighborhood effects research, school effects research), growth curve modeling (e.g., repeated measures on individuals), and well as models for dichotomous outcomes. Topics will include multilevel data structures, model building and testing, fixed and random effects, and interpretation of results. At the end of this course, students should be able to specify a social science research question requiring hierarchical linear modeling, understand when and why hierarchical linear models should be used, apply hierarchical linear models to nested data, and correctly interpret analysis results from hierarchical linear models.

Day 1:
Introduction: Hierarchical linear modeling
Traditional Methods Prior to HLM development
HLM Goal, Advantages, and Disadvantages
Equations and Assumptions Underlying HLM
- Level-1 Equation and Assumptions
- Level-2 Equation and Assumptions
- Combined Model Equation
Estimate Fixed, Random, Variance-covariance components

Day 2:
Model Building
- Unconditional Models
- Random Intercept Models
- Random Slope Models
- Random Slope Models with Interaction
- Assessing Model Fit

Day 3:
Building and Interpreting Two Level HLM Models – School & Neighborhood Effects
- Unconditional Model
- Including Effects of School/Neighborhood Level Predictors
- Including Effects of Student/Individual-Level Predictors
- Including Student/Individual and School/Neighborhood Level Characteristics
- Assessing Model Fit

Day 4:
Growth Curve Modeling (Longitudinal Data as Hierarchical)
- Modeling and Interpretation
- Benefits of Growth Curve Modeling
Multilevel modeling with Dichotomous outcomes
Extensions of the Multilevel Model (time permitted)