# REM Course Descriptions

## EDUC 7456: Multilevel Models

Why study multi-level models? It turns out that most human behavior takes place in nested settings. Here are just a few examples: Children nested in families, students nested in teachers (and in turn in schools), households nested in counties; school districts nested in states; repeated observations over time nested within individuals, etc. In such clustered data, observations for the same cluster cannot be assumed to be mutually independent for given covariate values as required for conventional regression models. Longitudinal or repeated measures data can also be thought of as clustered data with measurement occasions clustered within subjects; hierarchical models for longitudinal data are also known as growth curve models. This course considers the statistical foundations of hierarchical linear models and focus on their application in behavioral and social research. The course is certainly methodological, but it's also conceptual in the sense that we will develop a lens for understanding how social organizations shape people's lives.

## EDUC 7326: Quasi-Experimental Design for Causal Inference in Social Sciences

Assessing the causal effects of social and educational policies and practices is one important aim of educational and social science research. Educational researchers may want to know, for example, what effect a particular teaching practice has on student learning, what effects accountability policies have on teaching practices, or what effect early childhood education programs have on school readiness, and so on. Historically, however, much educational and social science research has not been designed in such a way as to allow researchers to go beyond correlational claims to make credible causal inferences about the effects of educational and social practices and policies. In recent decades, however, the so-called counterfactual or potential outcomes model (also called the "Rubin Causal Model") and related developments have dramatically changed the way that social scientists have thought of causality. The new causal framework is not so much a set of technical models, but a precise logical framework for thinking about causality—and what constitutes evidence of causality—in the social sciences. This course introduces students to a toolkit of quantitative methods to enable them to make valid causal inferences, particularly in the absence of a true randomized experiment.

## EDUC 7386: Educational Program Evaluation

Since the1960s, program evaluation has played an important role in educational policy making. Evaluation involves making evidence-based judgments about the worth and value of projects, programs, and policies both for accountability purposes and program improvement. In this course, students explore different theories and approaches to educational evaluation. They discuss cases of how evaluators engage in different aspects of the evaluation process, such as working with stakeholders to identify evaluation questions, designing and implementing evaluation plans, and communicating findings to different audiences. Readings encompass the conduct of both large- and small-scale evaluation studies of projects, programs, and policies. The course also provides students with practical experience in at least one phase of evaluation with a real external client for a small program.

**EDUC 8710: Measurement in Survey Research**

The purpose of this course is to give students an introduction to survey research in the social sciences though a semester-long project in which students are expected to develop, pilot test, analyze and evaluate their own survey instruments. This course emphasizes the iterative *process* of developing, analyzing and validating a survey instrument. Though surveys can be used to measure both manifest variables (i.e., information that can be verified with external information) and latent constructs (i.e., information residing inside a person's head), in this course the empirical focus will be on developing a survey instrument in which there is some intent to make inferences about at least one latent construct. The concepts of both validity and reliability will be the criteria we use to evaluate the quality of the instrument. In the process of analyzing survey data, students will learn foundational concepts about classical test theory and the Rasch family of item response theory models

**EDUC 8720: Advanced Topics in Measurement**

The focus of this course is on psychometric models and their applications in educational and psychological testing. A psychometric model is a model that one specifies to support inferences about one or more latent variables (e.g., reading comprehension, writing ability, self-efficacy, etc.). Two examples of psychometric models that will be covered in this course are those that are motivated by Generalizability Theory and Item Response Theory. Generalizability Theory is especially useful in the context of observation protocols, because it helps the analyst decompose observed score variability into that which is the relevant signal of interest, and that which is noise. By applying a Generalizability Theory model, one can quantify the degree to which an observed score can be generalized over different sets of observers, occasions and/or prompts. Item Response Theory models are used to estimate the probability of a person responding to a survey or test item in terms of some combination of item and person characteristics. To the extent that the specified model adequately captures the nature of the response process, it becomes possible to leverage the model for a variety of valuable applications (i.e., respondents can be given a test that adapts to their response patterns). This course introduces students to sophisticated psychometric models have been devised to solve educational and psychological measurement problems in applied contexts.