Research Methods Courses Available
from the Curry School of Education
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Statistics Courses

EDLF 5310 Data Management for Social Science Research
This course introduces strategies for effectively working with large-scale quantitative data for social science research. Topics covered include: data cleaning, recoding and checking; merging data from multiple sources; reshaping data; documenting processes; writing programs and macros to reduce errors; and presenting descriptive data through tables and graphs. Students will utilize Stata, a statistical software package. This course is usually offered in fall semester of every year.

EDLF 5330 Quantitative Methods and Data Analysis I
This introductory statistics course covers descriptive and inferential statistics. Students learn to identify the type of data, select appropriate statistic and graphical methods, analyze data, and interpret the results. Specific methods include the t-test, chi-square test, correlation, simple linear regression, one-way ANOVA, and repeated measures ANOVA. Calculations are done by hand and with statistical software.

EDLF 7300 Foundations of Educational Research
Social and education science research encompasses a varied and challenging set of knowledge and skills to master. The nature of the research problems are complex and multifaceted; addressing these questions requires a diverse and strategic combination of research traditions, designs, and methods, so no single research design course exposes students to all that might be of relevance and interest. This course has two broad goals: (1) to build a foundation on which students can begin to development an understanding of social and education science research designs and methods; and (2) to develop students’ basic competencies in specifying linkages among research questions, designs, methods, evidence, inference, and use. This course is offered every fall semester.

EDLF 7420 Quantitative Methods and Data Analysis II: General Linear Models
The focus of this course is on quantitative methods within a general linear modeling (GLM) framework. Topics include multiple regression with continuous outcomes and predictors that are continuous, dichotomous and multi-category (i.e., analysis of variance (ANOVA) in a regression framework), and combinations of these predictor types. Emphasis will also be placed on moderation and mediation, as well as assumptions underlying the appropriate use of these procedures. Students will develop both a theoretical and applied understanding of the general linear model in the context of continuous outcomes. Prerequisite: EDLF 5330 or equivalent.
EDLF 8310 Generalized Linear Models  
This course provides students with advanced quantitative skills in applying ordinary least squares (OLS) methods, as well as introduces students to the generalized linear model (GLM) for cases when variables have specific non-normal conditional distributions. The course will address common data analytic challenges that arise in real world settings, such as when outcomes are not normally distributed, when the independent and dependent variables have nonlinear relationships, and when outliers or discrepant data are present. We also examine statistical methods for addressing missing covariate data and bootstrapping methods for inference tests. Prerequisite: EDLF 7420 or equivalent.

EDLF 8315 Causal Inference in Educational Policy Research  
An advanced methods course on quasi-experimental statistical techniques for generating unbiased effect estimates when random assignment is not feasible. Underlying theories, identifying assumptions, and applications are presented for techniques drawn from a variety of disciplines including economics, sociology, and psychology including regression discontinuity, instrumental variables, difference-in-difference, matching, and fixed effects. This course is usually offered in spring semester of every year. Prerequisite: EDLF 7420 or equivalent.

EDLF 5500 Field Experiments  
This course has three purposes. The first is to introduce students to recent methodological advances in the design and analysis of field experiments, particularly in school settings. The second is for students to read and discuss well-known field experiments that have important implications for policy, and/or our understanding of science. The third is to demonstrate that although the course is about field experiments, many of the issues that are addressed extend easily to the design and analysis of observational studies. Students will learn to use Stata for the analysis of field experiments. Prerequisite: EDLF 7420 or equivalent. This course is usually offered in spring semester of odd-numbered years.

EDLF 8360 Multilevel Modeling in Education Research  
This course is designed to familiarize students with the basics of multilevel modeling. Topics include random effects ANOVA models, means-as-outcomes models, random coefficients models, intercepts- and slopes-as-outcomes models, contextual models, random effects ANCOVA models, linear growth models, nonlinear growth models and cross-classified models. Prerequisite: EDLF 7420 or equivalent. This course is usually offered in fall semester of odd-numbered years.

Additional statistics courses include **EDLF 8361 Structural Equation Modeling** features statistical and measurement models. Details are listed under measurement courses.

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Measurement Courses

**EDLF 7180 Tests and Measurements**
This introductory course concentrates on the evaluation and interpretation of assessment tools. Topics include reliability and validity; social and ethical considerations of testing; summarizing and interpreting measurements; and the use of standardized tests, rating scales, and observational scales. This course is usually offered in fall semester of every year.

**EDLF 8340 Measurement Theory**
Fundamentals of item response theory and generalizability theory. Topics include the Rasch, two-parameter logistic, and three parameter logistic models for binary items and the partial credit, rating scale, and generalized partial credit models for polytomous items. Additional topics include scale linking and score equating, and multidimensional item response theory. Generalizability theory topics include estimation of variance components for generalizability studies, and estimation of reliability coefficients for decision studies. Application of these methods to educational and psychological testing and the use of statistical software is emphasized. Students will learn to use statistical software such as R, jMetrik, and flexMIRT. Prerequisites: EDLF 7180 and EDLF 7420 or instructor permission. This course is usually offered in spring semester of every year.

**EDLF 8350 Stat IV Multivariate Statistics**
Presents the theory and rationale of selected multivariate statistical techniques. Topics include multivariate analysis of variance, canonical correlation, discriminant analysis, exploratory factor analysis, and confirmatory factor analysis. Emphasizes computer-assisted analysis and the application of appropriate statistical methods to research data. Prerequisite: EDLF 7420 or instructor permission. This course is usually offered in spring semester of every year.

**EDLF 8361 Structural Equation Modeling**
The major topics include exploratory/confirmatory factor analysis models, a variety of structural equation models, growth curve models, and multi-sample modeling analysis. The major focus of the course is both on the conceptual understanding of latent variable modeling and on practical application of these models in research and measurement. Students will work with data sets and computer programs to gain practical research experience. Prerequisite: EDLF 7420 or equivalent.

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Qualitative and Program Evaluation Courses

**EDLF 7060 Theoretical Perspectives on Educational Policy**
This course introduces students to the use of theory in the educational research process by examining interpretive and critical theoretical approaches in educational policy research. It examines current theories including micro-macro theories, critical race theories, feminist and postmodern theories and their applications in research methods such as critical discourse analysis, critical ethnography, etc., as they pertain to policy research, policy analysis, and policy evaluation.

**EDLF 7404 Qualitative Analysis**
This class serves as an introduction to the central concepts of qualitative methods in research and evaluation. Primary emphasis is on the development of skills required to conduct qualitative research, with a focus on research design, specific methods of inquiry, and approaches to analysis. The philosophy and epistemology of qualitative approaches are also discussed. Empirical readings provide examples of qualitative research within education and related fields. This course is usually offered fall and spring semester of every year.

**EDLF 7402 Introduction to Program Evaluation**
An overview of current program evaluation approaches, this class is designed to provide an overview of the theories behind and approaches to evaluation as well as to begin to train students in evaluation design and methods. Theoretical, methodological, and empirical readings emphasize the terminology of educational evaluation and the variety of theoretical and design approaches to evaluation. Consideration is also given to the application of evaluation approaches and designs to non-educational settings. This course is usually offered in fall of odd-numbered years.

**EDLF 7410 Mixed Methods Research Design**
This course provides an introduction to mixed methods in social science/educational research. We will consider the types of questions that mixed methods can answer and discuss the benefits/challenges of mixed methods research. We will cover research design, sampling, and analysis, including reading exemplars of mixed methods research. Students will apply the theoretical/methodological tenets learned by designing their own mixed methods study. This course is usually offered in fall semester of even-numbered years.

**EDLF 8400 Program Evaluation Design**
Explores problems of designing, conducting, and reporting evaluation research studies. Time is spent examining philosophies of science that underlie evaluation studies; conceptualizing a total evaluation study; planning for the use of time and resources in conducting an evaluation study; assembling the evidence for or against a particular proposition; analyzing costs; and learning how to avoid common pitfalls in working with clients and program participants to design and conduct an evaluation study. This course is usually offered in fall semester of odd-numbered years.

**EDLF 8440 Advanced Qualitative Analysis**
Advanced course in methods and practices of qualitative research. Students determine their own philosophy of inquiry and become increasingly proficient in the application of qualitative methods. Assumes an introductory course in qualitative methods. Focuses on research design and
propose development, data collection and analysis techniques, and presentation of findings. The course is field-based and guides students through the complete qualitative research cycle. This course is usually offered in spring semester of every year.

Research Methods Course Sequence Guide

The next page shows a course sequence guide. It will help you understand the recommended sequence of courses. For example, if your aim is to take a course in structural equation modeling, find that course on the chart and identify the course prerequisites. Solid arrows in the chart represent required course prerequisites, and dashed arrows indicate recommended prerequisites.

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M.Ed./Ph.D. Research Methods
Course Sequence Guide
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Legend

Required Prerequisite (or instructor permission)
Recommended Prerequisite