

# Educational Statistics and Research Methods (ESRM)

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Educational Statistics and Research Methods website (<http://esrm.uark.edu>)

**Degrees Conferred:**  
 Ph.D. in Educational Statistics and Research Methods (ESRM)

**Graduate Certificates Offered** (non-degree):  
 Educational Statistics and Research Methods (EDST)

**Program Description:** The Educational Statistics and Research Methods program develops professionals in the areas of educational research methods and policy studies, both through courses and Independent research. Graduates can obtain employment with school districts, educational agencies, and industries with internal data analysis needs.

## Graduate Certificates

**Admission to the Graduate Certificate Programs:** In addition to meeting University requirements for admission to the Graduate School, applicants must have earned a master's degree with a 3.25 cumulative GPA and minimum scores on the Graduate Record Examinations at the 48th percentile Verbal, the 56th percentile Quantitative and the 29th percentile on Analytic Writing OR be currently enrolled in a doctoral program at the University of Arkansas.

**Certificate Requirements:** Required list of courses for a certificate with a grade-point average of 3.50.

## Doctor of Philosophy

**Doctor of Philosophy in Educational Statistics and Research Methods:** The increased emphasis on educational accountability and data-driven decision making to improve public school institutions, as well as greater reliance on empirical research and analysis in public policy and educational studies, have led to a greater need for experts in educational statistics and research methods. The Educational Statistics and Research Methods doctoral program develops professionals who can lead in these areas through coursework and independent research in educational statistics, research design, assessment, and program evaluation.

## Requirements for Ph.D. in Educational Statistics and Research Methods

**Admission Requirements for the Ph.D. Degree:** In addition to meeting University requirements for admission to the Graduate School, applicants should have an earned master's degree with a minimum 3.25 GPA and

preferred scores on the Graduate Record Examinations at the 48th percentile Verbal, the 65th percentile Quantitative and the 48th percentile on Analytic Writing. Higher performance on the quantitative component of the GRE may compensate for a lower GPA in admissions decisions.

**Requirements for the Ph.D. Degree:** Students must complete all requirements of the Graduate School for the Doctor of Philosophy degree, and complete an approved program of study including a minimum of 36 credit hours of core courses, 9 hours of elective courses, and 18 credit hours of doctoral dissertation. Coursework must be completed with a cumulative grade average of at least 3.25, with no credit for courses with a grade of "C" or lower.

### Core Classes

EDFD 53733	Psychological Foundations of Teaching and Learning	3
ESRM 64003	Educational Statistics and Data Processing	3
ESRM 64103	Experimental Design in Education	3
ESRM 64203	Multiple Regression Techniques for Education	3
ESRM 64503	Applied Multivariate Statistics	3
ESRM 65103	Hierarchical Linear Modeling	3
ESRM 65203	Structural Equation Modeling	3
ESRM 65303	Qualitative Research	3
ESRM 65503	Advanced Multivariate Statistics	3
ESRM 66103	Evaluation of Policies, Programs, and Projects	3
ESRM 66503	Measurement and Evaluation	3
ESRM 67503	Item Response Theory	3

### Electives: Choose 9 hours from the following 9

EDFD 56833	Issues in Educational Policy	
ESRM 65403	Advanced Qualitative Research	
ESRM 6680V	Practicum in Research	
ESRM 6990V	Advanced Seminar	
	Or other approved elective(s)	

### Dissertation Requirement

ESRM 7000V	Doctoral Dissertation	18
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**Total Hours 63**

Students should also be aware of Graduate School requirements with regard to doctoral degrees (<http://catalog.uark.edu/graduatecatalog/degreerequirements/#phdandedddegreetext>).

## Graduate Certificate in Educational Statistics and Research Methods

**Graduate Certificate in Educational Statistics and Research Methods:**

The graduate certificate in Educational Statistics and Research Methods recognizes students who complete a core of courses focused on developing theoretical, application, and interpretative aspects of statistical techniques and research methods. Graduate students completing this certificate will also develop comprehensive programming and data management skills necessary for today's academic researcher.

**Admission to the Certificate Program:** In addition to meeting University requirements for admission to the Graduate School, applicants must have earned a master's degree with a minimum 3.00 cumulative GPA on a 4.00 scale or be currently enrolled in a doctoral program at the University of Arkansas. Although there is no minimum GRE score required for the certificate admission, successful applicants admitted to this certificate

typically have GRE scores of above 40th percentile on both Verbal and Quantitative Reasoning sections and 30th percentile on Analytic Writing section. If you believe that your test scores are not valid indicators of your ability, you are welcome to explain your concerns in a statement of purpose. We encourage you to contact the Educational Statistics and Research Methods program coordinator with questions.

**Certificate Requirements:** Completion of a required list of courses for a certificate with a grade of B or above in the following courses:

#### Program Of Study

ESRM 64003	Educational Statistics and Data Processing	3
ESRM 64103	Experimental Design in Education	3
ESRM 64203	Multiple Regression Techniques for Education	3
Select two of the following:		6
ESRM 64503	Applied Multivariate Statistics	
ESRM 66503	Measurement and Evaluation	
ESRM 65103	Hierarchical Linear Modeling	
ESRM 65203	Structural Equation Modeling	
ESRM 65503	Advanced Multivariate Statistics	
ESRM 65303	Qualitative Research	
ESRM 65403	Advanced Qualitative Research	
ESRM 67503	Item Response Theory	
ESRM 6990V	Advanced Seminar	

**Total Hours** **15**

## Educational Foundations Courses

### EDFD 53733. Psychological Foundations of Teaching and Learning. 3 Hours.

Psychological principles and research applied to classroom learning and instruction. Social, emotional, and intellectual factors relevant to topics such as readiness, motivation, discipline, and evaluation in the classroom. (Typically offered: Irregular)

### EDFD 56833. Issues in Educational Policy. 3 Hours.

This course examines how K-12 education policy is designed and implemented in the United States. Students will develop a working knowledge of policymaking frameworks to examine major education policies of current interest and debate key policy issues that arise at each level of government. (Typically offered: Fall, Spring and Summer)

This course is cross-listed with EDRE 64103.

## Educational Statistics and Research Methods Courses

### ESRM 50103. Research Methods in Education. 3 Hours.

General orientation course which considers the nature of research problems in education and the techniques used by investigators in solving those problems. Prerequisite: Graduate standing. (Typically offered: Fall, Spring and Summer)

### ESRM 53003. Healthcare Analytics Fundamentals. 3 Hours.

The Healthcare Analytics Fundamentals course provides fundamental knowledge and skills in several major areas of healthcare and business data analytics in a modular format. Several modules that emphasize healthcare analytics as well as data fundamentals, concepts, and problems are used and include - Healthcare Analytics Concepts, Problems, and Management; Intermediate & Advanced Spreadsheet Topics; Relational Databases & SQL; and Introductory Programming with Python. Prerequisite: Program Director permission. (Typically offered: Irregular)

### ESRM 53903. Statistics in Education and Health Professions. 3 Hours.

Applied statistics course for Master's degree candidates. Includes concepts and operations for frequency distributions, graphing techniques, measures of central tendency and variation, sampling, hypothesis testing, and interpretation of statistical results. (Typically offered: Fall, Spring and Summer)

### ESRM 58203. Healthcare Business Analytics I. 3 Hours.

Fundamentals of healthcare analytics to include data patterns, forecasting techniques, and linear prediction models, including theoretical and mathematical study of assumptions in model building. Prerequisite: ESRM 53003, ISYS 55003, ISYS 58303, and ISYS 58403, or permission of the instructor. (Typically offered: Irregular)

### ESRM 58503. Healthcare Business Analytics II. 3 Hours.

Intermediate healthcare analytics to include categorical analyses and logistic regression for binary and polytomous models applied to healthcare. Prerequisite: ESRM 58203 or instructor permission. (Typically offered: Irregular)

### ESRM 6000V. Master's Thesis. 1-6 Hour.

Master's Thesis. (Typically offered: Fall, Spring and Summer) May be repeated for degree credit.

### ESRM 6050V. Independent Study. 1-6 Hour.

Independent study. (Typically offered: Fall, Spring and Summer)

### ESRM 64003. Educational Statistics and Data Processing. 3 Hours.

Theory and application of frequency distributions, graphical methods, central tendency, variability, simple regression and correlation indexes, chi-square, sampling, and parameter estimation, and hypothesis testing. Use of the computer for the organization, reduction, and analysis of data (required of doctoral candidates). Prerequisite: ESRM 50103 or ESRM 53903 or an equivalent course, each with a grade of C or better. (Typically offered: Fall, Spring and Summer)

### ESRM 64103. Experimental Design in Education. 3 Hours.

Principles of experimental design as applied to educational situations. Special emphasis on analysis of variance techniques used in educational research. Prerequisite: ESRM 64003 with a grade of C or better or an equivalent course with a grade of C or better. (Typically offered: Spring)

### ESRM 64203. Multiple Regression Techniques for Education. 3 Hours.

Introduction to multiple regression procedures for analyzing data as applied in educational settings, including multicollinearity, dummy variables, analysis of covariance, curvi-linear regression, and path analysis. Prerequisite: ESRM 64003 with a grade of C or better or an equivalent course with a grade of C or better. (Typically offered: Fall)

### ESRM 64503. Applied Multivariate Statistics. 3 Hours.

Multivariate statistical procedures as applied to educational research settings including discriminant analysis, principal components analysis, factor analysis, canonical correlation, and cluster analysis. Emphasis on use of existing computer statistical packages. Prerequisite: ESRM 64103 and ESRM 64203, both with a grade of C or better. (Typically offered: Spring)

### ESRM 65103. Hierarchical Linear Modeling. 3 Hours.

This course covers the theory and applications of hierarchical linear modeling (HLM) also known as multilevel modeling. Both the conceptual and methodological issues for analyses of nested (clustered) data in using HLM will be reviewed, including linear models, non-linear models, growth models, and some alternative designs. Prerequisite: ESRM 64103 and ESRM 64203, both with a grade of C or better. (Typically offered: Fall Even Years)

**ESRM 65203. Structural Equation Modeling. 3 Hours.**

This course provides a detailed introduction to structural equation modeling (SEM) based on students' previous knowledge of multiple linear regression. Topics include path analysis, confirmatory factor analysis, full latent variable models, estimation techniques, data-model fit analysis, model comparison, and other topics, potentially equivalent models, specification searches, latent mean models, parameter invariance, multi-group models, and models of discrete data. Prerequisite: ESRM 64203 with a grade of C or better. (Typically offered: Spring)

**ESRM 65303. Qualitative Research. 3 Hours.**

Introduction of non-quantitative methods, including data collection through interviews, field observation, records research, internal and external validity problems in qualitative research. Prerequisite: ESRM 64003 with a grade of C or better. (Typically offered: Fall and Spring)

**ESRM 65403. Advanced Qualitative Research. 3 Hours.**

Preparation for the conduct of qualitative research, structuring, literature reviews, data collection and analysis, and reporting results. Prerequisite: ESRM 65303 with a grade of C or better. (Typically offered: Spring) May be repeated for up to 6 hours of degree credit.

**ESRM 65503. Advanced Multivariate Statistics. 3 Hours.**

Builds on the foundation provided in Multivariate and introduces techniques that extend methodological elements of canonical, discriminant, factor analytic, and longitudinal analyses, providing the mathematical and theoretical foundations necessary for these designs. Prerequisite: ESRM 64503 with a grade of C or better. (Typically offered: Spring Even Years)

**ESRM 66103. Evaluation of Policies, Programs, and Projects. 3 Hours.**

Introduction to evaluation in social science research, including why and how evaluations of programs, projects, and policies are conducted; includes analysis of actual evaluations in a variety of disciplines. Prerequisite: ESRM 64003 with a grade of C or better. (Typically offered: Fall)

This course is cross-listed with EDRE 62103.

**ESRM 66503. Measurement and Evaluation. 3 Hours.**

Fundamentals of measurement: scales, scores, norms, reliability, validity. Test and scale construction and item analysis. Standardized measures and program evaluation models in decision making. Prerequisite: ESRM 64003 with a grade of C or better. (Typically offered: Fall)

**ESRM 6680V. Practicum in Research. 1-6 Hour.**

Practical experience in educational research on campus, in school systems, or in other agencies in educational program development. (Typically offered: Irregular)

**ESRM 67503. Item Response Theory. 3 Hours.**

Topics of measurement in the psychometric field focusing on item response theory; item level and test level analyses including differential item functioning, test dimensionality, computer adaptive testing, equating, and general evaluation and usage of measurement instruments. Prerequisite: ESRM 66503 with a grade of C or better. (Typically offered: Spring Odd Years)

**ESRM 6990V. Advanced Seminar. 1-6 Hour.**

Seminar. Prerequisite: Advanced graduate standing. (Typically offered: Irregular) May be repeated for up to 6 hours of degree credit.

**ESRM 7000V. Doctoral Dissertation. 1-18 Hour.**

Doctoral dissertation. Prerequisite: Candidacy. (Typically offered: Fall, Spring and Summer) May be repeated for degree credit.