Educational Statistics and Research Methods (ESRM)

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Wen-Juo Lo, Associate Professor
Sean W. Mulvenon, Professor
Charles E. Stegman, Professor
Ronna Turner, Associate Professor

Ronna Turner
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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 Program Evaluation (EDEV)
Educational Psychology (EDPS)
Educational Measurement (EDME)
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.

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: 18 semester hours from the list of courses for a certificate with a grade-point average of 3.50.

Graduate Certificate in Educational Program Evaluation: The graduate certificate in Educational Program Evaluation recognizes students who take a concentrated core of courses focused on systematic and rigorous evaluation of educational programs and policies. Students who earn this certificate have a working knowledge of qualitative and quantitative evaluation procedures and can use these to plan, conduct, and report on evaluations.

Program Of Study
ESRM 6403 Educational Statistics and Data Processing (Sp, Su, Fa) 3
ESRM 6413 Experimental Design in Education (Sp) 3

Graduate Certificate in Educational Psychology:
The graduate certificate in Educational Psychology recognizes students who take a concentrated core of courses focused on educational psychology. Students who earn this certificate develop a foundational understanding of educational psychology theories, application of theory to educational practices and evaluation, and methods for identifying issues that arise in the learning process for learners of all ages.

Program Of Study
EDFD 5373 Psychological Foundations of Teaching and Learning (Irregular) 3
EDFD 5573 Life-Span Human Development (Sp, Su, Fa) 3
EDFD 5673 Principles of Motivation (Sp) 3
EDFD 5773 Advanced Topics in Educational Psychology (Even years, Fa) 3

Select two of the following: 6
ESRM 6413 Experimental Design in Education (Sp)
ESRM 6423 Multiple Regression Techniques for Education (Fa)
ESRM 6653 Measurement and Evaluation (Fa)

Total Hours 18

Graduate Certificate in Educational Measurement:
The graduate certificate develops professionals in the areas of measurement, testing, and assessment, through courses in the area of instrument development and research design. Graduates can obtain employment with educational agencies and industries with assessment and research analysis needs.

Program Of Study
ESRM 5653 Educational Assessment (Irregular) 3
ESRM 6403 Educational Statistics and Data Processing (Sp, Su, Fa) 3
ESRM 6653 Measurement and Evaluation (Fa) 3
ESRM 6753 Item Response Theory (Odd years, Sp) 3

Select one of the following: 3
ESRM 6613 Evaluation of Policies, Programs, and Projects (Fa)
ESRM 6633 Survey Research Methods (Even years, Sp)

Select one of the following: 3
ESRM 6413 Experimental Design in Education (Sp)
ESRM 6423 Multiple Regression Techniques for Education (Fa)

Total Hours 18

Graduate Certificate in Educational Statistics and Research Methods:

ESRM 6613 Evaluation of Policies, Programs, and Projects (Fa) 3
ESRM 6533 Qualitative Research (Sp) 3
ESRM 6633 Survey Research Methods (Even years, Sp) 3
Select one of the following: 3
ESRM 6423 Multiple Regression Techniques for Education (Fa)
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.

Program Of Study

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<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>ESRM 6403</td>
<td>Educational Statistics and Data Processing</td>
<td>3</td>
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<td>ESRM 6413</td>
<td>Experimental Design in Education</td>
<td>3</td>
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<td>ESRM 6423</td>
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<tr>
<td>ESRM 6453</td>
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<td>Structural Equation Modeling (Sp)</td>
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<tr>
<td>ESRM 6553</td>
<td>Advanced Multivariate Statistics (Even years, Sp)</td>
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<tr>
<td>ESRM 699V</td>
<td>Seminar (Irregular)</td>
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Total Hours 18

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.

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 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.

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<tr>
<td>EDFD 5683</td>
<td>Issues in Educational Policy (Sp, Su, Fa)</td>
<td>3</td>
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<td>Item Response Theory (Odd years, Sp)</td>
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<td>Seminar (Irregular)</td>
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<td>ESRM 700V</td>
<td>Doctoral Dissertation (Sp, Su, Fa)</td>
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Total Hours 45

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

Educational Foundations Courses

EDFD 5303. Historical Foundations of Modern Education (Sp, Su). 3 Hours.
Critical analysis and interpretation of the historical antecedents of contemporary education, focusing upon the American experience from the colonial period to the present.

EDFD 5353. Philosophy of Education (Irregular). 3 Hours.
Introduction to the method and attitude essential to effective analysis and interpretation of issues and values within a society reflecting cultural, ethnic, gender, and global diversity. Prerequisite: Graduate standing.

EDFD 5373. Psychological Foundations of Teaching and Learning (Irregular). 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.

EDFD 5573. Life-Span Human Development (Sp, Su, Fa). 3 Hours.
Basic principles of development throughout the human life-cycle. Physical, cognitive, social, emotional, and personality development.

EDFD 5673. Principles of Motivation (Sp). 3 Hours.
This course focuses on theories and concepts of human motivation. Students explore what motivates students to learn and examine strategies, techniques, and interventions that promote and sustain learner motivation.

EDFD 5683. Issues in Educational Policy (Sp, Su, Fa). 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. This course is cross-listed with EDRE 6413.

EDFD 5773. Advanced Topics in Educational Psychology (Even years, Fa). 3 Hours.
This course provides an opportunity for advanced study of socio-cognitive variables that play a crucial role in working in administration, teaching, and the evaluation of the success of students and academic programs. Prerequisite: ESRM 6403 and EDFD 5373.
Educational Statistics and Research Methods Courses

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.

ESRM 5393. Statistics in Education and Health Professions (Sp, Su, Fa). 3 Hours.
Applied statistics course for Master's degree candidates. Includes concepts and operations for frequency distributions, graphical techniques, measures of central tendency and variation, sampling, hypothesis testing, and interpretation of statistical results.

ESRM 5653. Educational Assessment (Irregular). 3 Hours.
Introduction to measurement issues and basic test theory. Focus on types and usage of assessment tools, data management, and analysis and interpretation of educational data. Practical training in the utilization and interpretation of academic achievement data in Arkansas.

ESRM 599V. Seminar (Irregular). 1-6 Hour.
May be repeated for up to 6 hours of degree credit.

ESRM 600V. Master's Thesis (Sp, Su, Fa). 1-6 Hour.
Master's Thesis. May be repeated for degree credit.

ESRM 605V. Independent Study (Sp, Su, Fa). 1-6 Hour.

ESRM 6403. Educational Statistics and Data Processing (Sp, Su, Fa). 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 5013 or equivalent.

ESRM 6413. Experimental Design in Education (Sp). 3 Hours.
Principles of experimental design as applied to educational situations. Special emphasis on analysis of variance techniques used in educational research. Prerequisite: ESRM 6403 or equivalent.

ESRM 6423. Multiple Regression Techniques for Education (Fa). 3 Hours.
Introduction to multiple regression procedures for analyzing data as applied in educational settings, including multicollinearity, dummy variables, analysis of covariance, curvilinear regression, and path analysis. Prerequisite: ESRM 6403.

ESRM 6453. Applied Multivariate Statistics (Sp). 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 6413.

ESRM 6513. Hierarchical Linear Modeling (Even years, Fa). 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 6413 and ESRM 6423.

ESRM 6523. Structural Equation Modeling (Sp). 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 6423.

ESRM 6533. Qualitative Research (Sp, Fa). 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 6403.

ESRM 6543. Advanced Qualitative Research (Sp). 3 Hours.
Preparation for the conduct of qualitative research, structuring, literature reviews, data collection and analysis, and reporting results. Prerequisite: ESRM 6533. May be repeated for up to 6 hours of degree credit.

ESRM 6553. Advanced Multivariate Statistics (Even years, Sp). 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 6453.

ESRM 6613. Evaluation of Policies, Programs, and Projects (Fa). 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 6403. This course is cross-listed with EDRE 6213.

ESRM 6623. Techniques of Research in Education (Sp, Su). 3 Hours.
Use of scientific method in attacking educational problems. Emphasis placed on the planning and design of research studies, collection of reliable and valid data, sampling methods, and analysis and interpretation of data. Prerequisite: ESRM 6403.

ESRM 6633. Survey Research Methods (Even years, Sp). 3 Hours.
The course addresses all phases of conducting a survey research study, including conceptualization, sample selection, instrument development, and analysis and reporting of findings. Prerequisite: ESRM 6403.

ESRM 6653. Measurement and Evaluation (Fa). 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 6403.

ESRM 666V. Practicum in Research (Irregular). 1-6 Hour.
Practical experience in educational research on campus, in school systems, or in other agencies in educational program development.

ESRM 6753. Item Response Theory (Odd years, Sp). 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 6653.

ESRM 699V. Seminar (Irregular). 1-6 Hour.
Prerequisite: advanced graduate standing. May be repeated for up to 6 hours of degree credit.

ESRM 700V. Doctoral Dissertation (Sp, Su, Fa). 1-18 Hour.
Doctoral Dissertation. Prerequisite: Candidacy. May be repeated for degree credit.