

# EDUCATIONAL RESEARCH METHODOLOGY (ERM)

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## ERM 401 Assessment I: Accountability in Our Nation's Schools 1

Students will examine Federal, State, and classroom accountability systems. Enrollment is limited to students who are pursuing initial teaching licensure.

**Prerequisites:** Admission to the Teacher Education Program.

## ERM 402 Assessment II: Standardized Tests 1

Students will examine standardized testing, key statistical terms, and the application of testing data to instructional planning. Enrollment is limited to students who are pursuing initial teaching licensure.

**Prerequisites:** Admission to the Teacher Education Program.

## ERM 403 Assessment III: Classroom Assessment 1

Development, monitoring, and evaluation of student progress through classroom assessments. Enrollment is limited to students who are pursuing initial teaching licensure in B-K, K-12, and secondary programs.

**Prerequisites:** Admission to the Teacher Education Program.

## ERM 405 Measurement and Assessment in Teaching 3

The fundamentals of measurement and assessment used in teaching middle and secondary grades, including the concepts of assessment types, assessment development, reliability, validity, interpreting test results.

## ERM 410 Data Literacy 3

This course provides students with an introductory set of tools for data literacy. The course introduces concepts related to the management, analysis, and presentation (figures and graphs) of data. While not a formal statistics class, fundamental concepts in statistics will be introduced as will relevant data management and statistical software.

**Prerequisites:** Completion of a "GMT" general education course or equivalent.

## ERM 411 Information Analytics 3

As stewards of data and information you are responsible for the origination, storage, description, classification, and retrieval of data. Because of this, there may be times when you must work with programmers and analysts. This course provides the background to do this.

**Prerequisites:** ERM 410.

## ERM 412 Data Visualization 3

Students in this class will become familiar with the storage and retrieval of data (e.g., different formats and data types in addition to security, assessing public repositories, etc...). In addition, students will become familiar with the various techniques of presenting and summarizing basic and complex data sets.

**Prerequisites:** ERM 410.

## ERM 413 Advanced Information Analytics 3

This course is the second of a two-course series (the first course is ERM 411) that will develop the basic tools that are necessary to understand and communicate with individuals relevant to the data that is managed.

**Prerequisites:** ERM 411.

## ERM 414 Program Evaluation 3

This course provides an overview of the basic concepts in program evaluation. Students will also be introduced to the practice of program evaluation.

## ERM 417 Statistical Methods in Education 3

Introductory course in applied descriptive statistics, correlational methods, and linear regression that provides a conceptual and theoretical foundation for more advanced work and a thorough grounding in the use of computers for descriptive statistical analysis, and interpretation of results.

**Prerequisites:** Elementary Algebra.

## ERM 488 Special Topics in Information Analytics 3

Covers emerging technologies, new trends and issues, and other current developments in the field of data analytics.

**Prerequisites:** LIS 199. LIS 200; Information Science Majors Only;

**Notes:** May be repeated once for credit when topic varies.

## ERM 490 Independent Study 1-4

Guided readings, research, and individual project work under direction of faculty.

**Prerequisites:** Information Science majors and permission of the instructor.

## ERM 491 Practicum in Data Analytics 3

Provides a supervised work experience for students in data analytics.

**Prerequisites:** CSC 120, ERM 410, IST 300, IST 301, IST 304, IST 423, IST 466, LIS 199, LIS 300. Information Science majors;

**Notes:** Graded on S/U basis only.

## ERM 600 Validity and Validation 3

Validity is fundamental to all testing operations. The course covers seminal theories, critical perspectives, as well as prominent validation research of critical importance to professionals working in diverse industry settings.

## ERM 604 Methods of Educational Research 3

Techniques and uses of research in education. Designed to provide the student with the ability to read, understand, and critically evaluate published empirical research.

**Notes:** Students who took this course as EAR 593 are not eligible to take ERM 604 and receive credit.

## ERM 605 Educational Measurement and Evaluation 3

For teachers, counselors, and administrators. Principles of measurement and evaluation, methods of scoring and interpreting tests. Construction and use of teacher-made tests. Statistical concepts basic to understanding and interpreting test data.

**Prerequisites:** None.

**Notes:** Students who took this course as EAR or ERM 670 are not eligible to take ERM 605 and receive credit.

## ERM 633 Second Language Assessment and Testing 3

Theoretical and practical issues related to second language testing with special attention paid to the assessment of English as a second language, world Englishes, and foreign languages.

## ERM 636 Advanced Studies in Second Language Testing 3

Language testing for English and foreign language learners, as well as the World Englishes domain. It investigates policies, theories, research, and tools employed to measure different language modalities.

## ERM 642 Evaluation of Educational Programs 3

Existing and emerging formulations of educational evaluation. Developing operational guidelines for conducting evaluations in educational settings.

## ERM 643 Applied Educational Evaluation 3

An application course that uses modern evaluation models, data collection, statistical analyses, and interpretation of findings to establish the effectiveness and utility of an educational program.

**Prerequisites:** ERM 642.

**ERM 644 Approaches to Collaborative Research and Evaluation in Education 3**

This course provides a comprehensive overview of collaborative and participatory approaches to evaluation and research in educational settings and how these approaches are differentiated from other methodological approaches.

**Prerequisites:** ERM 604.

**ERM 645 Culturally Responsive Approaches to Research and Evaluation 3**

This course provides a comprehensive overview of culturally responsive approaches to evaluation and research in educational settings and includes both theoretical and practical applications.

**Prerequisites:** ERM 604.

**ERM 650 Foundations of Qualitative Research Methods 3**

This course will provide graduate students with a theoretical understanding of qualitative research and practical, hands-on experience conducting a small-scale study.

**ERM 667 Foundations of Educational Measurement Theory 3**

Statistical foundations, classical test theory, reliability, validity, item analysis, and norms; selected topics in modern test theory. Designed for those who will develop, evaluate, and select measurement instruments in their professional roles.

**Prerequisites:** ERM 680 or equivalent course.

**Notes:** Credit may not be obtained for PSY 437.

**ERM 668 Survey Research Methods in Education 3**

Theory, methods, and procedures of survey research as this methodology is applied to problems in education. Sampling from finite populations.

**Prerequisites:** ERM 680 or equivalent.

**ERM 669 Item Response Theory 3**

Conceptual and mathematical foundations, parameter estimation, tests of model assumptions and goodness of fit, and practical applications of IRT.

**Prerequisites:** ERM 667 and either ERM 681 or STA 662 or equivalent courses.

**ERM 675 Data Visualization and Presentation 3**

Modern techniques for summarizing and visualizing univariate and multivariate data using various statistical and graphical software packages. Covers theories and research on graphics and the perception of visual data.

**Prerequisites:** ERM 680.

**ERM 680 Intermediate Statistical Methods in Education 3**

Applied descriptive and inferential statistics. Topics include applied probability, power analysis, chi-square distributions, hypothesis testing for a variety of applications, and correlation and regression. Concept learning, applications, and computer analyses are stressed.

**Prerequisites:** Elementary algebra.

**Notes:** Students who took this course as ERM 618 are not eligible to take ERM 680 and receive credit.

**ERM 681 Design and Analysis of Educational Experiments 3**

Advanced inferential statistics including factorial ANOVA, repeated measures design, multiple regression, ANCOVA, log-linear analysis. Applications in education and the social sciences.

**Prerequisites:** ERM 680 or equivalent, or permission of instructor.

**ERM 682 Multivariate Analysis 3**

Multivariate normal distribution. Cluster analysis, discriminant analysis, canonical correlation, principal component analysis, factor analysis, multivariate analysis of variance. Use and interpretation of relevant statistical software.

**Prerequisites:** ERM 680 and ERM 681, or STA 573, or STA 662, or permission of instructor.

**ERM 685 R for Education and the Social Sciences 3**

Using R to learn about programming fundamentals, data management, automating large numbers of analyses, conducting simulation studies, conducting specialized analyses, and producing high quality graphics.

**Prerequisites:** ERM 681.

**Corequisites:** ERM 681 or equivalent.

**ERM 688 Contemporary Problems Seminar 1-3**

Specific course title identified each semester by subscript, e.g., Contemporary Problems Seminar: Issues in Professional Negotiations.

**Prerequisites:** Advanced master's or doctoral standing or permission of instructor.

**Notes:** May be repeated for credit when topic varies.

**ERM 688B Cont Pr Sem:Hot Topics Ed Res 3****ERM 692 Independent Study 1-4**

Guided readings, research, and individual project work under direction of a staff member.

**Prerequisites:** Permission of instructor.

**ERM 700 Validity and Validation 3**

Validity is fundamental to all testing operations. The course covers seminal theories, critical perspectives, as well as prominent validation research of critical importance to professionals working in diverse industry settings.

**ERM 704 Methods of Educational Research 3**

Techniques and uses of research in education. Designed to provide the student with the ability to read, understand, and critically evaluate published empirical research.

**Notes:** Students who took this course as EAR 593 are not eligible to take ERM 704 and receive credit.

**ERM 720 Evaluation and Public Policy 3**

This course will provide students with a critical understanding of the multiple connections (and disconnections) between public policy and evaluation.

**Prerequisites:** ERM 741 or equivalent.

**ERM 726 Advanced Topics in Educational Measurement 3**

Technical developments and applications in classical test theory, item response theory, generalizability theory, models of selection bias, differential item functioning, and test score equating.

**ERM 727 Computer-Based Testing: Methods and Applications 3**

Computer-based testing applications including automated test assembly, item banking, computer-adaptive and multistage testing, web-based testing, large scale assessment development and support systems, and computer-based performance assessments. Covers state-of-the-art research and developments.

**Prerequisites:** ERM 767.

**ERM 730 Practicum in Educational Research and Evaluation 3**

Field-based and mentored practicum.

**Prerequisites:** Permission of instructor.

**Notes:** Grade: Satisfactory/Unsatisfactory (S/U).

**ERM 731 Structural Equation Modeling in Education 3**

Formulation of structural models, estimation of structural coefficients using LISREL, estimation of model fit, confirmatory factor analysis models, practical applications.

**Prerequisites:** ERM 782 or permission of instructor.

**ERM 732 Hierarchical Linear Modeling 3**

Structure of hierarchical data, random intercepts, individual change/growth models, applications in meta-analysis, assessing hierarchical models, hierarchical generalized linear models, hierarchical models for latent variables, cross-classified random effects, estimation.

**Prerequisites:** ERM 782 or STA 671 or permission of instructor.

**ERM 733 Second Language Assessment and Testing 3**

Theoretical and practical issues related to second language testing with special attention paid to the assessment of English as a second language, world Englishes, and foreign languages.

**ERM 734 Equating 3**

Equating designs, equating and scaling assumptions, design of anchor sets, observed score equating methods, true-score equating methods, standard error of equating, use and interpretation of relevant statistical software.

**Prerequisites:** ERM 781 or ERM 767 or permission of instructor.

**ERM 736 Advanced Studies in Second Language Testing 3**

Language testing for English and foreign language learners, as well as the World Englishes domain. It investigates policies, theories, research, and tools employed to measure different language modalities.

**ERM 737 Diagnostic Classification Models 3**

Philosophy of diagnostics models, DINA/DINO model, RUM, Log-Linear Cognitive Diagnosis Model, Test Construction, Estimation of Diagnostic Models, Application of Diagnostic Models.

**Prerequisites:** ERM 769.

**ERM 741 Evaluation of Educational Programs 3**

Existing and emerging formulations of educational evaluation. Developing operational guidelines for conducting evaluations in educational settings.

**ERM 742 Advanced Topics in the Evaluation of Educational Programs 3**

Theoretical understanding of evaluation design and strengthening of practical program evaluation skills.

**ERM 743 Advanced Theory in Program Evaluation 3**

Advanced seminar of complex issues in program evaluation. Students will develop a deep synthesis of the major approaches and theories of evaluation. The purpose of evaluation in society will be examined.

**Prerequisites:** ERM 741 or equivalent.

**ERM 744 Approaches to Collaborative Research and Evaluation in Education 3**

This course provides a comprehensive overview of collaborative and participatory approaches to evaluation and research in educational settings and how these approaches are differentiated from other methodological approaches.

**Prerequisites:** ERM 704.

**ERM 745 Culturally Responsive Approaches to Research and Evaluation 3**

This course provides a comprehensive overview of culturally responsive approaches to evaluation and research in educational settings and includes both theoretical and practical applications.

**Prerequisites:** ERM 704.

**ERM 749 Foundations of Qualitative Research Methods 3**

This course will provide graduate students with a theoretical understanding of qualitative research and practical, hands-on experience conducting a small-scale study.

**ERM 750 Case Study Methods in Educational Research 3**

Overview of the methodology of case study research; enhancement of students' skills in using case study methods.

**Prerequisites:** ERM 704, ERM 741, or equivalent.

**ERM 752 Applied Educational Evaluation 3**

An application course that uses modern evaluation models, data collection, statistical analyses, and interpretation of findings to establish the effectiveness and utility of an educational program.

**Prerequisites:** ERM 741.

**ERM 767 Foundations of Educational Measurement Theory 3**

Statistical foundations, classical test theory, reliability, validity, item analysis, and norms; selected topics in modern test theory. Designed for those who will develop, evaluate, and select measurement instruments in their professional roles.

**Prerequisites:** ERM 780 or equivalent course.

**Notes:** Credit may not be obtained for PSY 437.

**ERM 768 Survey Research Methods in Education 3**

Theory, methods, and procedures of survey research as this methodology is applied to problems in education. Sampling from finite populations.

**Prerequisites:** ERM 780 or equivalent.

**ERM 769 Item Response Theory 3**

Conceptual and mathematical foundations, parameter estimation, tests of model assumptions and goodness of fit, and practical applications of IRT.

**Prerequisites:** ERM 767 and either ERM 781 or STA 662 or equivalent courses.

**ERM 771 Advanced Item Response Theory 3**

Estimation techniques for various unidimensional dichotomous and polytomous IRT models using various software packages. IRT applications such as computerized testing, equating, test construction, and differential item/test functioning are also covered.

**Prerequisites:** ERM 769 or equivalent.

**ERM 772 Multidimensional Item Response Theory 3**

Multidimensional item response theory models including their estimation, representation, and application. Use of relevant estimation and graphing software discussed.

**Prerequisites:** ERM 769 and ERM 771 or permission of instructor.

**ERM 774 Data Visualization and Presentation 3**

Modern techniques for summarizing and visualizing univariate and multivariate data using various statistical and graphical software packages. Covers theories and research on graphics and the perception of visual data.

**Prerequisites:** ERM 780.

**ERM 775 Directed Doctoral Research 1-6**

Individual work on dissertation research problems: collection and analysis of data; critical review, integration, and interpretation of research literature on a topic pertinent to the student's dissertation.

**Prerequisites:** Doctoral students in ERM and permission of instructor.

**ERM 780 Intermediate Statistical Methods in Education 3**

Applied descriptive and inferential statistics. Topics include applied probability, power analysis, chi-square distributions, hypothesis testing for a variety of applications, and correlation and regression. Concept learning, applications, and computer analyses are stressed.

**Prerequisites:** Elementary algebra.

**Notes:** Students who took this course as ERM 618 are not eligible to take ERM 780 and receive credit.

**ERM 781 Design and Analysis of Educational Experiments 3**

Advanced inferential statistics including factorial ANOVA, repeated measures design, multiple regression, ANCOVA, log-linear analysis. Applications in education and the social sciences.

**Prerequisites:** ERM 780 or equivalent or permission of instructor.

**ERM 782 Multivariate Analysis 3**

Multivariate normal distribution. Cluster analysis, discriminant analysis, canonical correlation, principal component analysis, factor analysis, multivariate analysis of variance. Use and interpretation of relevant statistical software.

**Prerequisites:** ERM 780 and ERM 781, or STA 635, or STA 662, or permission of instructor.

**ERM 785 R for Education and the Social Sciences 3**

Using R to learn about programming fundamentals, data management, automating large numbers of analyses, conducting simulation studies, conducting specialized analyses, and producing high quality graphics.

**Prerequisites:** ERM 781.

**Corequisites:** ERM 781 or equivalent.

**ERM 788 Contemporary Problems Seminar 1-3**

Specific course title identified each semester by subscript, e.g., Contemporary Problems Seminar: Issues in Professional Negotiations.

**Prerequisites:** Doctoral standing or permission of instructor.

**Notes:** May be repeated for credit when topic varies.

**ERM 792 Independent Study 1-4**

Guided readings, research, and individual project work under direction of a staff member.

**Prerequisites:** Permission of instructor.

**ERM 799 Dissertation 1-12**

Individual direction in the development and execution of a doctoral dissertation.

**ERM 801 Thesis Extension 1-3**

Thesis Extension.

**ERM 802 Dissertation Extension 1-3**

Dissertation Extension.

**ERM 803 Research Extension 1-3**

Research Extension.