

QQPM Course Information

QQPM Course Overview (each level represents prerequisites for the next level):

Introductory Level Courses

EDPS 800	Foundations of Educational Research
EDPS 859	Statistical Methods
EDPS 870	Intro to Educational and Psychological Measurement
EDPS/EDAD 973A	Evaluation Theory and Practice

Intermediate Level Courses

EDPS 900	A (Experimental), B (Single Case), D (Survey), J (Historical), K (Qualitative)
EDPS 860	Applications of Selected Advanced Statistics
EDPS 941	Intermediate Statistics: Experimental
EDPS 942	Intermediate Statistics: Correlational
EDPS 969	Nonparametric Statistics

Advanced Level Courses

EDPS 970	Theory and Methods of Educational Measurement
EDPS 971	Structural Equation Modeling
EDPS 972	Multivariate Statistics
EDPS 987	Seminar in Hierarchical Linear Models
EDPS 987A	Seminar in Qualitative Methods and Diversity
EDPS 991	Seminar in Advanced Evaluation
EDPS 991	Seminar in Instrument Development
EDPS 991	Seminar in Mixed Methods Research
EDPS 991	Seminar in Experimental Design
EDPS 991	Seminar in Grounded Theory
EDPS/TEAC 935	Seminar in Qualitative Research
TEAC/EDPS 930A	Ethnographic Methods
TEAC 930D	Discourse Analysis Across Home and School Settings
EDPS 945	Computer Assisted Research Data Analysis

Suggested QQPM Courses for Various Degree Programs:

Masters*

EDPS 859
EDPS 860
EDPS 800
EDPS 870
EDPS 854 or EDPS 863
EDPS 850 or EDPS 851
EDPS 941
EDPS 942
EDPS 900D
EDPS 973A

PhD

EDPS 941
EDPS 942
EDPS 970
EDPS 900K
EDPS 900A
EDPS 960, 961, 966 (2 of)
EDPS 962 or 963

*for Masters students who
intend to pursue a doctorate.
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EDPS 945

Description of Courses in Quantitative, Qualitative, and Psychometric Methods (QQPM)

Statistics Courses

These are courses that cover statistical methods, including choosing the appropriate statistical technique for a given situation, and computation and interpretation of statistics. While these courses may cover a limited amount of material on research designs with which the statistical techniques are associated, they are not intended to be courses in research design issues.

***EDPS 859: Statistical Methods.** Introductory course in basic statistics that is recommended as a first course for masters and doctoral students who have not had previous coursework in statistics. It is also recommended for students who have had some coursework in statistics but feel the need for a “brush-up.” This may be the case for students whose statistics coursework was taken several years previously.

Content: Covers descriptive and inferential statistics including indexes of central tendency and dispersion (mean, median, mode, range, variance, standard deviation), graphs, frequency distributions, simple correlation and regression, one-sample z and t-tests, two-sample independent and dependent t-tests, and chi-square. The emphasis is on the proper application of these statistical techniques, although some principles of research design (sampling, types of research designs) may also be covered.

Computer knowledge: No computer knowledge is required, although a familiarity with basic MAC or PC usage is a plus. Most sections will include instruction in and use of the SPSS package.

Course Objectives: Use statistical reasoning in applied situations, determine the appropriate statistics to use in a given situation, interpret the results of the basic statistical procedures taught, understand basic statistical notation and formulas, design and analyze simple quantitative studies.

***EDPS 860: Applications of Selected Advanced Statistics.** Intermediate level course for students who have already had EDPS 859. It is recommended as either a terminal class for masters level students or as an intermediate course for students who plan to go on to take more advanced courses such as EDPS 941 or 942 but who do not feel confident in their skills based on their performance in EDPS 859.

Prerequisites: EDPS 859 or equivalent.

Content: One and two-sample tests of means, variances, and correlations; analysis of variance designs including single factor, factorial designs, repeated measures designs, and post-hoc procedures; simple and multiple regression, analysis of covariance, chi-square goodness of fit and independence tests.

Computer knowledge: No computer knowledge is required, although a familiarity with basic MAC or PC usage is a plus. This course will include instruction in and use of the SPSS package.

Course Objectives: Understand the steps involved in hypothesis testing, compute and interpret the tests listed in the content section above, use the SPSS software package to analyze data.

EDPS 941: Intermediate Statistics: Experimental. Covers analysis of variance (ANOVA) procedures for a wide range of experimental designs. It is recommended for doctoral or advanced masters or Ed.S. students who will be involved with research utilizing experimental designs. Although ANOVA designs are covered in EDPS 860, the coverage in EP 941 is much more detailed.

Prerequisites: EDPS 859 or equivalent (we recommend that students who have not earned *at least* a B grade in EDPS 859 or take EDPS 860 prior to taking EDPS 941).

Content: Analysis of variance designs, including oneway, two-way, and general factorial designs, trend analysis, repeated-measures (within subjects) designs, split-plot (mixed between/within) designs. Also includes material on effect sizes and power, follow-up tests (Tukey, etc.), and planned comparisons.

Computer knowledge: No computer knowledge is required, although a familiarity with basic MAC or PC usage is a plus. This course will include instruction in and use of the SPSS package.

Course Objectives: Understand the principles and conceptual foundations of ANOVA techniques and understand their strengths and weaknesses. Students will learn how to determine the appropriate analysis for a given research design, how to compute and interpret ANOVA test statistics, how to interpret computer output from ANOVA designs, assumptions required for each test and how to assess them, and how to determine power levels, effect sizes, and sample sizes required to achieve a given level of power.

EDPS 942: Intermediate Statistics: Correlational. Covers a variety of multiple regression procedures. Recommended for doctoral or advanced masters or Ed.S. students who will be involved with research that is not necessarily experimental in nature, for example, analysis of data from survey research. Although multiple regression is covered briefly in EDPS 860, the coverage in EDPS 942 is much more comprehensive.

Prerequisites: EDPS 859 or equivalent (we recommend that students who have not earned *at least* a B grade in EDPS 859 take EDPS 860 prior to taking EP 942). Note that EDPS 941 is **not** a prerequisite for EDPS 942, and we have no specific advice about which of these courses to take first.

Content: Basic multiple regression, variable selection techniques such as forward, backward, and stepwise regression, statistical control techniques such as partial and semi-partial correlations, use of categorical independent variables through dummy and effect coding, analysis of covariance designs, and curvilinear regression techniques.

Computer knowledge: No computer knowledge is required, although a familiarity with basic MAC or PC usage is a plus. This course will include instruction in and use of the SPSS package.

Course objectives: Determine the appropriate regression technique for a given situation, understand the principles and conceptual foundations of regression techniques, conduct and interpret regression analyses using the SPSS package, and understand the strengths and limitations of regression techniques.

EDPS 969: Nonparametric Statistical Methods. Commonly used nonparametric statistical tests. These tests are generally used for situations in which the assumptions of parametric tests such as t-tests and analysis of variance cannot be met. It is recommended for doctoral or advanced masters or Ed.S. students who anticipate working with nominal or ordinal data or data that may not be normally distributed or satisfy other parametric assumptions. It is also recommended for students who plan to use statistical methods extensively in their future careers and who would like a broader background in statistical methods and a wider range of statistical tools from which to choose.

Prerequisites: EDPS 859 or equivalent.

Content: Statistical tests covered include the sign test, Wilcoxon signed rank test, Mann-Whitney U test, Wilcoxon rank sum test, Kruskal-Wallis test, Rank transform test, Friedman test, aligned ranks test, Spearman rank correlation, Kendall's tau correlation, robust regression methods, chi-square tests, and loglinear modeling. Issues of statistical power and efficiency will also be covered.

Computer knowledge: No computer knowledge is required, although a familiarity with basic MAC or PC usage is a plus. This course will include instruction in and use of the SPSS and SAS packages.

Course objectives: Understand the conceptual foundations of the various nonparametric statistics presented and their strengths and weaknesses relative to each other as well as to comparable parametric techniques. Students should also be familiar with the relative efficiency and power of these techniques. Based on such considerations, students should be able to choose the appropriate method to use in a given situation, analyze the data using a standard statistical package such as SPSS or SAS, and interpret the output.

EDPS 971: Structural Equation Modeling. Introduction to structural equation modeling techniques, including path analysis, confirmatory factor analysis, and combinations of these. It is recommended for doctoral and advanced masters and Ed.S students who anticipate conducting research for which the variables can best be conceptualized in terms of a path model or flowchart type of system. It is also recommended for students who anticipate working in the area of scale or instrument development and validation or who want to expand their knowledge of statistical techniques.

Prerequisites: EDPS 941, EDPS 942, and EDPS 870 or equivalents.

Content: Simple path analysis, confirmatory factor analysis, full structural models, multiple group analyses, as well as issues involving violation of assumptions in SEM and criticisms of SEM. Basic matrix algebra related to SEM concepts is also covered. Use of the MPLUS computer package is taught.

Computer knowledge: Knowledge of MAC or PC based computer systems is assumed. The LISREL and PRELIS computer packages will be used in this course, but no previous knowledge of these programs is required.

Course objectives: Run appropriate analysis using MPLUS, interpret the output, and write up the results in a format suitable for a journal article or research report. Students should also understand the conceptual framework of SEM techniques, their strengths and limitations, and should be aware of acceptable and unacceptable practices in this area.

EDPS 972: Multivariate Statistical Methods. Statistical methods for situations in which there may be more than one dependent variable. It is recommended for doctoral or advanced masters or Ed.S. students who anticipate working with more complicated ANOVA and regression designs, particularly designs with more than one dependent measure. It is also recommended for students who plan to use quantitative methods extensively in their careers and who want to expand their knowledge of quantitative statistics.

Prerequisites: EDPS 941 and EDPS 942 or equivalents.

Content: Multivariate analysis of variance (MANOVA) designs including two-group, k-group, and factorial MANOVA, MANCOVA (multivariate analysis of covariance), canonical correlation and analysis, and repeated measures ANOVA. Basic elements of matrix algebra relevant to these techniques will also be covered.

Computer knowledge: No computer knowledge is required, although a familiarity with basic MAC or PC usage is a plus. This course will include instruction in and use of the SAS and/or SPSS packages.

Course objectives: Choose the appropriate multivariate technique for a given situation, analyze data from multivariate designs using the SAS and/or SPSS package, and interpret the output. Students should also understand the conceptual underpinnings of these techniques and their strengths and weaknesses.

EDPS 991: Seminar in Hierarchical Linear Models (HLM). This course is designed for advanced quantitative students.

Prerequisites: EDPS 941, EDPS 942 and one measurement course.

Content: HLM is concerned with the analysis of multilevel data (nested data). Multilevel data arise, in part, because some observations have a nested structure. For example, if repeated observations are collected on a set of individuals and the measurement occasions are not identical for all persons, the multiple observations are properly conceived as nested within persons. Each person might also be nested within some organizational unit such as a workplace or classroom. These organizational units may in turn be nested within a geographical location such as a community, state, or country. Within the hierarchical linear model, each of the levels in the data structure (e.g., repeated observations within persons, persons within communities, communities within states) is formally represented by its own sub-model. Each sub-model represents the structural relations occurring at that level and the residual variability at that level.

Measurement Courses

These are courses that cover measurement principles such as reliability and validity, and measurement techniques such as writing different types of items, item analysis, and instrument development.

EDPS 870: Introduction to Educational and Psychological Measurement. This is an introductory course in measurement covering the basics of reliability, validity, classical test theory, item writing, instrument development, interpretation of standardized test scores, and evaluation and use of standardized achievement, aptitude, and personality instruments. This course is recommended as a first course in measurement for both masters and doctoral level students. It is the feeling of the QQME faculty that all students at the graduate level should have a good background in measurement that would include at least EDPS 870.

Prerequisites: EDPS 859 or equivalent.

Content: History and nature of measurement in the social sciences, item writing principles for both cognitive and affective measures, basic instrument development procedures, item analysis procedures, basic principles of reliability, validity, and classical test theory, interpretation of different types of scores including grade and age equivalents, percentiles and percentile ranks, normalized scores, z and T scores, and evaluation and use of standardized achievement, aptitude, and personality tests.

Computer knowledge: No computer knowledge is required, although familiarity with the PC or MAC is useful. Students will conduct analyses on the SPSS package for the PC, which will be taught in the class.

Course objectives: Write both cognitive and affective items, conduct item analyses, determine the most important form of reliability and validity for an instrument and conduct reliability and simple validity studies. Students should also be able to interpret the various scores appearing on standardized tests, and explain their advantages and limitations. Students should be able to obtain information on standardized instruments and to use this information to make decisions about the adequacy of instruments for particular purposes.

EDPS 970: Theory and Methods of Educational Measurement. This is an advanced course in educational measurement intended primarily for students who are interested in the areas of testing and measurement theory. Applications of the methods presented are primarily educational, although extensions to psychological and attitude measurement are included.

Prerequisites: EDPS 870 or equivalent.

Content: Theory and applications of classical and modern test theory, multidimensional scaling, factor analysis, item response theory, equating, differential item functioning, and standard

setting. The course will also include discussions of how these areas are related to test development and validation.

Computer knowledge: Familiarity with SPSS or similar package is required.

Course objectives: Determine which of the measurement techniques learned in class is appropriate for a given situation. Students will also be able to run and interpret basic computer analyses for reliability assessment, item analysis, and factor analysis. In addition, students will understand the principles and applications of standard setting and equating, and be familiar with current issues in the measurement field.

EDPS 991: Seminar in Instrument Development. (Offered occasionally.) This is a hands-on course designed to facilitate the instrument development process. It is recommended for students who plan to develop an instrument as part of their research, or who are interested in learning how to do so for future research projects.

Content: Defining the construct to be measured, item writing, screening items, instrument validity, including content, construct, and criterion-related as well as convergent, discriminant, and divergent, use of factor analysis, reliability analysis, and writing about the instrument development process.

Course objectives: A) provide a detailed strategy for constructing and developing an instrument, b) to develop an instrument suitable for the student's immediate research needs, c) to develop a validation strategy, d) to discuss data-analytic and interpretation strategies, and e) to discuss writing strategies. By the end of the semester, each student will have developed an instrument and have developed strategies to analyze the reliability and validity of the instrument.

Research Design Courses

These are courses that address issues concerning the design, implementation, and interpretation of research studies, both qualitative and quantitative.

***EDPS 800: Foundations of Educational Research.** This course provides an introduction to educational research for students from both the qualitative and quantitative research paradigms. It is recommended as a first course for masters level students and doctoral students with no previous coursework or experience in research design.

Prerequisites: EDPS 859 or equivalent.

Content: Steps in the research process, including reviewing the literature, identifying a research problem, generating research hypotheses, collecting and analyzing data, and writing and evaluating research studies. Specific research designs discussed include survey, experimental, case study and narrative, grounded theory, feminist, and mixed-methods.

Course objectives: Conduct a literature review using library resources such as CD-ROM data bases; write research papers using APA format; understand and apply basic research principles; differentiate among research designs, and determine situations in which different designs would be appropriate; design and carry out basic studies involving the research designs taught in class; evaluate published research; and should be familiar with ethical research principles.

EDPS 900A: Correlational and Experimental Methods in Educational Research.

Experimental and quasi-experimental designs. This course is recommended for advanced masters level or doctoral students who plan to use these types of designs in their research or who want a better understanding of quantitative research designs.

Prerequisites: EDPS 800 and EDPS 859 or equivalents.

Content: Measurement issues such as reliability and validity of measures, hypothesis testing concepts, sampling, statistical power, internal and external validity principles, correlational designs, quasi- and true experimental designs.

Course objectives: Understand the principles of hypothesis testing, sampling, statistical power, and internal, external, construct, and statistical conclusion validity, and be able to use this knowledge to evaluate applied research studies. Students should also be able to differentiate among correlational and the various types of experimental designs and to determine which design is most appropriate for a given situation.

EDPS 900B: Single Case/Small N Methods in Educational Research. Research methods for advanced for situations in which individuals are observed over time, typically subsequent to an experimental or other type of intervention, or who are interested in learning more about single case research.

Prerequisites: EDPS 800 and EDPS 859 or equivalents.

Content: Specific strategies and procedures for understanding, designing, implementing, and evaluating single case/small N research studies. Topics include measuring and recording behavior, issues of validity, withdrawal and reversal designs, multiple baseline designs, changing-criterion designs, multiple treatment designs, data evaluation, graphical analysis, replicating and evaluating single case research, and limitations of single case designs.

Course objectives: Define and operationalize important terms and concepts in single case research; analyze, interpret and evaluate graphical data from single case designs; identify single case designs appropriate to given situations; and critically evaluate research literature involving the use of single case designs.

***EDPS 900D: Survey Research Methods.** Research methods course intended for advanced masters level students or doctoral students who will be involved in research using survey techniques or who are interested in learning more about survey research.

Prerequisites: EDPS 800 and EDPS 859 or equivalents.

Content: Introduction to the principles and applications of survey research, including questionnaire design, item writing and measurement issues, survey administration, sampling plans, selection of sample size, response rates, and ethical issues in survey research.

Course objectives: Identify and justify a research question, write items that produce reliable and valid scores to measure variables of interest, design an effective survey questionnaire format, develop a sampling plan that minimizes error and bias, and design effective survey implementation procedures.

EDPS 900J: Historical Methods in Educational Research. This is a course in historical research design for advanced masters level or doctoral level students who are interested in learning more about historical research paradigms.

Prerequisites: EDPS 800 and EDPS 859 or equivalents.

Content: This course provides an introduction to historical research designs.

***EDPS 900K: Qualitative Approaches to Research in Education.** This is a required course for both masters and doctoral level students; the course is also for masters level or doctoral level students who plan to be involved in qualitative research or who are interested in learning more about qualitative research paradigms.

Prerequisites: EDPS 800 and EDPS 859 or equivalents.

Content: Introduction to qualitative research designs and their philosophical assumptions, and how these influence the research questions, data collection, data analysis, verification, and use of theory and literature. Students will be introduced to five traditions within the qualitative framework: narrative, case study, ethnography, grounded theory, and phenomenology. The course will also address ethical issues in qualitative research and strategies for reporting qualitative data.

Course objectives: Identify the differences between the qualitative and quantitative paradigms, identify a researchable problem and develop research questions and a purpose statement for a qualitative research project, select and use appropriate qualitative data collection procedures, select appropriate qualitative data analysis procedures, identify the characteristics of the five traditions of qualitative inquiry introduced in the course, identify narrative strategies for writing qualitative studies, articulate the place of theory and literature in qualitative study, and discuss potential ethical issues in qualitative research.

***EDPS/TEAC 935: Seminar in Qualitative Research.** An advanced course in qualitative methods, intended for students who have had at least one qualitative research course.

Prerequisites: EDPS 900K or equivalent.

Content: The course includes coverage of data collection and analysis strategies for a variety of qualitative approaches.

TEAC/EDPS 930A: Ethnographic Methods. Ethnographic method is an approach to research developed in anthropology and sociology and directed to developing in-depth information about the beliefs and behaviors of groups of people in naturally occurring settings. Ethnography has generally been defined as extended contact with a given community with an emphasis given to description of local particularities, including individuals' perspectives and interpretations of their world. In this course discussion and readings will focus on the place of ethnographic research in education, theoretical foundations of ethnography, methods of ethnographic research, analysis of ethnographic data, a proposal and implementation of a small research project which may or may

not be drawn from students' own research, writing an ethnographic report, and the utilization of findings. The course will also explore the use of video, audio, and print representations in data collection and in the dissemination of ethnographic research. Note: This course is cross-listed in TEAC/EDPS/FACS/NUTR.

Prerequisites: None.

TEAC/EDPS 930D: Discourse Analysis Across Home and School Settings (Offered occasionally.) This is a seminar in which advanced doctoral students who have already collected conversational data in schools, classrooms, or other educational settings in communities will meet to learn more about the analysis of discourse and to share and advance their ongoing research. The course introduces students to theory and method in the sociolinguistic study of communication and reviews in particular research on communication in educational settings.

Key concepts in analysis of discourse is examined including the nature and structure of conversation, turn-taking, form/function relationships in speech, the study of language in context, involvement strategies in discourse, analysis of spoken text, and the relationship of discourse to teaching and learning. Among the educational topics to which analysis of discourse will be applied in the readings, discussions, and projects are the teaching and learning of subject matter; power and authority in classroom language; differential treatment and access to knowledge on the basis of characteristics such as race, gender, first language, or ethnicity; classrooms as cultural settings; and the examination of talk and learning in traditional and alternative pedagogies. Note: This course is cross-listed in TEAC/EDPS/FACS/NUTR.

Prerequisites: None

***EDPS 936: Seminar in Mixed Methods Research.** The intent of this course is to provide an overview of mixed method research, including the history and philosophy of this type of research, the emerging literature on it, the types of research problems addressed, the specification of purpose statements and research questions, the types of design, the data collection and analysis strategies, and the writing and evaluating of mixed method studies.

Prerequisites: At least one qualitative and one quantitative research methods course and one statistics course.

EDPS 991: Seminar in Experimental Design. (Offered occasionally.) This is an advanced course in experimental design issues for doctoral students who plan to be involved in quantitative research and who are interested in a more comprehensive treatment of experimental design issues than that presented in EDPS 900A.

Prerequisites: EDPS 800 and EDPS 859 or equivalents.

Content: Compare the strengths and weaknesses of correlational, quasi-experimental, and true experimental designs, and to use this knowledge to improve design sensitivity. Topics include: hypothesis testing, causality, the role of randomization in experimental research, threats to validity, statistical power, increasing design sensitivity, and reduction of error and bias. The course will also include strategies for writing research papers.

Course objectives: Understanding three sources of variation in experimental research, construct an “experimental design” schema, discuss the nature of hypothesis testing, history of causality, and the extent to which researchers can establish causality, discuss the four foundational criteria for validity, categorize threats to validity, consider issues of power and effect size in detail, discuss sampling and experimental control procedures to reduce error and bias, review current debates in the hypothesis testing literature, provide a detailed plan for writing up experimental research, and consider recent issues in experimental design and research.

Evaluation Courses

These courses focus on methods for evaluating the effectiveness of education and social service programs.

EDPS /EDAD 973A: Evaluation Theory and Practice. Introduction to the theories and strategies of evaluation. Key evaluation models examined as they relate to judgements about programs. Methodological, social and political issues in evaluation projects.

Prerequisites: None.

EDPS 991: Seminar in Advanced Evaluation. (Offered occasionally.) Evaluation design based on advanced qualitative and quantitative methods.

Prerequisites: At least six hours of statistics; at least 6 hours of research methods including at least three hours of qualitative methods.

Data Analysis

EDPS 945: Computer Assisted Research Data Analysis. Practical opportunity to learn several statistical software applications; limited coverage of qualitative analysis software.

Prerequisites: EDPS 859 and one additional statistics course.

Content: Covers use of data analysis software (SPSS and/or SAS) for the PC. Developing and managing data files, transferring data files, data transformation and selection.

*Class offered both face-to-face and online.

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