Faculty of Education

Measurement & Evaluation

Research Methodology and Psychometrics Track

Faculty of Education, The University of Ottawa

Would you like to learn how to ***model data from psychometric assessments*** such as achievement tests, personality scales, and quality-of-life indicators?

Would you like to learn how to use ***current software packages*** such as SPSS, HLM, and LISREL and ***understand the meaning behind the symbols and numbers in the output***?

Would you like to learn about the theoretical foundations behind a ***variety of statistical and psychometric modeling approaches*** and their ***mathematical representations***?

Would you like to learn how to ***construct concise and coherent arguments using empirical evidence*** from various statistical and psychometric models?

Then you should consider enrolling in the ***M.A. or Ph.D. program*** in the ***Measurement & Evaluation*** specialization under a ***Research Methodology and Educational Psychometrics*** track!

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Measurement & Evaluation

As a core component, we offer a ***sequence of 5 distinct courses*** specifically designed to provide you with ***complementary knowledge and skills*** offered on an ***annual and bi-annual basis***:

EDU 5191	Quantitative Methods and Interpretation I	Fall 2004, Fall 2005
EDU 6191	Quantitative Methods and Interpretation II	Winter 2005, Winter 2006
EDU 7193	Advanced Measurement Theories	Winter 2005
EDU 7395	Advanced Statistical Methods	Fall 2004, Fall 2005
EDU 7394	Selected Topics in Measurement and Evaluation	Winter 2006

Each course is taught by a ***full-time professor*** with an ***active record of research*** in the subject matter. Our instruction ***integrates statistical theory and real-life data applications*** through group lecture, individual projects, and laboratory work.

If becoming a full-time student does not currently suit your needs but you are interested in some of the above courses, consider ***enrolling as a special student in up to 2 courses***!

For ***more information*** on the above courses as well as additional courses within our M.A. and Ph.D. programs that may suit your particular needs, please ***contact André A. Rupp at the Faculty of Education.***

André A. Rupp
Assistant Professor, Faculty of Education

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Course Objectives (2004-2006)

Faculty of Education, The University of Ottawa

EDU 5191 – Methods and Interpretation in Quantitative Methods (Part I)
Prerequisites: None.
Offered: Fall 2004, Fall 2005

This course provides the foundations of descriptive and inferential statistical methods for educational research. You will learn about fundamental considerations in study design and sampling procedures and how to go from developing a research question to collecting data that can help you answer it and to utilizing statistical methods for analyzing such data. In the realm of descriptive statistics, these methods include graphical displays of data, transformation of scores onto standardized scales, and numerical measures of central tendency and variability. In the realm of inferential statistics, these methods include basic distributional theory, hypothesis tests and confidence intervals about mean differences, cross-classification analyses for categorical data, and correlational analyses for bivariate continuous data. Throughout the course, you will learn about the statistical foundations behind the procedures and see examples that illustrate them. In addition, you will gain experience with data analysis in SPSS and learn about the utility of simulation studies through the use of on-line web materials.

EDU 6191 – Methods and Interpretation in Quantitative Methods (Part II)
Prerequisite: EDU 5191 or equivalent
Offered: Winter 2005, Winter 2006

This course is the continuation of EDU 5191 and introduces the theory and practice of general and generalized linear models in educational research, which are extended predictive statistical models. This includes simple and multiple linear regression, logistic regression, and ANOVA and ANCOVA methods. Throughout the course, you will learn about the statistical foundations behind the procedures and see examples that illustrate them. In general, there will be an increased emphasis on the statistical foundations of the methodologies and their sensitivity to violations of assumptions about the data structures they are designed for. In addition, you will extend your experience with data analysis in SPSS and extend your knowledge of the utility of simulation studies through the use of on-line web materials.

Academic Secretariat
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Faculty of Education

EDU 7395 – Advanced Statistical Methods
Prerequisites: None
Offered: Fall 2004, Fall 2005

This course covers the foundations of multivariate data analysis with an eye towards the analysis of educational psychometric measures such as achievement, psychological, and attitudinal measures. You will learn the multivariate extensions of basic inferential tests about means such as the Hotelling's T^2 test and MANCOVA models as well as methods for grouping observations based on multivariate data such as cluster analysis and discriminant function analysis. In the realm of data-reduction and structure-recovery models, you will learn about principal components analysis and exploratory factor analysis while you will be introduced to their hypothesis-testing cousins, confirmatory factor analysis and structural equation modeling, more briefly. You will extend your knowledge about the mathematical representations of statistical models to basic matrix algebra and will continue to expand your experience with data analysis in SPSS. Moreover, you will be introduced to LISREL, a computer program specifically designed for confirmatory multivariate data analysis, and continue to expand your knowledge of the utility of simulation studies for investigating the sensitivity of statistical models.

EDU 7193 – Advanced Measurement Theories
Prerequisites: None
Offered: Winter 2005

This course is designed to provide you with the foundations for confirmatory analyses of data from educational psychometric measures such as achievement, psychological, and attitudinal measures. In contrast to EDU 7395, this course focuses specifically on confirmatory latent variable methods for analyzing such data and extends these methods to binary and ordinal multivariate outcome variables. The course begins with an introduction to the measurement framework of classical test theory and its operationalization of reliability, standard errors of measurement, and invariance conditions. You will then learn about confirmatory factor analysis for continuous data and item response theory for binary and ordinal data. This will include discussions about model estimation approaches, model fit assessment, and model sensitivity to violations of assumptions about the underlying data structure. You will learn how to test restrictive hypothesis about model parameters to investigate potential biases against subgroups for educational scales. You will also expand your knowledge of the LISREL software program and be introduced to basic item response theory estimation programs.

EDU 7394 – Selected Topics in Measurement and Evaluation
Prerequisites: None
Note: Content changes every time; this represents the last course.
Offered: Winter 2006

This course is an advanced measurement seminar that focuses on the conceptual foundations of recent advances in latent variable modeling. In this course you will extend your basic knowledge of item response theory, confirmatory factor analysis, and structural equation modeling from EDU 7193. In particular, you will learn about multivariate, non-parametric, and cognitive item response theory. Moreover, you will learn about extensions of basic structural equation modeling approaches to include time-variant and time-invariant covariates and the use of structural equation modeling for describing differential growth in longitudinal designs. You will be introduced to hierarchical linear modeling, which accommodates a nested data structure such as that common to students in classrooms that are nested in schools. Finally, you will extend your basic knowledge of testing hypotheses about parameter equalities from EDU 7193 to the analysis of differential item, item bundle, and test functioning, and the explanation of biases in scales through the use of explanatory variables.

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