Quantitative Methods in the Applied Behavioral Sciences

RSM 3090 (Fall, 2014)
Thursdays 1-4pm, Rotman South Building 6024 (95 St. George Street)

Professor Jacob Hirsh
Rotman School of Management
Office: 6042 Rotman South Building
Phone: 416-978-3219
Email: jacob.hirsh@utoronto.ca

Course Description

A defining feature of scholarship in the applied behavioral sciences is its emphasis on empirical research, by collecting data and submitting it to quantitative analysis. This course covers fundamental issues in conducting the analysis of quantitative data collected in fields such as management, marketing, industrial relations, psychology, and related fields. It is designed for doctoral students who intend to conduct empirical research publishable in scholarly journals. It is intended to follow RSM3062 (or its equivalent), which covers research methodology.

This course covers model building and analysis, including topics such as an introduction to statistical inference, analysis of variance, regression analysis, testing and interpreting interaction effects, mediation analysis, hierarchical linear modeling, aggregation across levels of analysis, path analysis, factor analysis, and longitudinal approaches.

A core focus of this course is on doing analyses that reflect current research in the applied behavioral sciences. Students are assigned core readings and, when appropriate, are given real empirical data to apply the method under discussion. As a prerequisite, students should have a full understanding of basic statistics and should have taken RSM3062 (or its equivalent).

Course Requirements

Students are required to fully participate at weekly class meetings. Each meeting will include a discussion of readings and reporting of any assigned homework, including data analyses. Students are expected to read all materials. Students also must turn in written answers to the assigned homework questions. The answers are due at the beginning of each class. The answers should be brief (2-4 pages, single spaced) and to the point. When analyses are involved, written answers must include supporting results such as excerpts from computer output and brief summary tables, appended to the end of the answers. The written answers serve two purposes. First, this course emphasizes hands-on application of various methodological tools, and for learning purposes, there is no substitute for using these tools and summarizing the results in writing. Second, written answers to homework questions provide an important means of monitoring learning throughout the course. If these answers show that certain topics are not well understood, they will be reviewed in class. Students may consult with each other regarding the concepts and principles underlying the methods used. Written answers, however, should represent the work of each individual student.

Also, as a general assignment for all class meetings, all students should bring one or more discussion questions based on the assigned readings and data analyses and be prepared to initiate a discussion of the questions. These questions will be addressed as time permits.
Students must have access to statistical software for the assignments. We will conduct analyses using Windows versions of SPSS, which is available at the Rotman School of Management. Guidance will be provided regarding the use of this software (e.g., sample input files, answers to basic questions). Students may also find it useful to seek help from software documentation and web pages devoted to the software. Students who use other software are responsible for importing the provided data files into their software. Trial and Student versions of HLM and SPSS AMOS will be used during the classes on HLM, Path Analysis, and Confirmatory Factor Analysis.

**Grading**

Written answers to homework assignments will constitute 100% of the final grade. Students who complete all 10 assignments on time will have their best 9 assignments included in the calculation of their final grade. All assignments will be given the same weight. Please email me a copy of your work **before each class** and bring an additional hard copy to the lecture. Students will receive their grades along with comments on their work at the end of the following class.

**Required Reading Materials**

Required reading materials for the course include book chapters and journal articles. The complete references for all of the readings are included in this syllabus.

**Building your Library**

In addition to the readings for the class, the following books and references provide helpful information, and you may wish to acquire these books as you progress in your career.

Primarily for methods/psychometrics:


Primarily for statistics/analyses:

Summary of Topics

Session 1 (September 11). Introduction to the Course and the Role of Theory


Session 3 (September 25). Analysis of Variance: F-tests relative to t-tests. Orthogonal contrasts. Two-way interaction tests. Simple effect tests. ANCOVA.


Session 7 (October 23). Aggregation and Levels of Analysis Issues: Introduction to levels of analysis in organizational research. Theoretical and empirical support for aggregation of constructs across levels of analysis.


Session 9 (November 6). Hierarchical Linear Modeling – Part 2: Interactions between variables at different levels of analysis (i.e., cross-level interactions).


Readings

(Readings subject to change with advance notice)

1. **Introduction to the Course** (no required readings)
   
   **Recommended:**
   

2. **Introduction to Inferential Statistics**
   
     - Chapter 7 (Hypothesis testing, pp. 267-310)
     - Chapter 8 (Inferences about Population Means, pp. 311-328) – read thru sec. 8.10

   **Recommended:**
   

3. **Analysis of Variance**
   
     - Chs. 2, 3, 4 (one-way analysis of variance, pp. 15-84)
     - Chs. 10, 11, 12 (two-way interactions, pp. 193-262)

   **Recommended:**
   
4. Correlation and Regression Analysis


Recommended:

  - Ch. 2 (bivariate correlation and regression)
  - Ch. 3 (multiple regression)
  - Ch. 5 (data analytic strategy using multiple regression)

5. Interaction Effects in Regression Analysis


Recommended:

  - Ch. 7 (interactions among continuous variables)
  - Ch. 9 (interactions with categorical variables)

6. Mediation and Control


Recommended:


7. Aggregation and Levels of Analysis Issues


Recommended:


8. **Hierarchical Linear Modeling**


**Recommended:**


9. **Path Analysis**


**Recommended:**

  – Chs. 4 and 5 (introduction and details of path analysis)

10. **Exploratory and Confirmatory Factor Analysis**

    **Theory and Framework**


**Exploratory factor analysis (EFA):**


**Confirmatory factor analysis (CFA):**


**Recommended:**


11. **Longitudinal Analysis**


**Recommended:**
