Course Description:

The purpose of this seminar is to introduce doctoral students to methods, design strategies, and issues of multivariate quantitative research. The first few classes we will review and discuss research design issues as applied to multivariate research, including appropriate research questions to address with multivariate methods, research validity, measurement, effect size, and power. Then we will address specific multivariate research methods including multiple regression, multivariate analysis of variance, discriminant analysis, path analysis, structural equation modeling, and multilevel modeling. The format of the seminar will consist of lecture and group discussion. We will read and critique recent articles that make use of multivariate methods of data analysis in the educational research literature. Studies have been included in the supplementary readings which (a) address a key issue relating to education and (b) utilize a specific multivariate method to answer the research questions posed. I have provided numerous articles for the class to read, and students will find additional articles for the critique assignment that are consistent with your research interests.

Accommodations:

Students who require reasonable accommodations as a consequence of disability are encouraged to contact me early in the semester (as soon as possible). You should also contact the Office of Disability Services (ODS; 804 University Ave., Room 309, 3rd floor, 443-4498 or TDD: 315-443-1371), the entity charged with providing accommodations and maintaining Syracuse University’s compliance with federal regulations under Section V of the 1973 Rehabilitation Act, to communicate your needs and to begin to develop a working relationship with their staff.

Assigned texts:


Optional text for multilevel modeling:

**Supplementary materials:** These texts are available at Bird Library for reference, written for varying levels of competence.


**Course requirements:**
Participation: 10% of Final grade.

**Assignment Options for the remaining 90% of final grade:**

**Option A.**
3 Article Critiques.
Review and critique three (3) articles from the professional literature in your content area using the template provided in class handout. Critique the various elements of the research design in terms of the four types of research validity. Also, offer specific ideas for how the design could be improved to strengthen the warrant for knowledge or its relevancy for your content area. Use articles that were not included in supplementary reading packet. 7-10 pages each. Please review articles that report use of a multivariate method of analysis that we are covering in this class (multiple regression, MANOVA, path analysis, SEM, etc.). I suggest that your first critique should be an article that uses multiple regression, then review articles that use more advanced statistical approaches for the second and third critiques. Include a copy of the article with your critique. Use APA format.

Grade proportion: 90% (30% for each)
Critiques due: (Class 7), (Class 11), (Class 14).

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**Option B: Article Critique & Research Grant Proposal**

**B. 1. - Article Critique.**
Review and critique one (1) article from the professional literature in your content area using the template provided in class handout. The article must report the use of a multivariate method of analysis.

Grade Proportion: 30%
Critique due: (Class 7)
B. 2. Research Grant Proposal:
For this assignment, develop an 12-15 page (double-spaced) research grant proposal, including a brief introduction to the issue to be addressed, the theoretical foundation of the research (brief literature review), research design, sampling, measurement, methods of data analysis, and anticipated outcomes of the research study. Your research design must use a multivariate method of data analysis. Include a budget (funding limit: $10,000) as an Appendix).

Grade Proportion: 60%
Grant Proposal due: December 5th – Class 14.

Option C: Article Critique & Research Program Plan
C. 1. - Article Critique.
Review and critique one (1) article from the professional literature in your content area using the template provided in class handout. If you are choosing Option B, then the critique MUST be an article that uses a true multivariate technique of data analysis (MANOVA, path analysis, SEM, etc.)

Grade Proportion: 30%
Critique due: Class 7

C. 2. – Research Program Plan
Develop a construct map of a model of variable relationships based in literature that you are familiar with. Then use the map/model to outline/sketch three different research projects to address aspects of the model using three different MV techniques. Paper length: 12-15 pages.

Grade proportion: 60%
Research Plan due: December 5th – Class 14

Readings assigned for a given week should be read prior to that week’s class.

Topical Course Outline:

Class 1 - August 29th
Course overview. Introduction: Foundations of multivariate research: Causal analysis, hypothesis testing, constructs and indicators, measurement, research validity. Also, significance testing & variance partitioning.
Readings:
Bellini & Rumrill (2009) - SR

Class 2 - September 5th
Overview: Review of multiple regression basics.
Readings:
Class 3 – September 12th
Review of multiple regression techniques continues: multiple independent variables, variable entry methods, analysis of categorical variables.
Readings:
Keith (2006), Chapters 4-6, pp. 56-127.

Class 4 – September 19th
Advanced multiple regression techniques: testing moderation and mediation using multiple regression.
Readings:
Keith (2006), Chapters 7-9, pp. 129-211.
Frazier et al. (2004) – SR (Optional)

Class 5 – September 26th
Concluding our review of multiple regression: Example articles from literature that use regression to test mediation and moderation hypotheses.
Readings:
Hoyt et al. (2008) - SR
Constantine (2002) - SR
Hollingsworth & Fassinger (2002) - SR

Class 6 – October 3rd
Multivariate Analysis of Variance.
Readings:
Weinfurt (1995) – SR
Kiselica et al. (1994) – SR (example of MANOVA)
Huberty & Morris (1989) – SR (optional)

Class 7 – October 10th
Path analysis: An extension of multiple regression.
Readings:
Flores & O’Brien (2002) - SR
Bishop et al. (2002) - SR

*** 1st Article Critique due ***

Class 8 – October 17th
Path analysis continued. Also, error in statistical analysis.
Readings:

**Class 9 – October 24th.**
Multilevel modeling using nested data: Another extension of multiple regression.
Readings:

**Class 10 – October 31st**
Multilevel modeling continued.
Readings:
Matrone & Leahy (2005) – SR
Porter & Umbach (2001) - SR

**Class 11 – November 7th**
Readings:
Keith, Chapters 14-15, pp. 305-349.
Rosen-Grandon et al. (2004) - SR
Huesmann et al. (2003) – SR (SEM: longitudinal design)

**Class 12 – November 14th**
Structural Equation Modeling continued.
Readings:
Keith (2006), Chapters 16-17, pp. 350-400.
Wei et al. (2004) – SR (SEM – tested mediation & moderation using SEM)

**Final project draft due (optional)**

**Class 13 – November 21st**
**Student Presentations**
Readings:
None

*** November 28th  No Class: Thanksgiving Break  ***

**Class 14 (last class) – December 5th**
**Student Presentations**

*** Final Project due ***
Supplemental Readings


