**BSAD 6314 Section 001**

**Multivariate Statistics**

**Spring 2013**

Professor

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Office Hours: By appointment

Course Time & Location:

BSAD 6314 Section 001; Wednesdays, 11:00 pm – 1:50 pm; COBA 236

**Course Website:**

Materials posted on Blackboard

**Course Description**:

This course is designed to help you to effectively apply, interpret, and evaluate different multivariate statistical techniques. Throughout the course there will be an emphasis on both conceptual understanding and the development of practical "how‑to" skills. Topics covered in the sequence are organized in terms of complexity, beginning with a broad overview, moving into regression, and ending with structural equation modeling.

Business scholars have made use of a broad range of methods and analytical strategies to address questions of interest. Because each approach to answering research questions involves trade‑offs, researchers have often found it necessary to employ a combination of analytical techniques to reach any firm conclusions. A major goal of this course is to facilitate decision making within these constraints.

We will discuss a variety of advanced statistical techniques. Throughout the semester, you will gain hands‑on experience through projects and learn how to draw statistical and substantive conclusions from results of analyses. You will be asked to prepare written summaries of results using either Academy of Management style or style guidelines for other journals in your field. If you use style guidelines other than those of the Academy of Management or the American Psychological Association, please provide a copy of these guidelines to me along with your first project so I can refer to them as I evaluate your projects.

**Learning Objectives:**

By the end of this course students will be able to:

1. Choose the appropriate multivariate technique to answer specific research questions
2. Describe the pros and cons of using various techniques to control for missing data
3. Describe the assumptions required to use various multivariate techniques including regression, canonical correlation, logistic regression, discriminant analysis, MAVOVA, and factor analysis.
4. Use SPSS to run statistical analysis in regression, logistic regression, discriminant analysis, and factor analysis.
5. Interpret the results of data analysis by examining SPSS output from regression, canonical correlation, logistic regression, discriminant function analysis, MANOVA, and factor analysis.

**Required Text:**

Hair, J. F., Black, W.C., Babin, B. J., Anderson, R.E., Tatham, R. L. 2006. Multivariate Data Analysis (6th Edition) Upper Saddle River, NJ: Prentice Hall.

**Recommended Supplemental Materials:**

*Academy of Management Journal* Style Guide. <http://aom.pace.edu/amjnew/style_guide.html>

*Academy of Management Review* Style Guide. <http://aom.pace.edu/AMR/style.htm>

SPSS Statistical Procedures Companion. Prentice Hall: Upper Saddle River, NJ. Version 14 or later.

**Course Requirements:**

Course requirements include: (1) four project assignments and brief write‑ups of results in appropriate format; (2) Identification of articles using techniques discussed in class; (3) a midterm exam; (4) a final exam; and (5) a final paper.

Grades are determined as follows:

30%  Evaluation of the assigned projects (10% each)

5%   Article Identification   
20% Midterm exam

20%  Final exam

25% Final paper

Final grades: A (90%); B (80%); C (70%); D (60%); F (below 60%)

**Article Identification:** Specific disciplines often emphasize different techniques, and your analytic choices will often be evaluated based on norms of use in your discipline. Thus, after the completion of each multivariate technique in class, you will be required to identify examples of how these techniques are used and written up in top journals in your discipline. Each week that article examples are due, you should (1) bring enough copies of articles to provide a copy of the article to myself and all class members and (2) be prepared to get up in front of the class and give a brief presentation of the content of your article including (a) variables examined, (b) analyses conducted, and (c) results of analyses.

**Final Paper:** The final paper should examine research questions using a set of data. You must use one or more multivariate techniques that we cover in class. Results must be written in the style guidelines in your discipline. Students are encouraged to submit their papers to a national conference in their discipline. In order to ensure you are on track with the paper early in the semester, you will be required to hand in an outline of what you plan to do one month into the semester. The outline should address the following:

1. What data set will you use? How did you obtain access to this data? (Please ensure approvals to use data have been obtained prior to handing in your outline) What is your sample size? What variables are included in this data set?
2. What are the hypotheses or research questions you plan to answer? (Have at least 3 hypotheses or questions).
3. What multivariate statisical techniques will you use to test each hypothesis/answer each question? (You will need to ensure you meet assumptions of each technique).

If you do not already have datasets to use from your own research projects or collaborations with another professor, I have several datasets which could be used for this project. If you are interested in this, please see me to discuss. If you begin working on a data set that I provide you, I would expect that you and I would continue to collaborate on the paper for publication if there are interesting findings. If you use a data set provided to you by another professor or colleague, it is a good idea to discuss expectations regarding ongoing research up front with whoever provides the data to you.

**Class Policies**

1. Attendance. As graduate students, I expect that you all will attend class and be engaged in learning. However, if you miss class, you are responsible for class material and announcements made in class including changes to the syllabus.
2. Class Disruptions.  Please come to class on time, turn off your cell phones and pagers before class, and refrain from other activities that disrupt class.

3.   Due Dates.  Projects, article examples and the final paper must be handed in by the beginning of class on the day they are due. Anything that is late will receive 50% of the possible points if handed in within a day. No points will be given for any work that is handed in more than one day late.

4.   Collaborative Work. You are encouraged to work together to conduct data analysis for projects and prepare for exams. However, each student must independently write up data analysis results for projects. Students should complete exams and the final paper without assistance from other students.

5. Make ups. Please do not miss exams. Make-up exams will not be allowed except under conditions of *documented* severve illness or emergency.

8.   Academic Integrity. Students are responsible for maintaining academic integrity.  Cheating on exams or plagiarism from other students or published sources (including the internet) violates academic integrity and professional ethics. Cheating includes handing in work (your own or others’) for this class that was completed for another class.  Dishonesty in reporting results or unethical behavior in research is a violation of academic integrity. Engaging in any unethical behavior can result in failure of the course and/or other penalties.

**CLASS SCHEDULE**

This course is a dynamic process, **subject to change**. You are responsible for maintaining awareness of changes in class scheduling if you have missed class.

**Date Topic**

**Jan 16 Overview of Multivariate Statistics**

Hair, Chapter 1

Bobko, P. 1990. Multivariate Correlational Analysis. In Dunnette, M. D. & Hough, L. M. (Eds.) Handbook of Industrial/Organizational Psychology (2nd Edition), Volume 1, pp. 637-686. Palo Alto, CA: Consulting Psychologists Press.

**Jan 23 Data Cleaning and Multivariate Techniques**

Hair, Chapter 2

Orr, J. M., Sackett, P. R., & Dubois, C. L. Z. 1991. Outlier detection and treatment in I/O psychology: A survey of researcher beliefs and an empirical illustration. Personnel Psychology, 44: 473‑486.

Roth, P.L., & Switzer, F.S. 1995. A monte carlo analysis of missing data techniques in a HRM setting. Journal of Management, 21: 1003-1023.

**Jan 30 Multiple Regression**

Hair, Chapter 4

St. John, C. H. & Roth, P. L. 1999. The impact of cross-validation adjustments on estimates of effect size in business policy and strategy research. Organizational Research Methods, 2: 157-174.

**Feb 6 Regression: Mediation & Moderation**

**DUE article using multiple regression**

*Project 1 Assigned*

Aiken, L. S., & West, S. G. 1991. Multiple regression: Testing and interpreting interactions (Ch. 2-4, pp. 9-61; Ch. 7, pp. 116-138). Newbury Park, CA: Sage.

Baron, R. M., & Kenny, D. A. 1986. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of Personality and Social Psychology, 51: 1173-1182.

Edwards, J. R., & Lambert, L. S. (2007). Methods for integrating moderation and mediation: A general analytical framework using moderated path analysis. Psychological Methods, 12, 1-22.

Zhao, X. Lynch, J. G. & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and Truths about Mediation Analysis.  Journal of Consumer Research, 37, 197-206.

Useful aid for graphing interactions:

http://www.jeremydawson.co.uk/slopes.htm

**Feb 13 Canonical Correlation**

**DUE article using mediated regression**

**DUE article using moderated regression**

**DUE *Project 1***

Hair, Chapter 8 from 5th edition (see Blackboard list of readings)

**Feb 20 Logistic Regression: Dichotomous Dependent Variables**

**DUE article using canonical correlation**

Hair, pp. 269-275; 366-382

Green, G. H., Boze, B. V., Choundhury, A. H., & Power, S. 1998. Using logistic regression in classification. Marketing Research, 5-31.

Peng, C. J., Lee, K. L., Ingersoll, G. M. (2002). An introduction to logistic regression analysis and reporting. The Jorunal of Educational Research, 96, 3-14.

**Feb 27 Discriminant Analysis**

**DUE article using logistic regression**

**DUE article using disrciminant analysis**

*Project 2 Assigned*

Hair, pp. 276-355

Betz, N. E. 1987. Use of discriminant analysis in counseling psychology research. Journal of Counseling Psychology, 34: 393-403.

**March 1 Project 2 DUE**

**March 6 Midterm Exam In Class**

**March 13 SPRING BREAK**

**March 20** **MANOVA**

**DUE** **Outline of Final Paper. Include data set choosen, hypotheses to test and techniques to use to test them**

Hair, Chapter 6

Haase, R. F., & Ellis, M. V. 1987. Multivariate analysis of variance. Journal of Counseling Psychology, 34: 393-403.

**March 27 and April 3 Factor Analysis**

**DUE articles using MANOVA and factor analysis**

**Project 3 Assigned**

Hair, Chapter 3

Conway J. M., & Huffcutt A.I. 2003. A review and evaluation of exploratory factor analysis practices in organizational research. Organizational Research Methods, 6: 147-168.

Ford, J. K., MacCallum, R. C., & Tait, M. 1986. The application of exploratory factor analysis in applied psychology: A critical review and analysis. Personnel Psychology, 39: 291‑314.

**April 10 Structural Equation Modeling**

**DUE** **Project 3**

Hair, Chapter 10 and 11

Anderson, J. C., & Gerbing, D. W. 1988. Structural equation modeling in practice: A review and recommended two-step approach. Psychological Bulletin, 103, 411-423.

Mulaik, S. A., James, L. R., Van Alstine, J., Bennett, N., Lind, S., & Stilwell, C. D. 1989. Evaluation of goodness-of-fit indices for structural equation models. Psychological Bulletin, 105: 430-445.

**April 17 and April 24 Special Topics in Data Analysis**

Atinc, G., Simmering, M. J., Kroll, M. J. (2012). Control variable use and reporting in macro- and micro-management research. Organizational Research Methods, 15, 57-74.

Carlson, K. D. & Wu, D. (2011). The illusion of statistical control: Control variable practice in management research. Organizational Research Methods, 15, 413-435.

Zyphur, M. J. (2009). When mindsets collide: Switching analytical mindsets to advance organizational science. Academy of Management Review, 34, 677-688.

**May 1 Final Exam in Class**

**DUE Final Paper**