Nazarene University College

BHS 410 *Basic Multivariate Statistics* (3)
Winter 2003

Instructor: Kelly Schwartz, Ph.D.
Office Hours: T/Th 11:00-12:00
Office: 508

Class Time: T/Th 9:45-11:00AM
Lab Time: M 9:45-11:00AM
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Required Text

Tacq, J. (1997). *Multivariate analysis techniques in social science research: From problem to analysis*. London: Sage.

On Reserve

TBA

Course Description

This course is designed to acquaint the student with both the theory and application of multivariate statistical methods. The focus will be on practical issues such as selecting the appropriate analysis, preparing data for analysis, menu-driven programming, interpreting output, and presenting results. Four overlapping aspects of multivariate procedures will be covered. (1) Theoretical: We will examine the heuristic basis of the various statistical techniques and assumptions underlying their use. (2) Practical: We will learn to use the SPSS for Windows statistical package to analyze multivariate data. (3) Interpretive: We will develop the skills to write accurate and informative results sections based on the techniques used. (4) Reflective: We will focus on understanding the history, controversies and limitations in the statistical procedures that we use.

Course Objectives

At the completion of this course, you should be able to demonstrate:

- How to check data to determine if they are suitable for analysis and, if deemed unsuitable, if and how the data can be made suitable for analysis;
- Skill in deciding what statistical technique(s) will best answer different research questions;
- Ability to input data, run the appropriate statistical technique, and interpret the output, understanding what conclusions can be reached and their limitations; and
- How to critically read peer-reviewed research articles, especially as it pertains to the appropriate use and interpretation of various multivariate analysis techniques.

Course Schedule

January 14		Introduction
January 16, 21	Ch. 1	Types of Research Problems
January 23, 28	Ch. 2	Techniques of Multivariate Analysis
January 30	Ch. 3	The Analysis Technique as a Mirror of the Problem
February 4	Ch. 4	The *t* Test
February 6, 11, 13	Ch. 5	Univariate and Multiple Regression Analysis
February 17-21		**Mid-Term Break**
February 25, 27	Ch. 6	Partial Correlation and Path Analysis
March 4, 6	Ch. 7	Analysis of Variance and Covariance
March 11, 13	Ch. 11.1	Multiple Analysis of Variance and Covariance
March 18, 20	Ch. 8	Two-Group Discriminant Analysis
March 25, 27	Ch. 11.2	Multiple Discriminant Analysis
April 1, 3	Ch. 9	Factor Analysis
April 8, 10	Ch. 10	Canonical Correlation
Exam Period		**Final Exam (Take Home)**

Lab Schedule

January 20	Getting Started with SPSS (no assignment)
January 27	Creating and Working with Data Files
February 3	Working with Data
February 10	Independent Sample *t* Test
February 24	Bivariate and Multiple Regression*
March 3	Partial Correlation
March 10	ANOVA/ANCOVA*
March 17	MANOVA/MANCOVA*
March 24	Two-Group Discriminant Analysis
March 31	Multiple Discriminant Analysis*
April 7	Factor Analysis*

*Marked assignment.

NB: All lab assignments are due to be handed in at the beginning of the following week's lab class. Late assignments will not be accepted.

Course Requirements and Grading

1) **Lab Assignments:** There will be ten (10) lab assignments that are due over the course of the term; only five (5) will be marked (see schedule above). Specifics of each assignment will be provided in each lab class. They will usually involve analyzing a data set, running the appropriate statistical technique, and writing up a results section (APA format). You may work in small groups for these projects, but each student must hand in his/her own assignment, including the SPSS output. Each marked assignment will be worth **10%** of the final grade (5 X 10% = **50%**).

2) **Technique Descriptive Summary and Article Review:** For this assignment, you will select one (1) of the major multivariate techniques covered in the course: Simple Regression, Multiple Regression, Partial Correlation, Path Analysis, Principle Components Analysis, Factor Analysis, ANOVA, ANCOVA, MANOVA, MANCOVA, Discriminant Analysis, or Canonical Correlation Analysis. Find (and copy) three (3) articles from the sociology and psychology literature that uses the chosen technique in their analysis. One of these articles should be a "strong" example of the chosen technique (i.e., correctly executed and well-presented in the paper) and one should be a "weak" example of the chosen technique (i.e., it is questionable whether the technique was appropriate, was performed correctly, and/or the write-up is poor). The third paper can be strong, weak, or mixed, and should be cross-discipline.

   Using these three articles, prepare a written report that covers:

   1) A conceptual summary of the chosen technique (e.g., what it is, when would one use it, what are the requirements for using the technique, how is the analysis performed and interpreted).

   2) A description of the advantages and disadvantages of the statistic. These can be statistical (e.g., any assumptions the statistic makes that should be true for the statistic to be applied), interpretational (e.g., issues involved with the interpretation of the results), or practical (e.g., the amount of data required, limitations on the experimental design, etc.). You may also want to describe the advantages of this statistic relative to other statistics that could be used in the same situation.

   3) A summary of each article including the study's purpose, methodology, a description of the results, and the conclusions reached based on the use of this statistic. Focus on how the authors analyzed their data and defend your assessment of their work as a strong or weak example of the application.

   This written report can be no longer than 20 pages, double-spaced, 12-point font (NOT including the copies of the articles or references). You will also be required to present (10 minutes max) one of your articles during the week that we are covering your statistical technique. This assignment is worth **30%** of your final grade and will be due two weeks to the day after your class presentation.

3) Final Exam: There will be a take-home final exam that will be due on the last day of classes (April 11, 2003). It will be worth **20%** of your final grade.

Course Guidelines

1) Attendance at class is expected from each student. After three (3) unexcused absences (per term), the instructor reserves the right to ask a student to withdraw from the class.

2) The written assignments are due on the dates specified. Extensions will only be granted upon request of the student at least two (2) weeks prior to the due date. In the case of illness or other extenuating circumstances, exceptions may be made.

3) Exams must be taken at the times specified. The student must inform the instructor immediately if there is a problem with taking a test on a certain date.

Grade Structure

Percentage:	Letter Grade:	Grade Point Weight:
96-100	A+	4.0
91-95	A	4.0
86-90	A-	3.7
82-85	B+	3.3
75-81	B	3.0
72-74	B-	2.7
68-71	C+	2.3
63-67	C	2.0
60-62	C-	1.7
56-59	D+	1.3
50-55	D	1.0
0-49	F	

Important Notes

The last day to withdraw from this course and still receive a 100% refund is January 24, 2003. The last day to withdraw from the class without academic penalty is March 21, 2003.

Relevant Journals (NUC Library)

Applied Developmental Science
Families in Society: The Journal of Contemporary Human Services (InfoTrac)
Journal of Child and Family Studies
Journal of Family Psychology
Reclaiming Children and Youth
Social Development