NAZARENE UNIVERSITY COLLEGE

BHS 410 Basic Multivariate Statistics (3)
Fall 2003

Instructor: Kelly Schwartz, Ph.D.   **Class Time:** W/F 11:15-12:30
Office Hours: TBA   **Lab Time:** M 1:00-2:15
Office: 505   **Phone:** 571-2550 Ext. 5908
     E-Mail: Kelly.Schwartz@nuc.edu

Required Text:
Schwartz, K. D. (Ed.) (2003). *Basic multivariate statistics: Course reader.*

On Reserve:
Girden, E. R. (2001). *Evaluating research articles from start to finish*. Thousand Oaks,
     CA; Sage.

Tabachnick, B. G., & Fidell, L. S. (1996). *Using multivariate statistics*. New York:
     HarperCollins College Publishers.

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: **Chapter:**

September 3   Introduction

September 5, 10   Overview of Techniques

September 12   General Linear Model

September 17   Correlation

September 19, 26   Simple Regression

October 1, 3   Multiple Regression

October 8, 10   Canonical Correlation

October 15 t Test

October 17   One-Way ANOVA

October 22, 24   ANOVA/ANCOVA

October 31, November 5   MANOVA/MANCOVA

November 12, 14, 19   Discriminant Analysis

November 21   Logistic Regression

November 26, 28   Factor Analysis/ Principle Component Analysis

December 3, 5   Path Analysis/Structural Equation Modeling

December 10   Class Presentations

Exam Period   **Final Exam (Take Home)**

Lab Schedule:

September 8   Re-Orientation to SPSS
September 15   Working with Data Files in SPSS
September 22   Correlation*
September 29   Simple Regression
October 6   Multiple Regression*
October 13   **Thanksgiving Day (No Class)**
October 20   Canonical Correlation*
October 27 t Test/One-Way ANOVA
November 3   ANOVA/ANCOVA*
November 10   MANOVA/MANCOVA
November 17   Discriminant Analysis*
November 24   Logistic Regression
December 1   Factor Analysis*
December 8   Class Presentations

*Marked assignment
NB: All lab assignments are due to be handed in at the beginning of the following week's lab class. <u>Late assignments will not be accepted.</u>

Course Requirements and Grading:

1) **Lab Assignments:** There will be ten (10) lab assignments that are due over the course of the term; only <u>six (6)</u> will be marked (see 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 assignments, 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 (6 X 10% = **60%**).

2) **Technique Descriptive Summary and Article Review:** For this assignment, you will select <u>one (1)</u> of the major multivariate techniques covered in the course: Correlation, simple regression, multiple regression, canonical correlation, ANOVA, ANCOVA, MANOVA, MANCOVA, discriminant analysis, logistic regression, principle components analysis, factor analysis, or path analysis. Find (and copy) three (3) articles from the sociology and psychology literature that uses the chosen technique in their analyses. One of these articles should be a "strong" example of the chosen technique (i.e., correctly executed, well-presented) and one should be a "weak" example of the chosen technique (i.e., appropriateness of technique, was performed incorrectly, 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 that should be true for the statistic to be applied), interpretational (e.g., 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 15 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) <u>one (1) of your articles</u> during the last two days of class (Dec. 8 or 10). This assignment is worth **20%** of your final grade and is due at the beginning of the lab on **November 24**.

3) **Final Exam:** There will be a take-home final exam that will be handed out on Dec. 1 and is due on **December 12**. The exam 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 September 12, 2003.
The last day to withdraw from the class without academic penalty is November 5, 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