ALLIANCE UNIVERSITY COLLEGE

NAZARENE UNIVERSITY COLLEGE

BHS 410 *Basic Multivariate Statistics* (3)
Fall 2006

Instructor: Kelly Schwartz, Ph.D.   **Class Time:** T/Th 9:45-11:00
Office Hours: By Appointment   **Phone:** 571-2550 Ext. 5908
Office: 507   **E-Mail:** kschwartz@auc-nuc.ca
Lab Instructor: Rhiannon MacDonnell   **Lab Time:** M 2:30-3:45
Office Hours: Monday 12-1PM   **E-Mail:** rmacdonnell@auc-nuc.ca

Required Text:
Field, A. (2005). *Discovering statistics using SPSS* (2nd ed.). Thousand Oaks, CA: Sage.

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

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

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 written presentation of results. Four overlapping aspects of multivariate procedures will be covered. (1) *Theoretical*: the heuristic basis of the various statistical techniques and assumptions underlying their use. (2) *Practical*: the use of SPSS for Windows as statistical package to analyze multivariate data. (3) *Interpretive*: the skills to write accurate and informative results sections based on the techniques used. (4) *Reflective*: a 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:	Topic:	Chapter:
September 7	Introduction	
September 12, 14	Revisiting the Statistics You Never Knew	Ch. 1
September 19	The General Linear Model	Handout
September 21, 28	Correlation	Ch. 4
September 26	**Community Day** (no class)	
October 3, 5	Simple Regression	Ch. 5
October 10, 12	Multiple Regression	Ch. 5
October 17, 19	Paired and Independent Samples *t*-Test	Ch. 7
October 24, 26	Analysis of Variance (ANOVA)	Ch. 8
October 31	Analysis of Covariance (ANCOVA)	Ch. 9
November 2, 7	Factorial ANOVA	Ch. 10
November 9	**Reading Days** (no class)	
November 14, 16	Repeated Measures Designs	Ch. 11
November 21, 23	Mixed Design ANOVA	Ch. 12
November 28, 30	Multivariate Analysis of Variance (MANOVA)	Ch. 14
December 5, 7	Exploratory Factor Analysis	Ch. 15
December 12	**Final Exam (Take Home)**	

Lab Schedule:

September 11	Introduction	
September 18	Reintroduction to SPSS	Ch. 2
September 25	Exploring Data	Ch. 3
October 2	Correlation*	Ch. 4
October 9	**Thanksgiving Day (No Lab)**	
October 16	Multiple Regression*	Ch. 5
October 23	Paired and Independent Samples *t*-Test	Ch. 7
October 30	ANOVA*	Ch. 8
November 6	ANCOVA	Ch. 9
November 13	Factorial ANOVA*	Ch. 10
November 20	Repeated Measures Designs*	Ch. 11
November 27	Mixed Design ANOVA*	Ch. 12
December 4	MANOVA	Ch. 14
December 11	Exploratory Factor Analysis	Ch. 15

*Graded lab assignment

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 graded (see above). Specifics of each assignment will be provided in each lab class. They will normally involve analyzing a data set, running the appropriate statistical technique, answering some questions, 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. 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> Lab assignments will be worth **45%** (7.5% each) of your final grade.

2) **Technique Descriptive Summary and Article Reviews:** For this assignment, you will select <u>one (1)</u> of the major multivariate techniques covered in the course: Correlation, simple regression, multiple regression, ANOVA, ANCOVA, factorial ANOVA, MANOVA, repeated measures, mixed design ANOVA, or exploratory factor analysis. Find (and copy) two (2) articles from the sociology <u>and</u> psychology literature (one article from each discipline, post-1998) that uses one or more of the technique in their analyses. Ideally, one of the articles should be a "stronger" example of the chosen technique (i.e., correctly executed, well-presented) and one should be a "weaker" example of the chosen technique (i.e., lacks described appropriateness of technique, was performed incorrectly, and/or the write-up is poor). Using these two 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 should be 10-12 pages, double-spaced, 12-point font (NOT including the copies of the articles or references). This assignment is worth **25%** of your final grade and is due at the beginning of the lab on **December 1**.

3) **Final Exam:** There will be a final exam scheduled during the exam period. You will receive Part A of the exam on the last day of lectures (December 12). This will consist of a data set that you will analyze and write a results section. Part B of the exam will be completed during the exam time and will consist of multiple choice and short answer questions based on the cumulative course material. The exam will be worth **30%** 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:

It is the responsibility of all students to become familiar with and adhere to academic policies of as are stated in the Student Handbook and Academic Calendar.

Personal information, that is information about an individual that may be used to identify that individual, may be collected as a requirement as part of taking this class. Any information collected will only be used and disclosed for the purpose for which the collection was intended. For further information contact the Privacy Compliance Officer at privacy@auc-nuc.ca.

The last day to enter a course without permission and /or voluntary withdrawal from a course without financial penalty **September 15, 2006**.

The last day to voluntarily withdraw from a course or change to audit without academic penalty is **November 15, 2006**.

Although extensions to coursework in the semester are at the discretion of the instructor, students may not turn in coursework for evaluation after the last day of the scheduled final examination period unless they have received permission for a "Course Extension." Alternative times for final examinations cannot be scheduled without prior approval. Requests for course extensions or alternative examination time must be submitted to the Registrar's Office by the appropriate deadline. Course extensions are

only granted for serious issues that arise "due to circumstances beyond the student's control."

We are committed to fostering personal integrity and will not overlook breaches of integrity such as plagiarism and cheating. Plagiarism and cheating can result in a failing grade for an assignment, for the course, or immediate dismissal from the university college. Students are expected to be familiar with the policies in the current Academic Calendar and the Student Handbook that deal with plagiarism, cheating, and the penalties and procedures for dealing with these matters. All cases of academic dishonesty are reported to the Academic Dean.

Students are advised to retain this syllabus for their records.