VANDERBILT UNIVERSITY
SCHOOL OF NURSING

Spring, 2004

NRSC 397: Multivariate Statistics for the Health Sciences

Course Description: An intermediate level course in multivariate inferential statistics. Topics covered include multiple linear regression, path analysis, logistic regression, cannonical correlation, factorial (N-Way) ANOVA, ANCOVA, MANOVA, MANCOVA, principal components and factor analysis, and an introduction to structural equation modeling, time series analysis, cluster analysis, discriminant function analysis, and survival analysis. Emphasizes use of SPSS-PC and interpretation of output generated by the SPSS-PC program.

Prerequisites NRSC 396, or consent of instructor. A basic working knowledge of SPSS-PC or similar statistical software is assumed.

Credit 3 semester hours

Time/place Wednesdays 1:30 – 4:30 p.m.; Room 162 Nursing Annex

Faculty

Ken Wallston, Ph.D.* and
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* Course coordinator

Joe Hepworth, Ph.D.**
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** When he is in town

Course Objectives: At the conclusion of this course, the student will be able to:

1. Select and communicate the reasoning behind the appropriate multivariate inferential statistic(s) suitable for most of the situations arising in the health sciences.

2. Use the SPSS-PC program to compute appropriate statistic(s).

3. Communicate, both verbally and in writing, the proper interpretation of selected multivariate statistics from computer "printouts" and journal articles.

Competencies: In meeting these objectives, students will develop the following competencies:

1. Critical analysis of the research literature in the health sciences.

2. Knowledge of research methods (as applied to multivariate data analysis).

3. Critical comparisons of research methods (as applied to choice of multivariate statistical procedures).

4. Dissemination of research findings (and results).

5. Quantitative data analysis techniques.

Course Requirements:

1. Weekly preparation for class, including assigned readings.

2. Completion of weekly "homework" assignments (including writing up the "Results section" for one or more studies).

3. Teaching content for two of the classes, plus submission of exam questions (with answers) pertinent to the material you present in your first class.

4. Successful completion of two take-home exams.

Required Texts:

Grimm, L.G. and Yarnold, P.R. (Eds.) (1996). *Reading and Understanding Multivariate Statistics*.

Grimm, L.G. and Yarnold, P.R. (Eds.) (2000). *Reading and Understanding More Multivariate Statistics*.

Supplemental Texts (optional):

Munro, B.H. (200X). *Statistical Methods for Health Care Research, 4th Edition.* Philadelphia, PA: Lippincott.

Pedazur, E.J. and Schmelkin, L.P. (1991). *Measurement, Design, and Analysis: An Integrated Approach.* Hillsdale, NJ: Erlbaum.

Tabachnick, B.G. and Fidell, L. S. (2001). *Using multivariate statistics, 4th Edition.* Allyn & Bacon.

Additional reading assignments, including journal articles reporting statistical procedures covered in class, may be assigned. Students will need access to SPSS-PC (version 10)

Evaluation: Student performance will be based on completion of homework assignments (10%), course presentations (30%), exam questions (with answers) submitted (10%); and two take-home examinations (25% each).

GRADING SYSTEM:

A+ = 96.5 - 100 A = 92.5 - 96.4 A- = 89.5 - 92.4

B+	=	86.5 - 89.4	B	=	82.5 - 86.4	B-	=	79.5 - 82.4
C+	=	76.5 - 79.4	C	=	72.5 - 76.4	C-	=	69.5 - 72.4
F	=	$\leq$ 69.4						

HONOR CODE POLICY: With the following exception, students are required to adhere to the Vanderbilt University Honor Code for the completion of all work used to determine the student=s grade. It is permissible for students to work together on routine homework assignments, but not on assignments that are to be turned in to the instructor. Once the take home exams are distributed, it is not permissible to discuss the take-home exams with anyone other than the course instructors.

DUE PROCESS: The instructors welcome the opportunity to work closely with you to facilitate your learning and to assist you in meeting course objectives. If at any time you have concerns regarding the course, discuss the problem first with Dr. Wallston. If further discussion is needed, contact Dr. Melanie Lutenbacher, Director of the Ph.D. Program in Nursing Science. You should bring a written statement of the problem or grievance to this meeting. If the problem still persists, you may contact Dr. Peter Buerhaus, Senior Associate Dean for Research in the School of Nursing.

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Class Schedule and Reading Assignments

DATES	TOPIC(S)	READING(S)
January 14 **classes**	Overview of Course and Review of Univariate & Bivariate Statistics	**Review notes from previous stats**
January 21	Multiple Linear Regression	**Grimm & Yarnold I (G&Y I): Ch. 2** **Rudestam & Newton: Ch. 10** *Tabachnick & Fidell (T&F): Ch. 5 * Munro (M): Ch. 12 (pp. 254ff) *Pedhazur & Schmelkin (P & S): Chs. 18, 19
January 28**	Multiple Linear Regression (cont.) Introduction to Path Analysis	**G &Y I: Ch. 3** *Munro, Ch:15_
February 4***	Logistic Regression	**G & Y I: Ch 7** *T & F Ch. 12 *M: Ch. 13 (pp. 291ff)
February 11***	Canonical Correlation	**G & Y II: Ch. 9** *T & F Ch. 6

Note: Exam # 1 will be distributed on 2/11/04 and will be due by noon on 2/18/04.
There will be no class on 2/18/04 so that nursing doctoral students can attend SNRS Conference

February 25***	Factorial ANOVA	**Rudestam & Newton: Ch. 9** *T & F: pp. 38-47; *M: pp. 162-169 *P & S: Ch. 20
March 3***	Analysis of Covariance (ANCOVA) And Repeated Measures ANOVA	**G & Y II: 10 pp. 317 - ??**

*T & F: Ch. 8
*M: Ch. 9
*P & S: Ch. 21

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Class Schedule and Assignments (cont.)

DATES	TOPIC(S)	READING(S)
Note: There will be no class on 3/10/04 because of Spring Break		
March 17**	MANOVA, MANCOVA, & HLM	**G & Y I: Ch. 8** **G & Y II: Ch. 10 pp. ?? - ???** *T & F: Ch. 9 *M: Ch. 8 (pp. 169ff)
Note: No class on 3/24/04 so that Professor Wallston can attend SBM Meeting		
March 31	Principal Components and Exploratory Factor Analysis	**G & Y I: Ch. 4** *T & F: Ch. 13 *M: Ch. 14 *P & S: Ch. 22
April 7**	Structural Equation Modeling	**G & Y II: Chs. 7 & 8** *T & F: Ch. 14 *M: Ch. 16 *P & S: Chs. 23 & 24
April 14***	Discriminant Function Analysis Cluster Analysis	**G & Y I: Ch. 9** **G & Y II: Ch. 5**
April 21***	Survival Analysis Time Series Analysis	**G & Y II: Ch. 11** **TBA**

Note: The Final Exam will be distributed on 4/21/04 and will be due on 4/28/04

*** Supplemental reading (not required)**
**** Classes when Joe Hepworth will be present**

***** Classes when students will present**