

8/16/2013

**APPLIED MULTIVARIATE STATISTICAL ANALYSIS**

**ED PSY 16:300:683**

**Fall 2013**

**Instructor:** Duanli Yan, Ph.D.

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**Phone:** (609)734-5764

**Office hours:** by appointment

**Time:** Thursdays, 4:50 – 7:30 PM

**Place:** Room 208, Graduate School of Education, 10 Seminary Place, New Brunswick, NJ 08901

**Reference:** Johnson, R. A. and Wichern, D. W. (2007) *Applied Multivariate Statistical Analysis*, 6<sup>th</sup> Ed. Pearson Prentice Hall.

**Software Packages:** SPSS, R.

**Course Description**

This course provides a survey of multivariate statistical procedures commonly used in educational research. Topics covered in this class include matrix algebra, multivariate normal distribution, inference about mean vector, principal components, exploratory factor analysis, canonical correlations, and discriminant analysis.

**Course Goals and Objectives** The goals of the course are to help students to

- 1) gain an understanding of multivariate analysis and their associated techniques
- 2) recognize the different situations under which to use the different approaches
- 3) implement multivariate analyses in SPSS or R.

**Course Requirements**

- 1) **Exam:** A take home exam is worth at least 30% of the final grade, respectively. The exam may consist of multiple choice items, computations, and short answer/essay questions.
- 2) **Homework assignments:** Approximately 7 homework assignments (worth a maximum 20% of the final grade) will be given throughout the semester. No late homework assignments will be accepted.
- 3) **Final Paper:** A research data analysis paper using one or more of the techniques is worth 50% of the final grade.

Each of the three components (homework assignments, exams and final paper) will be out of 100 points.

The final letter grade will be assigned as follows:

- 90% and Above A
- 80%-89% B+
- 75%-79% B
- 65%-74% C+
- 60%-64% C
- Below 60% F

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*SPSS and/or R* will be the programming language used for matrix manipulations and computations.

### **Class Schedule**

The following class schedule is subject to change if necessary.

Date	Topic
September 5	Overview
September 12	Aspects of Multivariate analysis
September 19	Matrix Algebra
September 26	Sample Geometry and random sampling
October 3	The multivariate normal distribution
October 10	Inference about mean vector
October 17	Comparisons of several multivariate means
October 24	Multivariate linear regression models
October 31	Midterm Exam
November 7	Principal components
November 14	Canonical correlation analysis
November 21	Factor analysis and inference for structures covariance matrices
December 5	Discrimination and classification
December 12	Cluster, distance, and ordination
December 16-20	FINAL Paper

### **ACADEMIC INTEGRITY POLICY**

Please comply with standards of academic integrity in this course. For the homework assignments, you are allowed to work with your classmates; however, submitted works should be of your own. For the exams, you are not allowed to work with or request help from anyone. The consequence for violating policies of academic integrity and other elements of the student code of conduct are serious and can have a tremendous negative impact on your academic progress and future career. Please familiarize yourself with the university policy on academic integrity: <http://studentconduct.rutgers.edu/academic-integrity>.

#### **Policy on Academic Integrity**

Please refer to the Policy on Academic Integrity for Undergraduate and Graduate Students at <http://academicintegrity.rutgers.edu>.

The University Code of Student Conduct can be accessed at:

<http://studentconduct.rutgers.edu/university-code-of-student-conduct>

Related regulations may also be found in the Rutgers Graduate School of Education Catalog. Clear evidence of violation of academic integrity policy may result in a grade of *F* for the assignment AND the course.