

2015 FALL
Applied Multivariate Analysis
16:300:683:01
3 Credits
Mondays, 4:50 -7:30 pm in SC 116 CAC

Instructor: Duanli Yan	Email address: dyan08550@gmail.com
Phone: 609-424-7507	10 Seminar Pl Rm: SC 116 CAC
Office Hours: by appointment	Prerequisites or other limitations: Yes.
Mode of Instruction: <input type="checkbox"/> v_ Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Hybrid <input type="checkbox"/> Online <input type="checkbox"/> Other	Permission required: <input type="checkbox"/> No <input type="checkbox"/> v_ Yes Directions about where to get permission numbers: dyan08550@gmail.com

Learning goals: 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 R.

Course catalog 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.

Class materials / Textbooks:

Johnson, R. A. and Wichern, D. W. (2007). *Applied Multivariate Statistical Analysis*, 6th Ed. Pearson Prentice Hall.

Reference: Everitt, B. and Hothron, T. (2011). *An Introduction to Applied Multivariate Analysis with R*. Springer.

Other description of course purposes, context, methods, etc:

Grading policy:

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

Assignments:

1) **Exam:** A take home final 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.

Web site: (If any)

Academic Integrity Policy:

The Office of Student Conduct supervises issues related to violations of academic integrity (see <http://academicintegrity.rutgers.edu>). Please familiarize yourself with the university policy on academic integrity at http://academicintegrity.rutgers.edu/files/documents/AI_Policy_2013.pdf

Office of Disability Services:

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: <https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.

Course Schedule

The following class schedule is subject to change if necessary.

Date	Topic
September 8	Overview
September 14	Aspects of Multivariate analysis
September 21	Matrix Algebra
September 28	Vectors and Matrices: basic concepts
October 5	Sample Geometry and random sampling
October 12	The multivariate normal distribution
October 19	Inference about mean vector
October 26	Comparisons of several multivariate means
November 2	Midterm Exam
November 9	Multivariate linear regression models
November 16	Principal components

November 23	Canonical correlation analysis
November 30	Factor analysis and inference for structures covariance matrices
December 7	Discrimination and classification
December 14	Review
December 15-21	FINAL Paper