

COURSE SYLLABUS

APPLIED MULTIVARIATE STATISTICS

SPRING SESSION 2008

Instructor: A. Narayanan
Class: Lindner 214 Saturdays 1:00pm--3:40pm

Text: Analyzing Multivariate Data, by J. Lattin, J.D. Carroll, and P.E. Green, Duxbury Press, 2003. This is the primary text for the course. I will mostly follow my class notes which can be accessed via Blackboard. It is strongly recommended that you read the suggested material before the lecture to understand the concepts thoroughly. I will definitely be adding more material in the class lectures that is not in the book. You are responsible for material covered in class and the material in the book.

Attendance Policy: Attendance and participation in class is critical to understanding the material. I will be covering material not in the book and class notes are important for these topics. Please arrive ON TIME and be prepared to participate in the day's activities. If you miss a class, it is YOUR responsibility to get the notes and read the topics covered. Failure to attend a class does not constitute getting an extension from exam or quiz. I DO NOT GIVE MAKE-UP TESTS SINCE I COME TO CAMPUS ONLY ON CLASS DAYS.

Class Participation: Students will not receive participation credit just by attending class but engaging on their computers, cell phones, PDAs, etc. or doing e-mail. CELL PHONES SHOULD BE SWITCHED OFF DURING CLASS.

Academic Integrity Policy: Academic integrity policy will be enforced. Any violation of the regulations, including acts of plagiarism or cheating, will be dealt with on an individual basis according to the severity of the situation. Plagiarism is an attempt to pass off another writer's work as one's own and this includes copying literally from a website. Submitting work not written by oneself or supplying work to another person for that purpose will result in receiving a failing grade for the course.

Course Objectives: The objective of this course is to teach topics of multivariate statistics that are used in business decision making. The emphasis of the course will be on applications and use of computer as a tool for analyzing data. Though matrix algebra is not a prerequisite, familiarity with matrix algebra and being comfortable with matrices will be a definite advantage. I believe that multivariate statistics cannot be well understood and explained without the use of matrix algebra. One of my main objectives is to get you interested in multivariate statistics and explore its usefulness. At the end of the course you will be able to:

- i) Understand the basic uses of multivariate statistics
- ii) Intelligently analyze data using appropriate multivariate methods and software
- iii) To create more awareness and interest for further study and independent research in multivariate statistics

Grading: There will be a mid-term exam, project work, and a final exam. The mid-term and final will be an in-class exam during the exam week (June 5-12,2008). These will be weighted as follows:

Mid-term	40 %
Class Participation	10 %
Final	40 %
Project work	10%

In-class exams will be closed-book and closed-notes. You can bring a one page "cheat sheet" which should be turned in with the exam. The final grade will be based on the total and a letter grade of A, A-, B+,B, etc. will be assigned at the end of the course. If you do not "participate" in class you need to demonstrate understanding of the material in other ways.

Project Work: The project work includes analyzing data using a software tool of your choice or doing an in-depth research on a topic and presenting the results in class. The presentation will be a group presentation; however, each student has to participate in the team work effort which will be graded accordingly. All the members of the team will share the work equally and will share the same grade for the project work. The report should be done professionally and NOT hand written.

Fourth credit hour for this class:

This is a four credit-hour course which meets in class like a three credit hour course. The fourth credit-hour is earned by the completion of a project or an extensive review paper. The project will involve doing research on a topic outside of class discussion. Some examples of projects to earn this credit are:

- Comparison of principal component analysis and factor analysis
- A comprehensive review of different methods of factor rotation
- Exploring the connection between descriptive multivariate methods
- Assessing the validity of factor analysis results
- An SAS program to estimate the standard error of factor loadings
- Application of multitrait multimethod matrices in consumer research

These are only examples of topic selection and you can select specific topics of interest.

Group Structure for the project: For the project component of the course groups of three or four students will be formed. This group will stay together for the length of the course. The group will cooperate in all the work and will share the workload. At the end of the quarter each student will grade the other members of the team on various aspects such as attendance at meetings, sharing workload, collecting data, running analyses, etc. and the student will receive an average based on these scores.

Computer Analyses:

Extensive use of computers will be made for the purpose of data analysis. SAS, SPSS and R will be the software tools used in class and I assume you will have access to these software programs either at work or at home. Basics of SAS, SPSS and R will be taught in class, but, I assume you will have some familiarity with computing (creating and reading data files, etc.) If you want to use alternate software such Stata, or other software for your project you are welcome to use, but you are on your own. SAS help files are available on SAS ONLINE and can be accessed at the URL <http://www.uc.edu/sashtml> and R can be downloaded from <http://www.r-project.org/>

TOPICS TO BE COVERED

Date	Topic	Reading Material
Week 1	Overview of methods	Chapters 1,2
Week 2	Principal Components Analysis	Chapter 4
Week 3	Factor Analysis	Chapter 5
Week 4	Cluster Analysis	Chapter 8
Week 5	Multidimensional Scaling	Chapter 7
Week 6	Mid-term / Multivariate Normal Distribution	In-class exam/ Class Notes
Week 7	Multivariate Hypothesis Testing/Multivariate Analysis of Variance	Class Notes/ Chapter 11 (11.4–11.7)
Week 8	Discriminant Analysis /Logistic Regression	Chapter 12
Week 9	Structural Equation Modeling or Canonical Correlation/Project discussion	Chapters 6, 10 or Chapter 9
Week 10	Final Exam	June 5, 2008

Student Information Sheet: Applied Multivariate Statistics Spring 2008

Name :

Phone Number:

E-Mail:

Mailing Address (postal):

Previous Statistics Background:

Previous Computing Background:

What do you expect out of this course?