STAT 6130 Applied Multivariate Statistics
Spring 2017

Instructor: Chao DU
E-mail: cd2wb@virginia.edu
Phone: 434-924-3014
Office: Halsey 107

Class Schedule: 3:30pm-4:45pm MW
Location: New Cabell Hall 058
Office Hour: Wed 11am-2pm
Grader: Qiannan Yin
qy2mn@virginia.edu

Course Description:

This class aims to provide an overview on the theoretical framework and inference tools for understanding and analyzing multivariate data for graduate students majored in statistics. Topics covered in this course include: matrix theory, multivariate normal distribution, multivariate regression, principle component analysis, factor analysis, classification, discriminate analysis, clustering and dimension reduction.

Prerequisites

1. College-level Calculus and Linear Algebra
2. Basic knowledge on probability theory and statistical inference (Stat 3120 or above)
3. Basic knowledge on linear regression (Stat 3220 or above)
4. Ability of performing basis data analysis with one statistical computing language.

Note: R will be the “official” language supported by instructor. Still, you may use other statistical computing packages (including but not limited to SAS, SPSS, etc.) in class assignments and final projects.

Textbook:


Other References:

Other textbooks on Multivariate Statistics:


Resources on R

R project homepage:  https://www.r-project.org

An Introduction to R:  https://onlinecourses.science.psu.edu/statprogram/sites/onlinecourses.science.psu.edu.statprogram/files/lesson00/R-intro.pdf

Online R Tutorial:  http://www.cyclismo.org/tutorial/R/

Course Assessment:

The final numerical grades will be calculated based on the major factors described below. The letter grades will be assigned based on the overall distribution of numerical grades. No fixed threshold will be set in advance.

1. Class participation (10%). You are expected to attend all lectures. The lectures materials would be drawn from a large spectral of sources and may not always follow textbook.
2. Homework (30%). There will be around 5-6 written assignments. Each assignment will be weighted equally towards the final grades. Homework is designed to help you understand the theoretical questions discussed in class and practice the tools for solving applied problems. The grading will be generous but it is strongly advised that you should independently work on the problems before discussing with fellow students.
3. Class Project (55%). The class project aims to test your general understanding of the various tools we discussed in class, as well as your ability of analyzing real data and presenting your work in a clear and professional manner. The class project is composed of three major parts
   1) Project Proposal (10%)  2 pages limit (single-spaced, 12 pt, 1 inch margins, not include graphs and tables), an overview of the data set you plan to work on, due on March 3, 17:00.
   2) Final Written Project (35%) 10 (15 for two-person project) pages limit (single-spaced, 12 pt, 1 inch margins, not include graphs and tables), due on May 10, 20:00.
   3) Presentation Slides (10%) 5 slides limit, the dimension of each slide must be no larger than 1024 X 768, and font size should be no smaller than 12pt. 7mins for one-person, due on May 10, 20:00.
4. Bonus (5%)

Class Policies:

Class Participation
You are expected to attend all lectures and participate actively in class discussion.

**Homework**
In order to be graded and counted towards the final grade, each assignment must be submitted on time. Extensions on assignment deadline will be granted only in the most exceptional circumstances. Any extension request must be made to the course instructor at least 24 hours before the due date.

**Class Project**
Class project must be submitted on time and in the request format. Late submission or submission in incorrect format will not be accepted or graded.

**Honor Policy:**
As the only true way to acquire knowledge is through your own hard work, it is of the uttermost importance that all the submitted works, such as homework assignments and exam papers, must reflect your independent efforts made during the learning process. Hence, the following honor policy will be enforced throughout the semester. Any breach to the policy will be reported directly to the UVa Honor Committee.

Although students may discuss homework assignments in groups, each student must finish his or her assignments/project independently based on his or her own understanding. Copying others’ works or any existing sources will not be tolerated.

The same rule apply for the class project, with the exception that two students may form a team and work on a single project.