
Introduction to Multivariate Statistical Analysis

IE-2400211, FALL 2023

Engineering Building 201-6302-1, Mon/Wed 10:30-11:45am

- Instructor** Chanseok Park (e-mail: CP<AT>PUSAN<DOT>AC<DOT>KR)
OFFICE: Engineering Building 207-10527
OFFICE HOURS: 12:00-13:00pm (Mon/Wed) or by appointment.
- Textbook** *Applied Multivariate Statistical Analysis, 6th edition* by Richard A. Johnson & Dean W. Wichern
- Web Page** <https://AppliedStat.GitHub.io/class>
- Software** *R Language* (<http://www.r-project.org>)
- Prerequisite** Engineering Statistics-I and II are required.
The expectation is that you have already been exposed to the basic ideas of linear algebra, statistical inferences, and regression at the undergraduate level. The background in basic statistics is absolutely essential because this is an applied *multivariate* statistics course as opposed to a basic statistics course.
- Policy**
- Attendance Policy: Class attendance is mandatory. If you miss a class for some reason, it is your responsibility to get notes, *etc.* from someone in the class. I will not repeat lectures during my office hours.
 - Tardy Professor Policy: If the instructor has not arrived within 15 minutes of the scheduled class time, you may assume that class has been canceled.
 - All drop/add procedures are your responsibility.

Description and Learning Objectives

The following major topics will be covered.

- (i) Review of basic linear algebra: vectors, matrix, positive definite, square-root matrix, mean vectors, covariance matrix.
- (ii) Basics on R language (<http://www.r-project.org>).
- (iii) Geometry of the sample, generalized variance.
- (iv) Multivariate normal distribution.
- (v) Inferences about a mean vector.
- (vi) Multivariate linear regression models.
- (vii) Principal components.
- (viii) Factor analysis.
- (ix) Canonical correlation analysis.
- (x) Discrimination and classification.

Upon successful completion of this course, a student will be able to:

- Understand basic multivariate statistics theories.
- Obtain multivariate inferences.
- Obtain a multivariate linear regression estimate.
- Learn how to program multivariate statistical programs using R language.

Grading

The final grade will be curved and calculated as follows:

HOMEWORKS:	5%
ATTENDANCE:	5%
MIDTERM	45%
FINAL:	45%

ROUGH GRADING GUIDE:

- A+: 95 ~ 100 A: 90 ~ 95-
- B+: 85 ~ 90- B: 80 ~ 85-
- C+: 70 ~ 80- C: 60 ~ 70-
- D+: 50 ~ 60- D: 40 ~ 50-
- F : below 40.

Exams

MIDTERM: T.B.A. In class
FINAL: T.B.A.

- All the exams will be closed-book.
- The final exam will be comprehensive.
- For the final exam, you are allowed to bring in *one* A4-size formula sheet made up by yourself.
- During the exams, a basic calculator will be permitted but cannot be shared with others.
- Calculators in smart phones, tablet PC and laptops are prohibited.
- No early or late exams will be allowed without a written and legitimate excuse.

Homeworks

- The students can collaborate on their homework problems, but they should submit their homeworks separately.
- Late homeworks will **not** be accepted.
- Up to 1 ~ 2 problems, selected at random, will be graded in detail, on a scale of 0–5 each.
- To get full credit, you must show all work on the homework problems, which must be handed in in the same order as they are assigned.