

Stat 543: Applied Multivariate Statistical Analysis

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Multivariate Statistics is a study of multiple dependent outcome variables. In this course, we will learn various multivariate statistical methods, how to apply them and interpret the results obtained. Most of the distributional results are mathematically intense and we will focus mainly on understanding the results rather than the technical derivations. The ideal prerequisite materials for the course would be statistical inference at the mathematical level (Stat 422 or Math 442) and matrix algebra at the level of M 221. Students without these backgrounds can still benefit as much from the course with a few additional readings. We will introduce matrix algebra in the course. It is also summarized in Chapter 2 of the textbook. Anyone who masters this chapter (and the supplement) will have a reasonable competency in this area. Regardless, it should be possible to understand the big pictures, and be able to apply the methods and interpret results without familiarity with the prerequisite materials. Previous successful audiences of the course include students from non-math disciplines.

Textbook:

R. A. Johnson and D. W. Wichern, Applied Multivariate Statistical Analysis, Sixth Edition, Pearson Education, Inc., 2007.

Topics to be covered include:

- Matrix Algebra
- Inference about the Mean Vector
- Comparison of Several Multivariate Means
- Inference for Time Course Studies (Repeated Measures Analysis)
- Multivariate Multiple Linear Regression
- Principal Components Analysis
- Factor Analysis and Structured Covariance Matrices
- Canonical Correlations Analysis
- Discrimination and Classification
- Clustering

Required Prerequisite:

- Statistical Methods II (Stat 452). Desirable: Stat 422 and M 221.