

Title (Units): SCI7450 APPLIED MULTIVARIATE ANALYSIS (2,2,0)

Syllabus Reviewed by: Michael Ng

Prerequisite/Co-requisite: SCI7430 STATISTICAL SOFTWARE IN BUSINESS AND MANAGEMENT

Objectives: This subject introduces classical multivariate analysis and techniques which are useful for analyzing both designed experiments and observational studies.

Calendar Description: This subject introduces classical multivariate analysis and techniques which are useful for analyzing both designed experiments and observational studies.

References:

- 1) R.A. Johnson and P.W. Wichern, Applied Multivariate Statistical Analysis, 5th Ed., Prentice -Hall International Book Company, 2002.
- 2) J. Han and M. Kamber, Data Mining: Concepts and Techniques, The Morgan Kaufmann Publishers, 2001.
- 3) D.F. Morrison, Multivariate Statistical Methods, 3rd Ed., McGraw-Hill International Book Company, 1990.
- 4) R. J. Roiger and M.W. Geatz, Data Mining, A Tutorial-based Primer, Pearson Educaton Inc., 2003.

Assessment: Continuous assessment (30%) and Final examination (70%)

Subject Content in Outline:

- I. Introduction and Matrix Algebra (5 hours of teaching)
 - A. Introduction to multivariate analysis and data mining
 - B. Data
 - C. Basic statistics of a data set
 - D. Data displays and graphical representations
 - E. Matrix algebra

- II. Multivariate Normal Distribution and Its Sampling Theory (7 hours of teaching)
 - A. Random vector and its distribution
 - B. Moments of multivariate distributions
 - C. Multivariate normal distribution
 - D. Matrix normal distribution
 - E. Maximum likelihood estimation
 - F. Properties of estimators

- III. Tests of Hypotheses on Means and Covariance Matrices (6 hours of teaching)
 - A. From univariate to multivariate problems
 - B. Tests of hypotheses on means and the T^2 -statistic
 - C. Two samples problem
 - D. Testing equality of several means
 - E. Some tests on covariance matrices

- IV. Multivariate Methods in Multivariate Analysis (10 hours of teaching)

- A. Principal component analysis
- B. Factor analysis
- C. Corresponding analysis
- D. Canonical correlation analysis