STAT-804 Multivariate Analysis (3 Credit Hours)

1. Objectives

This course aims to introduce students the multivariate structures, multivariate hypothesis testing, estimation, data reduction and modeling.

2. Course Contents

Multivariate descriptive statistics. The multivariate normal Density, its properties and related sampling distributions. Inference about the normal population mean. Hotelling's T2 and likelihood ratio tests. Confidence regions, multivariate quality control charts. Paired comparisons and a repeated measures design. MANOVA, multivariate multiple regression. Principal components, factor model, canonical variants and canonical correlations. Classification and discriminant analysis. Similarity measures, hierarchical and non-hierarchical clustering methods. Correspondence analysis and biplots. Partial Least Squares for prediction and classification. Related applications/computations with R.

3. Recommended Books

i. Johnson, R.A. and Wincher, D.W. Applied Multivariate Statistical Analysis. 6th Edition. Prentice-Hall. London (2004).

ii. Sharma, S., Applied Multivariate Techniques, John Wiley and Sons, New York (1996).

iii. Hair, J.F., Anderson R.E., Jotham, R.L. and Black W.C., Multivariate Data Analysis, 5th Edition. Pearson Education (1998, Reprint 2005).

iv. Manly, B.F.J., Multivariate Statistical Methods, A Primer 2nd Edition, Chapman and Hall, London (1994).

v. Anderson, T.W., An Introduction to Multivariate Statistical Analysis, John Wiley, New York (2003).

4. Outcomes

On successful completion of this course, students will be able to conduct multivariate hypothesis testing and multivariate modeling of their data. This will help students in dimension reduction, classification and clustering of multivariate data structures.