**COMPUTATIONAL STATISTICS**

# UNIT - I

**Multivariate Normal Distribution:** Multivariate Normal Distribution Functions - Conditional Distribution and its relation to regression model - Estimation of parameters. **Multiple Linear Regression Model:** Standard multiple regression models with emphasis on detection of collinearity - outliers - non-normality and autocorrelation - Validation of model assumptions.

# UNIT - II

**Multivariate Regression:** Assumptions of Multivariate Regression Models - Parameter estimation

* Multivariate Analysis of variance and covariance. **Discriminant Analysis:** Statistical background
* Linear discriminant function analysis - Estimating linear discriminant functions and their properties.

# UNIT - III

**Principal Component Analysis:** Principal components - Algorithm for conducting principal component analysis - Deciding on how many principal components to retain H-plot. **Factor Analysis:** Factor analysis model - Extracting common factors - Determining number of factors- Transformation of factor analysis solutions - Factor scores.

# UNIT - IV

**Cluster Analysis:** Introduction, Types of clustering, Correlations and distances, Clustering by partitioning methods, Hierarchical clustering, Overlapping clustering, K-Means Clustering - Profiling and Interpreting Clusters.

# TEXT BOOKS

* 1. Jobson, J. Dave, *Applied multivariate data analysis*, Vol, I & II, 2012, [Springer-Verlag New](https://www.bookdepository.com/publishers/Springer-Verlag-New-York-Inc) [York Inc.](https://www.bookdepository.com/publishers/Springer-Verlag-New-York-Inc)
  2. Anderson TW, *An introduction to multivariate statistical analysis*, 3rd Edition, 2009, Wiley Publications.

# REFERENCES

1. Mark Lutz, *Programming Python*, 4th Edition, 2010, O'Reilly Media.
2. Tim Hall and J-P Stacey, *Python 3 for Absolute Beginners*, 3rd Edition, 2009, Apress
3. Magnus Lie Hetland, *Beginning Python: From Novice to Professional*, 3rd Edition, 2005, Apress