

Course Plan – Data Analytics

Course Outcomes

- CO1: Explain the basic concepts of multivariate statistics and describe the degree of relationship among variables.
- CO2: Review univariate and bivariate statistical techniques and perform data screening, including treatment of missing data, detection of outliers, and testing assumptions such as normality, linearity, and homoscedasticity.
- CO3: Apply multiple regression techniques—linear, nonlinear, backward, forward, stepwise, and hierarchical regression—and interpret results of ANOVA, ANCOVA, MANOVA, and MANCOVA.
- CO4: Perform logistic regression, discriminant analysis (simple and multiple), and conjoint analysis to assess classification accuracy and interpret decision outcomes.
- CO5: Conduct principal component analysis, factor analysis with orthogonal and oblique rotation, multidimensional scaling, perceptual mapping, and cluster analysis for data reduction and segmentation.
- CO6: Apply path analysis, structural equation modeling, time series and decision tree techniques for predictive analytics.

Week	Topics	CO	Teaching	Assessment
1	Introduction to multivariate statistics; variables, scales, correlation	CO1	Lecture/Tutorial	Quiz
2	Univariate & bivariate analysis	CO2	Lecture+Lab	Assignment
3	Missing data, outliers, assumptions	CO2	Lab	Practical
4	Multiple linear & nonlinear regression	CO3	Lecture	Quiz
5	Backward, forward, stepwise, hierarchical regression	CO3	Lab	Assignment
6	ANOVA, ANCOVA, MANOVA, MANCOVA	CO3	Lecture	Mid-term
7	Logistic regression	CO4	Lecture+Lab	Practical
8	Discriminant & conjoint analysis	CO4	Lecture	Quiz
9	PCA	CO5	Lab	Assignment
10	Factor analysis & rotations	CO5	Lecture+Lab	Practical
11	MDS, perceptual mapping, cluster analysis	CO5	Lab	Quiz
12	Path analysis & SEM	CO6	Lecture	Assignment
13	Time series	CO6	Lecture+Lab	Practical
14	Decision trees, revision & presentations	CO6	Interactive	End-term prep