

## 4. Advanced Data Visualization

L-T-P 3-0-0 Cr. - 3

### Objective:

- To extend student's knowledge in the area of Data Science with emphasis on Predictions utilizing associated statistical methods and software tools.

### MODULE – I

Introduction to Data Acquisition – Applications – Process- Data Extraction- Data Cleaning and Annotation- Data Integration -Data Reduction- Data Transformation –Visualization- Introduction -Terminology- Basic Charts and Plots- Multivariate Data Visualization- Data Visualization Techniques– Pixel-Oriented Visualization Techniques- Geometric Projection Visualization

Techniques- Icon-Based Visualization Techniques- Hierarchical Visualization.

### MODULE – II

Techniques Visualizing Complex Data and Relations Data Visualization Tools– Rank Analysis Tools- Trend Analysis Tools- Multivariate Analysis Tools- Distribution Analysis Tools- Correlation Analysis Tools- Geographical Analysis Tools.

### MODULE – III

Regression model building framework: Problem definition, Data pre-processing; Model building;

Diagnostics and validation Simple Linear Regression: Coefficient of determination, Significance

tests, Residual analysis, Confidence and Prediction intervals.

### MODULE – IV

Multiple Linear Regression: Coefficient of multiple coefficient of determination, Interpretation of regression coefficients, Categorical variables, Heteroscedasticity, Multi-collinearity, outliers, Autoregression and transformation of variables, Regression model building.

### Outcome:

- Ability to apply specific statistical and regression analysis methods applicable to predictive analytics to identify new trends and patterns, uncover relationships, create forecasts, predict likelihoods, and test predictive hypotheses.
- Ability to develop and use various quantitative and classification predictive models based on various regression and decision tree methods.

### Books Recommended:

1. Andy Kirk, Data Visualization A Handbook for Data Driven Design, Sage Publications, 2016

2. Philipp K. Janert, *Gnuplot in Action, Understanding Data with Graphs*, Manning Publications, 2010.
3. Alberto Cordoba, “Understanding the Predictive Analytics Lifecycle”, Wiley, 2014.
4. Eric Siegel, Thomas H. Davenport, “Predictive Analytics: The Power to Predict Who Will Click,Buy, Lie, or Die”, Wiley, 2013.
5. James R Evans, “Business Analytics – Methods, Models and Decisions”, Pearson 2013.
6. R. N. Prasad, SeemaAcharya, “Fundamentals of Business Analytics”, Wiley, 2015.