Course Code	Course Title	Credits	Lectures /Week
USCSP601	**Data Science – Practical**	**1**	**3**
1	Introduction to Excel • Perform conditional formatting on a dataset using various criteria. • Create a pivot table to analyze and summarize data. • Use VLOOKUP function to retrieve information from a different worksheet or table. • Perform what-if analysis using Goal Seek to determine input values for desired output.		
2	Data Frames and Basic Data Pre-processing • Read data from CSV and JSON files into a data frame. • Perform basic data pre-processing tasks such as handling missing values and outliers. • Manipulate and transform data using functions like filtering, sorting, and grouping.		
3	Feature Scaling and Dummification • Apply feature-scaling techniques like standardization and normalization to numerical features. • Perform feature dummification to convert categorical variables into numerical representations.		
4	Hypothesis Testing • Formulate null and alternative hypotheses for a given problem. • Conduct a hypothesis test using appropriate statistical tests (e.g., t-test, chi-square test). • Interpret the results and draw conclusions based on the test outcomes.		
5	ANOVA (Analysis of Variance) • Perform one-way ANOVA to compare means across multiple groups. • Conduct post-hoc tests to identify significant differences between group means.		
6	Regression and Its Types • Implement simple linear regression using a dataset. • Explore and interpret the regression model coefficients and goodness-of-fit measures. • Extend the analysis to multiple linear regression and assess the impact of additional predictors.		
7	Logistic Regression and Decision Tree • Build a logistic regression model to predict a binary outcome. • Evaluate the model's performance using classification metrics (e.g., accuracy, precision, recall). • Construct a decision tree model and interpret the decision rules for classification.		

8	K-Means Clustering • Apply the K-Means algorithm to group similar data points into clusters. • Determine the optimal number of clusters using elbow method or silhouette analysis. • Visualize the clustering results and analyze the cluster characteristics.
9	Principal Component Analysis (PCA) • Perform PCA on a dataset to reduce dimensionality. • Evaluate the explained variance and select the appropriate number of principal components. • Visualize the data in the reduced-dimensional space.
10	Data Visualization and Storytelling • Create meaningful visualizations using data visualization tools • Combine multiple visualizations to tell a compelling data story. • Present the findings and insights in a clear and concise manner.