

Course Code	Course Title	Credits	Lectures /Week
USCSP601	Data Science – Practical	1	3
1	<p>Introduction to Excel</p> <ul style="list-style-type: none"> • 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	<p>Data Frames and Basic Data Pre-processing</p> <ul style="list-style-type: none"> • 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	<p>Feature Scaling and Dummification</p> <ul style="list-style-type: none"> • Apply feature-scaling techniques like standardization and normalization to numerical features. • Perform feature dummification to convert categorical variables into numerical representations. 		
4	<p>Hypothesis Testing</p> <ul style="list-style-type: none"> • 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	<p>ANOVA (Analysis of Variance)</p> <ul style="list-style-type: none"> • Perform one-way ANOVA to compare means across multiple groups. • Conduct post-hoc tests to identify significant differences between group means. 		
6	<p>Regression and Its Types</p> <ul style="list-style-type: none"> • 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	<p>Logistic Regression and Decision Tree</p> <ul style="list-style-type: none"> • 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	<p>K-Means Clustering</p> <ul style="list-style-type: none"> • 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	<p>Principal Component Analysis (PCA)</p> <ul style="list-style-type: none"> • 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	<p>Data Visualization and Storytelling</p> <ul style="list-style-type: none"> • 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.