

# Data Analytics Using Visualisation Tools

## ABOUT THE COURSE

<b>OVERALL COURSE OBJECTIVE:</b>	To equip participants with practical skills in data analysis using Python, focusing on real-world data scenarios and applications.
<b>LEARNING OUTCOME:</b>	<ul style="list-style-type: none"><li>• Explore the scope and responsibilities of a data scientist</li><li>• Perform data analysis and visualization using R</li><li>• Utilize Matlab for complex data analysis</li><li>• Conduct data analysis using Python libraries</li><li>• Master techniques for data preprocessing</li><li>• Conduct statistical analysis and interpret results</li><li>• Integrate and apply skills in a real- world data analysis project.</li></ul>

**TABLE 2: MODULE WISE COURSE CONTENT AND OUTCOME**

SL. NO	MODULE NAME	MODULE CONTENT	MODULE LEARNING OUTCOME	DURATIO N (HRS)
1	Introduc tion to Data Science	Overview of data science, role of a data scientist	Explore the scope and responsibilities of a data scientist	4

2	R for Data Analysis	Basics of R, data manipulation and visualization in R	Perform data analysis and visualization using R	12
3	Data Analysis with Matlab	Matlab for data analytics, working with matrices and functions	Utilize Matlab for complex data analysis	12
6	Python for Data Science	Python basics, pandas, NumPy, data manipulation in Python	Conduct data analysis using Python libraries	16
8	Data Preprocessing	Cleaning, transforming, and preparing data for analysis	Master techniques for data preprocessing	6
9	Statistical Analysis	Descriptive and inferential statistics,	Conduct statistical analysis and interpret	6
		hypothesis testing	results	
10	Capstone Project	Application of learned skills in a comprehensive project	Integrate and apply skills in a real-world data analysis project	4

<b>TABLE 3: OVERALL COURSE LEARNING OUTCOME ASSESSMENT CRITERIA AND USECASES</b>		
<b>LEARNING OUTCOME</b>	<b>ASSESSMENT CRITERIA</b>	<b>USECASES</b>
Analyze and interpret data using multiple tools	Accuracy of analysis, tool proficiency	<p>Use Case 1: Market Trend Analysis</p> <p>Task: Analyze market data to identify trends using R.</p> <p>Use Case 2: Operational Efficiency</p> <p>Task: Use Matlab to optimize operational processes based on data insights.</p>
Create dynamic and interactive data visualizations	Creativity, clarity, and effectiveness of visualizations	<p>Use Case 1: Interactive Sales Dashboard</p> <p>Task: Develop a dynamic sales dashboard using MatLab.</p> <p>Use Case 2: Educational Performance Tracker</p>
Conduct comprehensive statistical analysis	Depth of statistical methods, interpretation accuracy	<p>Use Case 1: Public Health Study</p> <p>Task: Perform statistical analysis on public health data using Python.</p> <p>Use Case 2: Financial Risk Assessment</p> <p>Task: Analyze financial data for risk assessment using Python.</p>

Develop business intelligence reports and dashboards	Insightfulness, layout, and usability of reports	<p>Use Case 1: Retail Business Intelligence</p> <p>Task: Create comprehensive BI reports for a retail chain using MatLab.</p> <p>Use Case 2: Supply Chain Analysis</p> <p>Task: Analyze and visualize supply chain data using Python.</p>
Apply skills in a realworld data analysis project	Integration of tools, problem-solving, project execution	<p>Use Case 1: E-commerce Customer Behavior Task: Analyze e-commerce data to understand customer behavior patterns.</p> <p>Use Case 2: Environmental Impact Study</p> <p>Task: Assess environmental data to identify impact trends.</p>

**TABLE 4: LIST OF FINAL PROJECTS**

<b>SL. NO</b>	<b>FINAL PROJECT</b>
1	Healthcare Data Analysis: Analyze patient data to identify health trends and predict outcomes.
2	Financial Market Forecasting: Use historical data to predict market trends and investment opportunities.
3	Social Media Sentiment Analysis: Analyze social media data to gauge public sentiment on various topics.
4	Sales Forecasting for Retail: Develop models to forecast future sales based on historical data.
5	Customer Segmentation in E-commerce: Segment customers based on purchasing behavior and preferences.
6	Climate Change Impact Study: Analyze environmental data to study the effects of climate change.

7	Real Estate Price Prediction: Predict real estate prices based on market data and trends.
8	Supply Chain Optimization: Analyze supply chain data to identify areas for efficiency improvement.
9	Sports Performance Analysis: Use data to analyze and improve sports team performance.
10	Energy Consumption Analysis: Study patterns in energy usage to suggest optimization strategies.
11	Traffic Flow Optimization: Analyze traffic data to improve city traffic management systems.
12	Crime Rate Prediction: Predict crime rates in different areas based on historical data.
13	Educational Outcomes Analysis: Study factors affecting educational outcomes in schools.
14	Marketing Campaign Effectiveness: Analyze marketing data to assess the impact of various campaigns.
15	Product Recommendation System: Develop a system for personalized product recommendations in e-commerce.
16	Employee Performance Analysis: Analyze employee data to identify patterns in performance and productivity.
17	Predictive Maintenance in Manufacturing: Use machine data to predict when maintenance is required.
18	User Experience Optimization: Analyze user interaction data to improve website or app design.
19	Telecommunication Network Analysis: Study network data to improve service quality and coverage.
20	Public Transportation Efficiency Study: Analyze data to improve efficiency and service in public transport.