Course Name: Advanced Data Analytics using Python

ABOUT THE COURSE

TOTAL DURATION:	45HRS
MODE OF DELIVERY	PHYSICAL CLASSROOM TRAINING AT RESPECTIVE COLLEGES
TRAINER TO STUDENT RATIO:	1:50
TOTAL MARKS:	75

OVERALL COURSE OBJECTIVE:	To equip participants with practical skills in data analysis using Python, focusing on real-world data scenarios and applications.
LEARNING OUTCOME:	• Perform data analysis and visualization using R • Utilize Matlab for complex data analysis • Conduct data analysis using Python libraries • Master techniques for data preprocessing • Conduct statistical analysis and interpret results • Integrate and apply skills in a real- world data analysis project.

TABLE 2: MODULE WISE COURSE CONTENT AND OUTCOME				
SL. NO	**MODULE NAME**	**MODULE CONTENT**	**MODULE LEARNING OUTCOME**	**DURATION (HRS)**
1	Introduction 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 visualizatio	Perform data analysis and visualization using R	12

		n in R		
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, hypothesis testing	Conduct statistical analysis and interpret results	6
10	Capstone Project	Application of learned skills in a comprehensive project	Integrate and apply skills in a real-world data analysis project	4

TABLE 3: OVERALL COURSE LEARNING OUTCOME ASSESSMENT CRITERIA AND USECASES		
LEARNING OUTCOME	**ASSESSMENT CRITERIA**	**USECASES**
		Use Case 1: Market Trend Analysis

Analyze and interpret data using multiple tools	Accuracy of analysis, tool proficiency	Task: Analyze market data to identify trends using R. **Use Case 2**: Operational Efficiency Task: Use Matlab to optimize operational processes based on data insights.
Create dynamic and interactive data visualizations	Creativity, clarity, and effectiveness of visualizations	**Use Case 1**: Interactive Sales Dashboard Task: Develop a dynamic sales dashboard using MatLab. **Use Case 2**: Educational Performance Tracker
Conduct comprehensive statistical analysis	Depth of statistical methods, interpretation accuracy	**Use Case 1**: Public Health Study Task: Perform statistical analysis on public health data using Python. **Use Case 2**: Financial Risk Assessment Task: Analyze financial data for risk assessment using Python.
Develop business intelligence reports and dashboards	Insightfulness, layout, and usability of reports	**Use Case 1**: Retail Business Intelligence Task: Create comprehensive BI reports for a retail chain using MatLab. **Use Case 2**: Supply Chain Analysis Task: Analyze and visualize supply chain data using Python.
Apply skills in a real-world data analysis project	Integration of tools, problem- solving, project execution	**Use Case 1**: E-commerce Customer Behavior Task: Analyze e-commerce data to understand customer behavior patterns. **Use Case 2**: Environmental Impact Study Task: Assess environmental data to identify

		impact trends.

TABLE 4: LIST OF FINAL PROJECTS	
SL. NO	**FINAL PROJECT**
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.

TABLE 5: COURSE ASSESSMENT RUBRICS (TOTAL MARKS: 75)				
ASSESSMENT CRITERIA	**DESCRIBE THE CRITERIA OF THE BELOW CATEGORY PERFORMANCE**			**TOTAL MARKS**
	FAIR	**GOOD**	**EXCELLENT**	
THEORY	>10	>15	>20	20
PRACTICAL	>25	>30	>35	40
VIVA	<5	<10	<15	15