

# Certified Associate Data Analyst with Python (PCAD)

**Duration: 5 Days**

## Course Description:

The Certified Associate Data Analyst with Python (PCAD) course is designed to equip students with comprehensive data analysis skills using Python, covering key areas such as data ingestion, exploration, statistical analysis, machine learning, and big data processing.

## Target Audience:

Certified Associate Data Analyst with Python is an in-depth course designed for those seeking to master data analysis using Python, offering insights into data ingestion, preparation, statistical analysis, and machine learning.

- Aspiring Data Analysts
- Data Scientists
- Business Analysts
- IT Professionals
- Software Developers
- Statisticians
- Market Researchers
- Academic Researchers
- Data Engineers
- Machine Learning Engineers
- Database Administrators
- Students in Data Science or Analytics Programs
- Professionals seeking a career pivot into data analytics
- Financial Analysts
- Operations Analysts

## Prerequisites:

To ensure you get the most out of our Certified Associate Data Analyst with Python course, we recommend that participants have the following minimum knowledge and skills:

- Basic Understanding of Python: Familiarity with Python syntax and basic programming concepts.
- Fundamental Knowledge of Mathematics: Basic knowledge of algebra and statistics, including mean, median, mode, and standard deviation.
- Experience with Data Manipulation Tools: Basic experience using any spreadsheet software (like Excel) for data analysis tasks.
- Basic Understanding of Databases: Familiarity with basic database concepts and knowledge of SQL is advantageous, although not mandatory.
- Problem Solving Skills: A logical approach to analyzing problems and identifying solutions.

These prerequisites are designed to ensure that learners can easily follow along with the course material and gain maximum benefit from the training program. If you meet these criteria, you'll be well-prepared to embark on your journey to becoming a Certified Associate Data Analyst with Python.

## Course Objectives:

- Understand the Data Analytics Process: Gain insights into the complete data analytics workflow, from data collection to analysis and visualization.
- Master Data Exploration Techniques: Learn Exploratory Data Analysis (EDA) with both quantitative and graphical techniques to derive meaningful insights from data.
- Data Preparation Skills: Develop the ability to clean, transform, normalize, and standardize data, handling outliers and missing values effectively for accurate analysis.
- Statistical Analysis Proficiency: Gain competence in performing descriptive statistics, understanding data distributions, identifying patterns, and visualizing data using Matplotlib and Seaborn.
- Data Manipulation Expertise: Acquire skills in data manipulation and aggregation with Pandas, including grouping, pivoting, and merging datasets.
- Time Series Analysis: Understand the fundamentals of time series data, including indexing, slicing, visualization, and forecasting techniques like ARIMA.
- Introduction to Machine Learning: Get acquainted with machine learning concepts, including supervised vs unsupervised learning.

## Course Outlines:

### Module 1: Data Analytics Overview

- Data Analytics Process
- Data Analysis Stages
- Data Analytics Process
- Python for Data Analysis
- NumPy
- Pandas
- Matplotlib

### Module 2: Exploratory Data Analysis (EDA)

- What is EDA
- EDA – Quantitative Technique
- EDA – Graphical Technique
- Data Analysis Predictions
- Data Analysis Communication
- Data Types for Plotting

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## COURSE OUTLINE

### Module 3: Data Ingestion and Preparation

- Reading data from various sources (CSV, Excel, databases)
- Data cleaning
- Handling missing values
- Data transformation
- Data normalization
- Data Standardization
- Handling Outliers
- Feature Engineering
- Feature Transformation

### Module 4: Statistical Analysis

- Descriptive Statistics
- Data visualization with Matplotlib and Seaborn
- Understanding data distribution
- Identifying patterns and trends
- Statistical Analysis Considerations
- Data Distribution

### Module 5: Data Manipulation and Aggregation

- Grouping and aggregation using Pandas
- Pivot tables and cross-tabulation
- Handling categorical data
- Data merging and joining

### Module 6: Time Series Analysis

- Introduction to time series data
- Time series indexing and slicing
- Time series visualization
- Stationarity and differencing
- Forecasting techniques (ARIMA, etc.)

### Module 7: Introduction to Machine Learning

- Supervised vs unsupervised learning
- Model evaluation metrics
- Overfitting and underfitting

### Module 8: Linear Regression

- Simple linear regression
- Multiple linear regression
- Model evaluation and interpretation

### Module 9: Logistic Regression

- Logistic regression model
- Model evaluation and interpretation
- Applications of logistic regression

### Module 10: Decision Trees and Random Forests

- Decision trees
- Random forests
- Model evaluation and interpretation

### Module 11: Model Evaluation and Selection

- Model evaluation metrics
- Hyperparameter tuning
- Cross-validation
- Model selection techniques

### Module 12: Data Analysis Case Study

- Real-world data analysis project
- Data cleaning
- Data Exploration,
- Data Visualization
- Model Building
- Model Evaluation
- Insights

### Module 13: Python for Data Visualization

- Advanced data visualization with Matplotlib
- Interactive visualizations with Plotly
- Geospatial data visualization
- Dashboard creation

### Module 14: Big Data with Python

- Introduction to big data concepts
- PySpark
- Big data processing
- Big Data Analysis

### Module 15: Clustering and Dimensionality Reduction

- Support Vector Machines (SVM)
- Clustering algorithms
- K-means Clustering
- Hierarchical clustering)
- Dimensionality reduction (PCA)
- Applications in data exploration and visualization

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