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CERTIFICATION IN DATA ANALYTICS AND AI APPLICATIONS USING PYTHON PROGRAMMING

1. COURSE OBJECTIVE

The Certification Course in Data Analysis using Python Programming is designed to provide a comprehensive and accessible pathway for learners from diverse backgrounds both technical and non-technical, to master the foundational tools and techniques of data analysis.

By the end of the course, participants will be able to:

* Understand the role of data analysis in business and decision-making.
* Write Python programs for data processing and analysis.
* Clean, manipulate, and explore datasets using Pandas and NumPy
* Visualize data effectively using Matplotlib and Seaborn.
* Develop an end-to-end mini project that demonstrates analytical thinking.
* Understand the foundational principles and purpose of Machine Learning
* Recognize how ML builds upon data analysis to make predictions and automate insights.
* Identify key algorithm types and their real-world business applications.

2. TOOLS & TECHNOLOGIES COVERED

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CATEGORY	TOOLS
Programming Language and other tools	Python 3.x, Excel, Microsoft, Power BI, Chatgpt
Environment	Jupyter Notebook, Google Colab
Libraries	NumPy, Pandas, Matplotlib, Seaborn, Scikit-Learn
Datasets	Supermarket Sales, HR Analytics, Financial Data

3.COURSE STRUCTURE: WEEK-WISE BREAKDOWN

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Month 1

PYTHON FOUNDATIONS FOR DATA ANALYSIS

Weeks 1–4

Goal: Build your Python fundamentals for handling and analysing data.

* What is data analysis, data science & its importance?
* Python setup (Anaconda, Jupyter)
* Data types, operations, and control structures
* Lists, tuples, sets, and dictionaries
* Introduction to NumPy and Pandas for real-world data
* Statistics- Mean, Median Mode, Quartile, Standard Deviation etc.
* Hands-on: Analyse a small dataset

Quiz + Assignment 1

Month 2

DATA HANDLING, CLEANING & VISUALIZATION

Weeks 5–8

Goal: Learn how to work with and visualize data for insights.

* Pandas: Series, Data Frames, Importing/Exporting CSV & Excel
* NumPy: Arrays, Indexing, Slicing, Joint, Split etc.
* Data Cleaning: handling missing values, duplicates, and outliers
* Data Transformation & Aggregation
* Data Visualization: Matplotlib & Seaborn (Bar, Pie, Line, Scatter, Heatmap etc)
* Exploratory Data Analysis (EDA) on real datasets

Quiz + Assignment 2 (Supermarket Sales Dataset, Titanic Dataset, Credit Card Dataset, Heart Disease Dataset)

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Month 3

EXCEL ANALYTICS & POWER BI DASHBOARDS

Weeks 9–12

Goal: Build strong reporting and visualization skills with business tools.

* Excel Basics and Navigation
* Data Cleaning & Functions
* Pivot Tables, Pivot Charts, and Conditional Formatting
* Data Analysis and Descriptive Statistics: Mean, Median, Correlation
* Essential Formulas and Functions such as SUM, AVG,MIN MAX etc.
* Charts and Data Visualization

Power BI for Business Insights

* Data loading, cleaning & transformation in Power BI
* Building relationships between tables
* Creating dashboards with filters, slicers, and KPIs
* Adding basic DAX calculations
* Designing and publishing professional dashboards

Hands-on Project: Sales Dashboard in Power BI

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Half Month

MACHINE LEARNING & CAREER READINESS

Weeks 13–14

Goal: Build strong reporting and visualization skills with business tools.

Machine Learning Introduction

* What is Machine Learning & Predictive Analytics
* Supervised and Unsupervised Machine Learning Algorithm
* Linear Regression, Classification (conceptual overview)
* Prompt Engineering with Chatgpt
* Mini project: Boston Housing Price Prediction, Diabetes Dataset, Mall Customer Dataset)

Career Preparation

* CV review & LinkedIn optimization
* Mock interviews & GitHub portfolio creation