AI Driven Data Analytics Course Summary

This course provides a comprehensive introduction to AI-driven data analytics, covering essential tools and techniques for extracting actionable insights from data. You will gain hands-on experience with key technologies including Python (NumPy, Pandas, Matplotlib), Microsoft Excel, SQL, and Power BI. The curriculum also delves into ETL processes and culminates in practical, real-world projects focusing on customer behavior analysis, risk profiling, and strategic business intelligence.

Course Curriculum:

1. Introduction to Data Analytics
1.1 What is Data Analytics?
1.2 Types of Analytics: Descriptive, Diagnostic, Predictive, Prescriptive
1.3 Data Analytics Lifecycle
1.4 Real-world Applications & Case Studies
1.5 Overview of Tools: Excel, Python, SQL, Power BI

2. Microsoft Excel for Data Analysis
2.1 Excel Interface and Navigation
2.2 Data Entry, Formatting, and Cleaning
2.3 Important Formulas
2.3.1 Logical: IF, AND, OR
2.3.2 Text: LEFT, RIGHT, LEN, CONCATENATE, TEXT
2.4 Sorting and Filtering
2.5 Conditional Formatting
2.7 Dashboards (with slicers, charts)

3. MySQL for Data Analysis
3.1 Introduction to Relational Databases
3.2 SQL Basics
3.2.1 SELECT, WHERE, ORDER BY, LIMIT
3.2.2 Filtering: LIKE, IN, BETWEEN, IS NULL
3.3 Aggregate Functions
3.3.1 COUNT(), SUM(), AVG(), MIN(), MAX()
3.3.2 GROUP BY, HAVING
3.4 Table Joins
3.4.1 INNER JOIN, LEFT JOIN, RIGHT JOIN, FULL JOIN
3.5 Subqueries and Aliases
3.6 Table Operations
3.6.1 CREATE, INSERT, UPDATE, DELETE
3.7 Importing/Exporting CSV files in MySQL

4. Python Programming for Analytics
4.1 Python Basics
4.1.1 Variables, Data Types, Operators
4.1.2 Lists, Tuples, Dictionaries, Sets
4.2 Control Flow
4.2.1 if-else, for, while
4.2.2 Functions and Lambda Expressions
4.3 File Handling
4.3.1 Reading and writing CSV/JSON files
4.4 Comprehensions and Exception Handling

5. NumPy – Numerical Python
5.1 Introduction to NumPy Arrays
5.2 Array Indexing and Slicing
5.3 Mathematical and Statistical Functions
5.4 Broadcasting and Vectorized Operations
5.5 Handling NaN and Inf values

6. Pandas – Data Manipulation
6.1 Series and DataFrame Basics
6.2 Reading & Writing Files (CSV, Excel, JSON)
6.3 Data Cleaning
6.3.1 Handling Null Values: fillna(), dropna()
6.3.2 Duplicates, Data Types
6.4 Data Selection and Filtering
6.5 Sorting, Renaming Columns, Resetting Index
6.6 Grouping and Aggregation
6.6.1 groupby(), agg(), Pivot Tables
6.7 Joining and Merging DataFrames
6.8 Applying Functions: apply(), map(), custom functions

7. Matplotlib – Data Visualization
7.1 Introduction to Matplotlib
7.2 Plot Types
7.2.1 Line Plot, Bar Plot, Pie Chart, Histogram, Box Plot
7.3 Customization
7.3.1 Titles, Labels, Colors, Legends, Grids
7.4 Subplots and Figure Size
7.5 Saving Plots to File

8. Power BI
8.1 Power BI Interface and Workflow

8.2 Connecting to Data Sources (Excel/CSV)

8.3 Data Cleaning with Power Query Editor and Transformation

8.4 Creating Visualizations

8.4.1 Bar, Line, Pie, Map, Card, KPI

8.5 Filters and Slicers

8.6 Basic Dashboard Creation

8.7 Publishing Reports to Power BI Service

9. MySQL ETL with Python

9.1 What is ETL?

9.2 Extracting Data from Files (CSV, Excel)

9.3 Transforming Data using Pandas

9.3.1 Cleaning, Normalizing, Renaming Columns

9.4 Loading Data into MySQL

9.4.1 Using pymysql or sqlalchemy

9.5 ETL Automation with Python

9.6 Logging and Error Handling in ETL Jobs

Project Title:

Customer Spending Behavior Analysis for AMEX

Project Description:

This project focuses on analyzing customer transaction behavior for AMEX using a synthetic dataset containing detailed demographic, transactional, and behavioral data. The dataset includes 100 customer records with attributes such as age, gender, income, credit score, card type, transaction counts, and default status.

The goal of the project is to extract actionable insights from customer patterns using data analysis techniques in Python with pandas, SQL queries, and visualizations .

Project Title:

Customer Transaction Insights and Risk Profiling for Royal Bank of Canada

Project Description:

This project involved the analysis of synthetic customer transaction data for the Royal Bank of Canada (RBC) to gain deeper insights into spending behaviors, card usage patterns, credit risk, and default trends. The dataset included 100 customer records enriched with demographic, transactional, and behavioral indicators.

The primary objective was to utilize Python (`pandas`), SQL, and `matplotlib` to explore and visualize the data for strategic business intelligence and credit risk monitoring.

Project Title:

Customer Financial Behavior and Risk Analysis for Berkshire Hathaway

Project Description:

This project involved simulating and analyzing customer financial behavior for Berkshire Hathaway's banking and credit operations. The objective was to explore patterns in spending, card usage, credit risk, and customer segmentation using data analytics tools like Python (`pandas`), SQL, and `matplotlib`. The dataset included synthetic records of 100 customers with various attributes including income, credit score, age, card type, transaction metrics, and payment history.

The project aimed to assist Berkshire Hathaway in identifying key performance drivers, minimizing risk, and improving customer engagement strategies through data-driven insights.