Course Title: Data Analytics with AI Essentials: A 7-Day Intensive Bootcamp

**Target Audience:** Pursuing Candidates (Undergraduate/Graduate students interested in data science, business analytics, and AI)

Duration: 7 Days, 1.5 hours per day (Total 10.5 hours)

**Overall Goal:** To equip students with fundamental data analytics skills using Python and introduce how AI techniques are integrated into modern data analysis workflows.

# Day-by-Day Breakdown:

# Day 1: Python for Data Analysis - Getting Started (1.5 hours)

- Introduction to Python for Data: Why Python? Setting up Anaconda/Colab. Basic syntax, data types, variables.
- Essential Libraries: Introduction to NumPy for numerical operations and Pandas for data manipulation. Importing libraries.
- Hands-on: Basic Python scripting, creating NumPy arrays, and Pandas Series/DataFrames.

# Day 2: Data Manipulation with Pandas (1.5 hours)

- Loading and Exploring Data: Reading data from CSV files. Basic DataFrame operations: viewing data, info, descriptive statistics.
- Data Selection and Filtering: Selecting columns, rows, and using conditional filtering.
- Hands-on: Loading datasets and performing basic data exploration and manipulation using Pandas.

# Day 3: Data Cleaning and Preprocessing (1.5 hours)

- Handling Missing Data: Identifying and dealing with NaN values (imputation, removal).
- **Data Transformation:** Data type conversion, renaming columns, creating new features.
- Introduction to Data Normalization/Standardization (briefly).
- Hands-on: Cleaning and preparing a real-world dataset for analysis.

# Day 4: Introduction to AI in Data Analytics (1.5 hours)

- What is AI in Data Analytics? Overview of how AI/ML techniques enhance data analysis (prediction, classification, pattern recognition).
- **Key Concepts:** Brief introduction to Supervised Learning (Regression, Classification) and Unsupervised Learning (Clustering).
- Introduction to the Scikit-learn Library: Briefly introduce its role in providing ML algorithms in Python.

# Day 5: AI for Predictive Analytics - Regression (1.5 hours)

- Introduction to Linear Regression: Basic concepts and applications in prediction.
- Using Scikit-learn for Linear Regression: Training and evaluating a simple linear regression model.
- Feature Selection (briefly): Understanding the importance of relevant features.
- Hands-on: Building and evaluating a simple linear regression model using a sample dataset.

## Day 6: AI for Classification and Pattern Recognition (1.5 hours)

- Introduction to Classification: Basic concepts and applications (e.g., spam detection).
- Introduction to Clustering (K-Means): Basic concepts and applications (e.g., customer segmentation).
- Using Scikit-learn for Classification (Logistic Regression briefly) and Clustering (K-Means briefly).
- Hands-on: Implementing a simple classification or clustering task using Scikit-learn on a sample dataset.

## Day 7: Visualizing Data and Future of AI in Analytics (1.5 hours)

- Data Visualization with Matplotlib and Seaborn: Creating basic charts and plots to understand data and model results.
- Interpreting AI Model Outputs: Basic understanding of how to interpret the results of regression and classification models.
- Ethical Considerations in AI-driven Analytics: Bias in data and models, responsible use of AI.
- **Future Trends:** Briefly discuss the evolving role of AI in data analytics, AutoML, and more advanced techniques.
- **Resources for Further Learning:** Recommended books, websites, courses, and communities.
- Q&A and Wrap-up: Addressing student questions and summarizing key takeaways.