Syllabus: Certificate in Artificial Intelligence with Python

- **Duration:** 6 Months
- **Eligibility:** 12th Pass (Science/Maths background recommended)

Evaluation Scheme

- **Full Marks:** 200
- **Theory:** 100 Marks
- **Practical/Project Works:** 80 Marks
- **Internal Assessment/Viva (Oral Test):** 20 Marks

Course Syllabus

This course provides a strong foundation in Artificial Intelligence and Machine Learning using the Python programming language, focusing on practical implementation and real-world applications.

Module 1: Python for Data Science

- Python Basics: Data Types, Control Flow, Functions, and Modules.
- **NumPy:** Working with arrays and numerical operations.
- **Pandas:** Data manipulation, cleaning, and analysis using DataFrames.
- **Matplotlib & Seaborn:** Data visualization techniques.

Module 2: Foundations of AI & Machine Learning

- Introduction to Artificial Intelligence, Machine Learning, and Deep Learning.
- Types of Machine Learning: Supervised, Unsupervised, and Reinforcement Learning.
- The Machine Learning Workflow: From data collection to model deployment.
- Introduction to Scikit-Learn library.

Module 3: Supervised Learning Algorithms

- **Regression:** Linear Regression for predicting continuous values.
- **Classification:** Logistic Regression, Decision Trees, and Support Vector Machines (SVM) for predicting categories.
- Model Evaluation Metrics: Accuracy, Precision, Recall, F1-Score.

Module 4: Unsupervised Learning Algorithms

- **Clustering:** Grouping similar data points using the K-Means algorithm.

- **Dimensionality Reduction:** Simplifying data using Principal Component Analysis (PCA).

Module 5: Introduction to Deep Learning

- Understanding Artificial Neural Networks (ANN).
- Introduction to TensorFlow and Keras frameworks.
- Building a simple neural network for image classification.
- Introduction to Convolutional Neural Networks (CNN) for image processing.

Module 6: Capstone Project

- Students will work on a real-world dataset to build, train, and evaluate a machine learning model.
- **Example Project:** Predicting customer churn for a telecom company, classifying handwritten digits from the MNIST dataset, or forecasting stock prices using regression models.