# ARTIFICIAL INTELLIGENCE

| TEACHER: CERTIFIED TRAINER | DURATION: 16 CLASSES (x5 LEVELS) (1 HOUR PER CLASS) | MODE: ONLINE AND OFFLINE |
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Artificial Intelligence (AI) is a computer program which is capable of performing a task which requires intelligence. This task is usually something which a human or an intelligent animal can accomplish, such as learning, planning, problem-solving, etc. It is the endeavour to replicate or simulate human intelligence in machines.AI can provide just-in-time assessment by leveraging learning analytics and data to find changes in confidence and motivation levels in individual students.

## COURSE CURRICULUM

**Level 1: Introduction to Artificial Intelligence**

This level introduces the foundational concepts of AI, including its history, evolution, and applications.

- Introduction to AI:
  - Understanding the basics of Artificial Intelligence.
  - History and evolution of AI.
  - Applications and domains of AI.
- Basics of Machine Learning:
  - Differences between AI and Machine Learning.
  - Introduction to supervised, unsupervised, and reinforcement learning.
  - Overview of data and feature engineering.
- Neural Networks Fundamentals:
  - Basics of neural networks and their structure.
  - Working principles of perceptrons and activation functions.
  - Introduction to forward and backpropagation.
- Project - Building a Basic Chatbot:
  - Implementing a simple chatbot using Python with rule-based responses.

**Level 2: Intermediate Machine Learning**

This level covers key algorithms in machine learning, including regression, classification, clustering, and model validation.

- Regression and Classification:
  - Understanding linear and logistic regression.
  - Introduction to decision trees and K-nearest neighbors (KNN).
- Clustering and Dimensionality Reduction:
  - K-means and hierarchical clustering algorithms.
  - Basics of Principal Component Analysis (PCA).
- Model Evaluation and Validation:
  - Key metrics: accuracy, precision, recall, and F1-score.
  - Cross-validation and hyperparameter tuning.
- Project – Predictive Analysis:
  - Implement a supervised learning project using real datasets.

**Level 3: Advanced Machine Learning**

This level focuses on advanced deep learning models, CNNs, and RNNs.

- Advanced Models - Neural Networks:
  - Introduction to deep neural networks and architectures.
  - Core concepts of deep learning.
- Convolutional Neural Networks (CNNs):

    - Fundamentals of CNNs for image recognition.
    - Implementing CNNs using TensorFlow or Keras.
- Recurrent Neural Networks (RNNs):
    - Basics of RNNs for sequential data analysis.
    - Application of RNNs in natural language processing.
- Project - Image Recognition:
    - Implement an image recognition project using CNNs on a real dataset.

**Level 4: Natural Language Processing (NLP)**

This level explores NLP techniques, text processing, classification, and text generation.

- Introduction to NLP:
    - Basics of NLP and its applications.
    - Overview of text preprocessing techniques.
- Text Classification and Sentiment Analysis:
    - Building text classification models for sentiment analysis.
    - Introduction to word embeddings and word2vec.
- Named Entity Recognition (NER) and Text Generation:
    - Implementing NER to extract entities from text.
    - Basics of text generation using RNNs.
- Project - Text Generation and Analysis:
    - Create a text generation or analysis project using NLP techniques.

**Level 5: Advanced Topics in AI**

The final level delves into advanced AI topics such as reinforcement learning, GANs, and ethics in AI.

- Reinforcement Learning Basics:
    - Introduction to reinforcement learning and its applications.
    - Understanding Markov Decision Processes (MDPs) and Q-learning.
- Generative Adversarial Networks (GANs):
    - Basics of GANs and their use in generating synthetic data.
    - Principles of GANs and how they function.
- AI Ethics and Bias:
    - Importance of ethics in AI.
    - Discussion on fairness, transparency, and bias in AI systems.
- Project - Advanced AI Application:
    - Develop an AI project using techniques such as reinforcement learning or GANs.