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AI & Artificial Intelligence

AI training syllabus designed to guide learners from beginner to **advanced levels**, suitable for academic students, **professionals**, or self-learners. The syllabus includes theory, **practical implementation**, and projects using **Python**, machine learning frameworks, and **real-world applications**.

Module 1: Introduction to Artificial Intelligence

- What is AI? History and Evolution
- Applications of AI (Healthcare, Finance, Education, Robotics, etc.)
- Types of AI: Narrow AI, General AI, Super AI
- Subfields of AI: ML, NLP, Computer Vision, Expert Systems, Robotics
- AI vs. ML vs. Deep Learning

◆ Module 2: Python Programming for AI

- Python Basics: Variables, Loops, Conditions, Functions
- Numpy and Pandas for Data Manipulation
- Data Visualization: Matplotlib and Seaborn

"Discipline Gives Everything"

Head Office



#131-5J, 1st Floor, Bharath Building, Swamy
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Corporate Office

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- File Handling and Web Scraping (Basics)
- Hands-on: Data preprocessing with real datasets

◆ **Module 3: Mathematics for AI**

- **Linear Algebra:** Vectors, Matrices, Eigenvalues
- **Probability and Statistics:** Bayes Theorem, Distributions, Variance
- **Calculus:** Derivatives, Gradient Descent
- **Optimization:** Cost Functions, Regularization

◆ **Module 4: Machine Learning (ML)**

A. Supervised Learning

- Regression (Linear, Polynomial, Logistic)
- Classification (KNN, Decision Trees, Random Forest, SVM)
- Model Evaluation (Confusion Matrix, Precision, Recall, F1, AUC-ROC)

B. Unsupervised Learning

- Clustering (K-Means, Hierarchical, DBSCAN)
- Dimensionality Reduction (PCA, t-SNE)

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C. Model Deployment (Basic)

- Saving Models (Pickle, Joblib)
- Streamlit for ML Web Apps

◆ Module 5: Deep Learning

- What is Neural Network? Biological vs. Artificial Neurons
- Activation Functions: ReLU, Sigmoid, Tanh
- Loss Functions & Backpropagation
- Feedforward Neural Network (ANN)
- Deep Neural Networks (DNN)
- TensorFlow and Keras Basics

◆ Module 6: Convolutional Neural Networks (CNN)

- Image Processing Basics
- Filters, Kernels, Padding, Stride
- Pooling Layers
- CNN Architecture (LeNet, AlexNet, VGG, ResNet)

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- Applications: Image Classification, Object Detection
- Tools: TensorFlow/Keras, OpenCV

◆ **Module 7: Natural Language Processing (NLP)**

- Text Preprocessing: Tokenization, Stopwords, Lemmatization
- Bag of Words, TF-IDF
- Word Embeddings: Word2Vec, GloVe
- Sentiment Analysis, Text Classification
- Transformers & BERT (Introductory)
- Tools: NLTK, spaCy, HuggingFace Transformers

◆ **Module 8: Reinforcement Learning (Basic)**

- Markov Decision Process (MDP)
- Q-Learning, Deep Q Networks (DQN)
- Policy vs Value-based methods
- Applications: Game AI, Robotics

◆ **Module 9: Generative AI & Advanced Topics**

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- GANs (Generative Adversarial Networks)
- Autoencoders
- ChatGPT & LLMs (Large Language Models)
- Prompt Engineering Basics
- Ethics in AI: Bias, Fairness, Explainability

◆ **Module 10: Capstone Projects**

1. **Face Mask Detection using CNN**
2. **Movie Review Sentiment Analysis using NLP**
3. **Diabetes Prediction Web App**
4. **Chatbot using NLP (rule-based or ML-based)**
5. **AI Music Recommender using Clustering**
6. **AI Object Detection for Road Safety**

◆ **Tools & Platforms Covered**

- Python (Jupyter Notebook, Colab, PyCharm)

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- TensorFlow, Keras, Scikit-learn
- NLTK, spaCy, HuggingFace
- OpenCV
- Streamlit / Flask for Deployment
- Git & GitHub



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