

# Advanced Artificial Intelligence

## Details


- 4 Sessions
- 8 Modules
- 15 Hours

## CONTACT US

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## PROGRAM OVERVIEW

Advanced Artificial Intelligence program is designed to help learners decode the mystery of AI and its business applications. The course provides an overview of AI concepts and workflows, machine learning and deep learning, and performance metrics. The applicants learn the difference between supervised, unsupervised, and reinforcement learning; be exposed to use cases; and see how clustering and classification algorithms help identify AI business applications.

This program will establish your proficiency in handling basic programming concepts. By the end of this program, you will understand object-oriented programming; basic programming concepts such as data types, variables, strings, loops, and functions; and software engineering concepts such as multithreading and multitasking using Python.

## KEY BENEFITS

The Program is aimed at providing:

- ✓ Fundamental knowledge of programming basics
- ✓ Introduce AI based software (SPSS, etc.)
- ✓ Introduce AI programming languages (Python, R, C++, etc.)
- ✓ An understanding of object-oriented programming principles including data types, variables, strings, loops, and functions
- ✓ Comprehend software engineering concepts, such as multithreading and multitasking
- ✓ How to master Machine Learning?
- ✓ How to make robust Machine Learning models?
- ✓ How to make accurate predictions?
- ✓ How to create strong added value to your business?
- ✓ How to handle specific topics like Reinforcement Learning, NLP and Deep Learning?
- ✓ How to handle advanced optimization algorithms (Ant Colony, Genetic Algorithm, etc.)

## WHO SHOULD ATTEND THIS PROGRAM?

This course is designed for:

- ✓ Students who want to start a career in Data Science.
- ✓ Data analysts/scientists who want to level up in Machine Learning. Organization Development
- ✓ Engineers who want to create added value to their business by using powerful Machine Learning tools.

## Prerequisites

Basics of Python Programming Language





## Agenda

### SESSION 1:

#### **Module 1: Introduction**

- Applications of Machine Learning
- Supervised vs Unsupervised Learning
- Python libraries suitable for Machine Learning
- Importing the Libraries
- Importing the Dataset
- Taking care of Missing Data
- Encoding Categorical Data
- Splitting the dataset into the Training set and Test set
- Feature Scaling

#### **Module 2: Regression**

- Linear Regression
- Non-linear Regression
- Polynomial Regression
- Support Vector Regression
- Decision Tree Regression
- Random Forest Regression
- Model evaluation methods
- Regression Model Selection

### SESSION 2:

#### **Module 3: Classification**

- K-Nearest Neighbour
- Naive Bayes
- Decision Trees
- Random Forest Classification

- Logistic Regression
- Support Vector Machines
- Model evaluation methods
- Classification Model Selection

#### **Module 4: Unsupervised Learning**

- K-Means Clustering
- Hierarchical Clustering
- Density-Based Clustering
- Association Rule Learning

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**SESSION 3:**

**Module 5: Reinforcement Learning**

- Upper Confidence Bound
- Thompson Sampling
- Sequential Decision Making with Evaluative Feedback
- Learning Action Values
- Estimating Action Values Incrementally
- What is the trade-off?
- Optimistic Initial Values
- Upper-Confidence Bound (UCB) Action Selection
- Dynamic Programming

**Module 6: Natural Language Processing**

- NLP Intuition
- Types of Natural Language Processing
- Classical vs Deep Learning Models
- Vocabulary & Feature Extraction
- Negative and Positive Frequencies
- Feature Extraction with Frequencies
- Preprocessing
- Natural Language Processing in Python

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**SESSION 4:**

**Module 7: Deep Learning**

**ANN**

- Plan of attack
- The Neuron
- The Activation Function
- How do Neural Networks work?

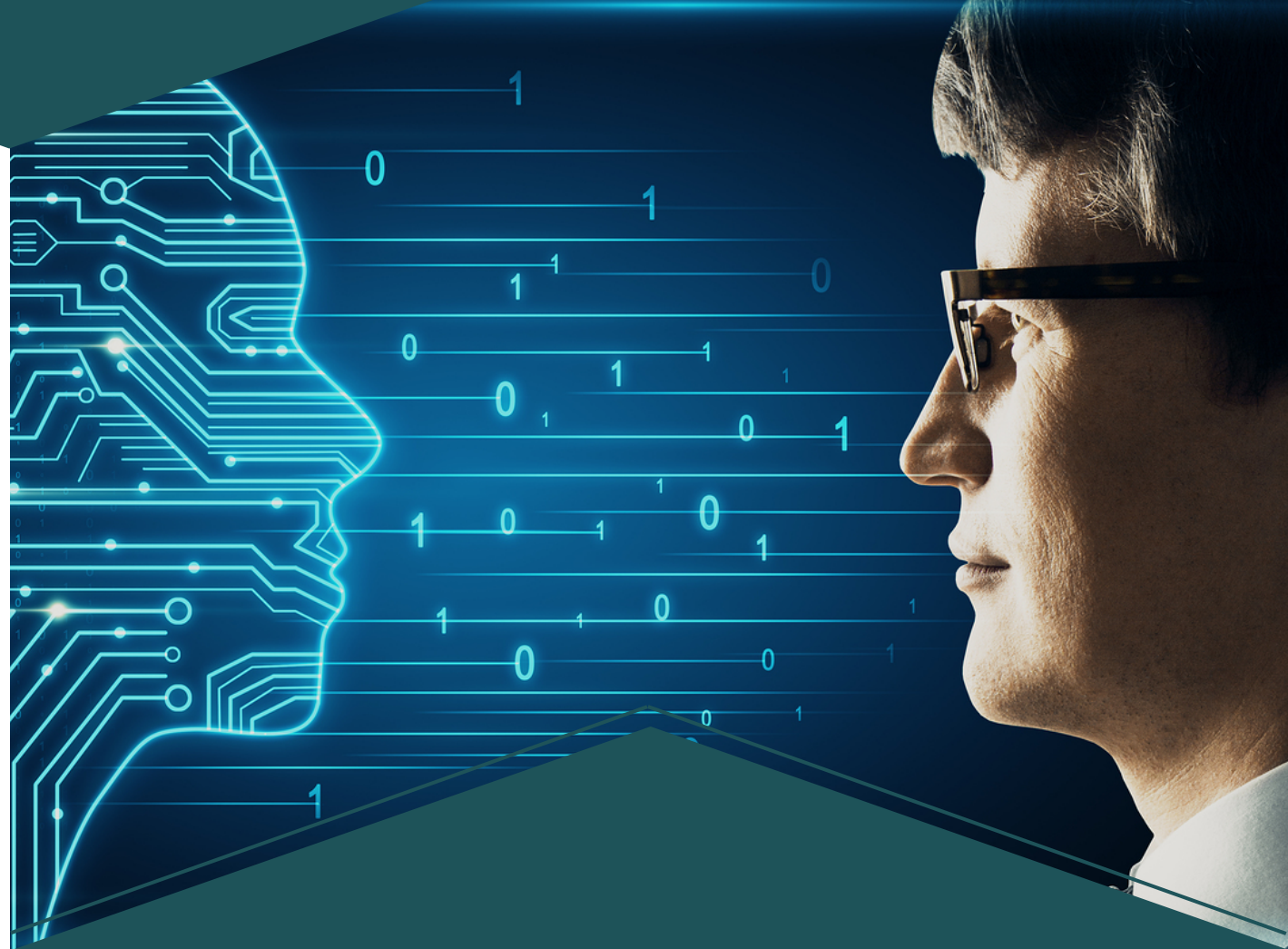
- How do Neural Networks learn?
- Gradient Descent
- Stochastic Gradient Descent
- Backpropagation
- Business Problem Description
- ANN in Python

**What are convolutional neural networks?**

- Step 1 - Convolution Operation
- Step 2 - Pooling
- Step 3 - Flattening
- Step 4 - Full Connection
- SoftMax & Cross-Entropy
- Make sure you have your dataset ready
- CNN in Python

## Module 8: Model Selection

- k-Fold Cross Validation in Python
- Grid Search in Python
- Deciding What to Try Next
- Evaluating a Hypothesis
- Model Selection and Train/Validation/Test Sets
- Diagnosing Bias vs. Variance
- Regularization and Bias/Variance
- Learning Curves
- Deciding What to Do Next Revisited







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