

**Course Length: 3 day**

## Overview

Machine learning and neural networks are pillars on which you can build intelligent applications. Artificial Intelligence and Machine Learning Fundamentals begins by introducing you to Python and discussing AI search algorithms. You will cover in-depth mathematical topics, such as regression and classification, illustrated by Python examples.

As you make your way through the course, you will progress to advanced AI techniques and concepts, and work on real-life datasets to form decision trees and clusters. You will be introduced to neural networks, a powerful tool based on Moore's law.

By the end of this course, you will be confident when it comes to building your own AI applications with your newly acquired skills!

## After completing this course, you will be able to:

- Understand the importance, principles, and fields of AI
- Implement basic Artificial Intelligence concepts with Python
- Apply regression and classification concepts to real-world problems
- Perform predictive analysis using decision trees and random forests
- Carry out clustering using the k-means and mean shift algorithms
- Understand the fundamentals of deep learning via practical examples

## Scope

This course takes a hands-on approach to implement different AI techniques and algorithms using Python. This course does not delve into the basics of Python. It is recommended to have knowledge of basic Python programming and high-school mathematics.

## Target Audience

This course is for you if you Artificial Intelligence and Machine Learning Fundamentals is for software developers and data scientists who want to enrich their projects with machine learning. You do not need any prior experience in AI. However, it's recommended that you have knowledge of high school-level mathematics and at least one programming language (preferably Python).

## Course Outline

### Lesson 1: Principles of Artificial Intelligence

- Fields and Applications of Artificial Intelligence
- AI Tools and Learning Models
- The Role of Python in Artificial Intelligence
- Python for Game AI

### Lesson 2: AI with Search Techniques and Games

- Heuristics
- Pathfinding with the A\* Algorithm
- Game AI with the Minmax Algorithm and Alpha-Beta Pruning

### Lesson 3: Regression

- Linear Regression with One Variable
- Linear Regression with Multiple Variables
- Polynomial and Support Vector Regression

### Lesson 4: Classification

- The Fundamentals of Classification
- Classification with Support Vector Machines

### Lesson 5: Using Trees for Predictive Analysis

- Introduction to Decision Trees
- Random Forest Classifier

### Lesson 6: Clustering

- Introduction to Clustering
- The k-means Algorithm
- Mean Shift Algorithm

### Lesson 7: Deep Learning with Neural Networks

- TensorFlow for Python
- Introduction to Neural Networks
- Deep Learning