AI Course Curriculum

Introduction to Artificial Intelligence

Introduction to Artificial Intelligence course is designed to help learners decode the mystery of Artificial Intelligence and understand its business applications. The course provides an overview of Artificial Intelligence concepts and workflows, Machine Learning, Deep Learning, and performance metrics. You'll learn the difference between supervised, unsupervised learning—be exposed to use cases, and see how clustering and classification algorithms help identify Artificial Intelligence business applications.

Key Learning Objectives

- Meaning, purpose, scope, stages, applications, and effects of Artificial Intelligence
- Fundamental concepts of Machine Learning and Deep Learning
- Difference between supervised, semi-supervised and unsupervised learning
- Machine Learning workflow and how to implement the steps effectively
- The role of performance metrics and how to identify their essential methods

Course curriculum

Lesson 1 - Decoding Artificial Intelligence
Lesson 2 - Fundamentals of Machine Learning and Deep Learning
Lesson 3 - Machine Learning Workflow
Lesson 4 - Performance Metrics

Data Science with Python

This Data Science with Python course will establish your mastery of Data Science and analytics techniques using Python. With this Python for Data Science Course, you'll learn the essential concepts of Python programming and gain in-depth knowledge in data analytics, Machine Learning, data visualization, web scraping, and natural language processing. Python is a required skill for many Data Science positions, so jump start your career with this interactive, hands-on course.

Key Learning Objectives

- Gain an in-depth understanding of Data Science processes, data wrangling, data exploration, data visualization, hypothesis building, and testing. You will also learn the basics of statistics
- Install the required Python environment and other auxiliary tools and libraries
- Understand the essential concepts of Python programming such as data types, tuples, lists, dicts, basic operators and functions
- Perform high-level mathematical computing using the NumPy package and its vast library of mathematical functions
- Perform scientific and technical computing using the SciPy package and its sub-packages such as Integrate, Optimize, Statistics, IO, and Weave
- Perform data analysis and manipulation using data structures and tools provided in the Pandas package
- Gain expertise in Machine Learning using the Scikit-Learn package
- Gain an in-depth understanding of supervised learning and unsupervised learning models such as linear regression, logistic regression, clustering, dimensionality reduction, K-NN and pipeline
- Use the Scikit-Learn package for natural language processing Use the matplotlib library of Python for data visualization
- Extract useful data from websites by performing web scraping using Python
- Integrate Python with Hadoop, Spark, and MapReduce

Course curriculum

Lesson 1: Data Science Overview
Lesson 2: Data Analytics Overview
Lesson 3: Statistical Analysis and Business Applications
Lesson 4: Python Environment Setup and Essentials
Lesson 5: Mathematical Computing with Python (NumPy)
Lesson 6 - Scientific computing with Python (Scipy)
Lesson 7 - Data Manipulation with Pandas
Lesson 8 - Machine Learning with Scikit–Learn
Lesson 9 - Natural Language Processing with Scikit Learn
Lesson 10 - Data Visualization in Python using matplotlib

Lesson 11 - Web Scraping with BeautifulSoup
Lesson 12 - Python integration with Hadoop MapReduce and Spark

Machine Learning

Simplilearn's Machine Learning course will make you an expert in Machine Learning, a form of Artificial Intelligence that automates data analysis to enable computers to learn and adapt through experience to do specific tasks without explicit programming. You will master Machine Learning concepts and techniques, including supervised and unsupervised learning, mathematical and heuristic aspects, and hands-on modeling to develop algorithms and prepare you for your role with advanced Machine Learning knowledge.

Key Learning Objectives

- Master the concepts of supervised and unsupervised learning, recommendation engine, and time series modeling
- Gain practical mastery over principles, algorithms, and applications of Machine Learning through a hands-on approach that includes working on four major end-to-end projects and 25+ hands-on exercises
- Acquire thorough knowledge of the statistical and heuristic aspects of Machine Learning
- Implement models such as support vector machines, kernel SVM, naive Bayes, decision tree classifier, random forest classifier, logistic regression, K-means clustering and more in Python
- Validate Machine Learning models and decode various accuracy metrics. Improve the final models using another set of optimization algorithms, which include Boosting & Bagging techniques
- Comprehend the theoretical concepts and how they relate to the practical aspects of Machine Learning

Course curriculum
Lesson 1: Introduction to Artificial Intelligence and Machine Learning
Lesson 2: Data Preprocessing
Lesson 3: Supervised Learning
Lesson 4: Feature Engineering
Lesson 5: Supervised Learning-Classification Lesson 6: Unsupervised learning
Lesson 7: Time Series Modelling
Lesson 8: Ensemble Learning
Lesson 9: Recommender Systems
Lesson 10: Text Mining

Deep learning with Keras and TensorFlow

This Deep Learning with TensorFlow course by IBM will refine your machine learning knowledge and make you an expert in deep learning using TensorFlow. Master the concepts of deep learning and TensorFlow to build artificial neural networks and traverse layers of data abstraction. This course will help you learn to unlock the power of data and prepare you for new horizons in AI.

Key Learning Objectives

- Understand the difference between linear and non-linear regression Comprehend convolutional neural networks and their applications
- Gain familiarity with recurrent neural networks (RNN) and autoencoders
- Learn how to filter with a restricted Boltzmann machine (RBM)

Course curriculum

Lesson 1 - Introduction to TensorFlow
Lesson 2 – Convolutional Neural Networks (CNN)
Lesson 3 – Recurrent Neural Networks (RNN)
Lesson 4 - Unsupervised Learning
Lesson 5 - Autoencoders

Artificial Intelligence Capstone Project

Simplilearn's Artificial Intelligence Capstone project will allow you to implement the skills you learned in the masters of Artificial Intelligence. With dedicated mentoring sessions, you'll know how to solve a real industry-aligned problem. You'll learn various Artificial Intelligence-based supervised and unsupervised techniques like Regression, SVM, Tree-based algorithms, NLP, etc. The project is the final step in the learning path and will help you to showcase your expertise to employers.

Key Learning Objectives

- Simplilearn's online Artificial Intelligence Capstone course will bring you through the Artificial Intelligence decision cycle, including Exploratory Data Analysis, building and fine-tuning a model with cutting edge Artificial Intelligence-based algorithms and representing results. The project milestones are as follows:
- Exploratory Data Analysis - In this step, you will apply various data processing techniques to determine the features and correlation between them, transformations required to make the data sense, new features, construction, etc.
- Model Building and fitting - This will be performed using Machine Learning algorithms like regression, multinomial Naïve Bayes, SVM, tree-based algorithms, etc.
- Unsupervised learning - Clustering to group similar kind of transactions/reviews using NLP and related techniques to devise meaningful conclusions.

Electives
Python for Data Science

Kickstart your learning of Python for Data Science with this introductory course, carefully crafted by IBM. Upon completion of this course, you will be able to write Python scripts and perform fundamental, hands-on data analysis using the Jupyter-based lab environment..

Key Learning Objectives

- Simplilearn's online Python for Data Science course will bring you
- Write your first Python program by implementing concepts of variables, strings, functions, loops, and conditions
- Understand the nuances of lists, sets, dictionaries, conditions, branching, objects, and classes
- Work with data in Python, such as loading, working, and saving data with Pandas, and reading and writing files

Topics Covered:

- Python Basics
- Python Data Structures
- Python Programming Fundamentals
- Working with Data in Python
- Working with NumPy Arrays

Advanced Deep Learning and Computer Vision

Take the next big step toward advancing your Deep Learning skills with this high-level course. This Advanced Deep Learning and Computer Vision course includes Computer Vision Basics with Python; Advanced Computer Vision with OpenCV 4, Keras, and TensorFlow 2; Computer Vision for OCR and Object Detection; and PyTorch for Deep Learning and Computer Vision to ensure you are prepared for your Deep Learning and computer vision journey.

Key Learning Objectives

- Understand 2D Scaling Transformations, 2D Geometric Transformations, Binary Morphology, Image Filtering, and Shape Detection through Transform
- Implement Object Detection, YOLO, Object Tracking, Motion, 3D Reconstruction, and Smart CCTV Project
- Computer vision with OpenCV, Image Manipulation in OpenCV Operations, Image Segmentation, and ML and DL on computer vision
- Introduction to OCR, Tesseract Image OCR Implementation

- DNN - PyTorch, Linear Regression; PyTorch, Image Recognition; PyTorch,
- CNN; PyTorch, CIFAR 10 Classification; PyTorch, Transfer Learning - Pytorch

- Computer Vision Basics with Python
- Advanced Computer Vision with OpenCV 4, Keras, and TensorFlow 2
- Computer Vision for OCR and Object Detection
- PyTorch for Deep Learning and Computer Vision

Natural Language Processing and Speech Recognition

This Natural Language Processing and Speech Recognition course will give you a detailed look at the science of applying Machine Learning algorithms to process large amounts of natural language data. This module focuses on natural language understanding, feature engineering, natural language generation, automated speech recognition, speech-to-text conversion, text-to-speech conversion, and voice assistance devices.

Key Learning Objectives

- Understand the concepts, tools, and techniques of NLP
- Learn about natural language understanding and natural language generation
- Perform text mining
- Extract intent and entities
- Understand the vector space model
- Apply vector, matrix, and algebra on data
- Learn about feature engineering
- Understand the syntactic and semantic structure of a sentence Hands-on experience with Python libraries
- How to apply Machine Learning and Deep Learning with NLP Understand speech and its types
- Perform text-to-speech conversion with automated speech recognition Work on voice assistance devices and build Alexa skills

Topics Covered:
- Introduction to Natural Language Processing Feature Engineering on Text Data
- Natural Language Understanding Techniques Natural Language Generation
- Natural Language Processing Libraries
- Natural Language Processing with Machine Learning and Deep Learning
- Introduction of Speech Recognition
- Signal Processing and Speech Recognition Models Speech-to-Text
- Text-to-Speech
- Voice Assistant Devices

Industry Master Class – Artificial Intelligence

Attend this online interactive industry masterclass to gain insights about advancements in Data Science, AI, and Machine Learning techniques.