

# Curriculum: 16-Week Live Machine Learning Course



Week 1	Introduction
Week 2 - 5	Fundamentals of machine learning
Week 5 - 7	Data preprocessing and analysis
Week 7 - 9	Model building and improvement
Week 9 - 13	Supervised learning algorithms and projects
Week 13 - 15	Unsupervised learning algorithms and projects
Week 16	ML model deployment with shareable interface

## Course projects

- Life expectancy prediction
- Optical character recognition
- Cancer classification
- Recommendation system
- Email spam detection
- Uber surge price calculation
- Sentiment analysis
- PUBG cheater detection
- Personality prediction
- Image compression using PCA

Week 1: Introduction	
1	<b>Guidance:</b> Step-wise guidance to start machine learning, Python virtual environment setup for coding.
2	<b>Introduction to machine learning:</b> Traditional programming vs Machine learning, Artificial intelligence vs Machine learning.
Assignments to brush up Python programming.	

## Week 2 - 5: Fundamentals of machine learning



1	<b>Learning:</b> How exactly “machines” learn?
2	<b>Algorithm:</b> Role of optimization algorithm in machine learning, Understanding Gradient Descent.
3	<b>Types of Models:</b> Classification of ML models on five different basis, Supervised vs. Unsupervised, Classification vs. Regression.
4	<b>Loss Function:</b> Popular loss and cost functions in classification and regression problems.
5	<b>Libraries:</b> Discussion on popular Python libraries: Numpy, Pandas, Matplotlib, Seaborn.
ML interview question discussions, Assignment on Python libraries	

## Week 5 - 7: Handling Structured and Unstructured Data

1

**Data:** Understanding numerical and categorical forms of data.

2

**Data Pre-processing:** Methods to pre-process data and make it suitable for ML models.

3

**Exploratory Data Analysis:** Univariate, Bivariate and Multivariate Analysis.

4

**Text Data:** Pre-processing and Vector encoding methods

ML interview questions discussions

Assignment on data pre-processing and analysis

## Week 7 - 9: Developing Model and Improving Performance



1	<b>Normalization:</b> Mathematical understanding on how scaling/normalizing features help.
2	<b>Understanding ML Problems:</b> Underfitting and Overfitting problems and their possible cures, Bias vs. Variance Tradeoff.
3	<b>Coding ML model from Scratch:</b> How to develop a machine learning model without the help of libraries?
4	<b>Scikit-Learn:</b> Discussion on supports provided by Scikit-Learn.
5	<b>Project Development Guidance:</b> A general guidance on steps included in ML model development.

ML interview questions discussions

Assignment on model development and Scikit-Learn

## Week 9 - 13: Supervised Learning Algorithms



1	<b>Linear and Logistic Regression:</b> Mathematical understanding on how these algorithms learn.
2	<b>SVMs:</b> Support vector machines, Hyperplanes, Maximal margin classifiers and understanding kernels.
3	<b>KNN (K-Nearest Neighbor) and Naive Bayes:</b> Simple and most explainable algorithms in ML
4	<b>Tree Based Algorithms:</b> Decision Trees, Bagging and Boosting Trees, and Random forest algorithms.
5	<b>Machine Learning Applications:</b> ML projects discussion on every algorithm.

ML interview questions discussions and ML project assignments

## Week 13 - 15: Unsupervised Learning Algorithms

1

**Clustering:** k-means and k-means++ algorithms

2

**Dimensionality-Reduction:** Principal component analysis (PCA) algorithm.

3

**Projects:** Personality prediction, Image compression mechanism.

ML interview questions discussions and ML project assignments

## Week 16: ML Model Deployment

1

**User Interface in Python:** Introduction to Gradio, Developing shareable and simple user-interface.

2

**Developing a Web-Application:** Create an image compression web-application using PCA algorithm and share it with users.

ML interview questions discussions and ML project assignments





If you wish to learn the topics through self-study, you can refer to these books and materials:

- EnjoyAlgorithms self-paced course.
- An introduction to statistical learning with applications in Python.
- Machine intelligence: Demystifying machine learning, Neural networks and Deep learning.
- Research papers on Algorithms like k-means, PCA, SVM and decision trees.
- Math for computer science (MIT Opencourseware)

If you have any query related to curriculum, reach us via [contact@enjoyalgorithms.com](mailto:contact@enjoyalgorithms.com).

Thank you!