

DATA SCIENCE

# Machine Learning For All With Python



Instructor

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(ডেটা সাইন্স)  
কীভাবে ধাপে ধাপে  
PYTHON, মেশিন লার্নিং  
শিখবেন ??



## Benefits

Have a look ->

Teach Basic Python & Strongly Focus on Mathematics and Statistics Behind Machine Learning Algorithms.

Work With Real Data & Implement With Python.

Daily Assignment for Students & Live Projects.

Facebook Group to Discuss Any Topic Related to The Course or DATA SCIENCE.

After Completing the Course, We Will Provide You the Certificate.

Life-time Support For All Students.

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## Module 01: Introduction & Basic Python

Class 01	<p><b>Important Discussion on:</b></p> <ul style="list-style-type: none"><li>• What is Data Science?</li><li>• What is Machine Learning?</li><li>• Data Science Venn Diagram.</li><li>• Differences between Data Science, Machine Learning and Deep Learning.</li><li>• Why Python for Data Science.</li><li>• Python vs R.</li><li>• Future of Data Science.</li><li>• Why Machine Learning so popular?</li><li>• Types of Learning in ML.</li><li>• Supervised Learning.</li><li>• Unsupervised Learning.</li><li>• Supervised vs Unsupervised.</li><li>• All about ML Algorithms.</li><li>• Data Science Job Market.</li></ul>
Class 02	<p><b>Software Installation:</b></p> <ul style="list-style-type: none"><li>• Python</li><li>• Jupyter Notebook</li></ul> <p><b>Basic Python:</b></p> <ul style="list-style-type: none"><li>• Input / Output Functions</li></ul>

	<ul style="list-style-type: none"> <li>• Variables</li> </ul> <p>Variables Data Structures: -</p> <ul style="list-style-type: none"> <li>• Python Data Structures</li> <li>• Lists</li> <li>• Tuples</li> <li>• Functions</li> </ul>
Class 03	<p>Data Structures: -</p> <ul style="list-style-type: none"> <li>• Python Arrays</li> <li>• Sets</li> <li>• Dictionaries</li> <li>• Data Frame Loop &amp; Condition: <ul style="list-style-type: none"> <li>• Loops (for, while)</li> <li>• Python Conditions (if,elif,else)</li> </ul> </li> </ul> <p>Discussion on Important Libraries: -</p> <ul style="list-style-type: none"> <li>• NumPy</li> <li>• Pandas</li> <li>• Vaex</li> <li>• Matplotlib</li> <li>• Seaborn</li> <li>• Scikit Learn</li> <li>• Keras</li> <li>• TensorFlow</li> <li>• Pytorch</li> </ul>

## Module 02: Regression & Feature Engineering (Part 01)

Class 04

### All About Single Variable Linear Regression:

- What is Linear Regression?
- Uses of Linear Regression in Real Life.
- Straight Line
- Curve Line
- Slope
- Intercept
- Math: In Depth Intuition of Linear Regression
- Cost Function
- Loss Function
- Mean Absolute Error (MAE)
- Mean Squared Error (MSE)
- Minimizing the Cost: Gradient Descent Algorithm
- Create Data Set in CSV Format
- Analysis Data with Matplotlib
- Implement Single Variable Linear Regression with Python and Real Dataset
- Future Value Prediction
- Assignment (Real Data Set)

### Feature Engineering:

- Different Types of Variables
- Work with Categorical Variables

Class 05	<ul style="list-style-type: none"> <li>▪ Measure of Central Tendency-</li> <li>▪ Mean</li> <li>▪ Median</li> <li>▪ Mode</li> <li>▪ Theory of One Hot Encoding</li> <li>▪ One Hot Encoding with Python</li> <li>▪ Theory of Label Encoding</li> <li>▪ Label Encoding with Python</li> <li>▪ Theory of Ordinal Encoding</li> <li>▪ Ordinal Encoding with Python</li> <li>▪ Mean or Target Encoding</li> <li>▪ Mean or Target Encoding with Python</li> <li>▪ Assignment (Real Data Set)</li> </ul>
Class 06	<p><b>Feature Engineering:</b></p> <ul style="list-style-type: none"> <li>• What is Feature Scaling?</li> <li>• Techniques of Feature Scaling in Machine Learning</li> <li>• Theory of Normalization</li> <li>• Normalization with Python</li> <li>• Standardization</li> <li>• Standardization with Python</li> <li>• Theory of Robust Scaler</li> <li>• Robust Scaler with Python</li> <li>• Theory of Logarithmic Transformation</li> </ul>

	<ul style="list-style-type: none"> <li>• Logarithmic Transformation with Python</li> <li>• Theory of Reciprocal Transformation</li> <li>• Reciprocal Transformation with Python</li> <li>• Assignment (Real Data Set)</li> </ul>
Class 07	<p><b>All About Multiple Variable Linear Regression:</b></p> <ul style="list-style-type: none"> <li>• All about Gradient Decent in ML</li> <li>• Linear Regression with Gradient Decent</li> <li>• Math Behind Multiple Variable Linear Regression</li> <li>• Handle Missing Values with Python (Mean &amp; Median)</li> <li>• Implement Multiple Variable Linear Regression with Python and Real Dataset</li> <li>• R Squared Value</li> <li>• Implement R Square with Python</li> <li>• Simple ML Project: Future Profit Prediction Based on Previous Data</li> <li>• Introduction to Kaggle.com &amp; How to Download and Use Data Set from Kaggle.com</li> <li>• Assignment (Real Data Set)</li> </ul>

Module 03: Classification & Feature Engineering Part 02	
Class 08	<p>Introduction to Classification Algorithms: All about Decision Tree</p> <ul style="list-style-type: none"> <li>• Basic Logarithmic Operations.</li> <li>• All about Tree.</li> <li>• What is Decision Tree Algorithm?</li> <li>• What is Entropy in Decision Tree?</li> <li>• What is Information Gain?</li> <li>• What is Gini Index?</li> <li>• In Depth Mathematics Behind Decision Tree.</li> <li>• Implementation of Decision Tree with Python.</li> <li>• Visualize and Download Tree.</li> <li>• Assignment (Real Data Set</li> </ul>
Class 09	<p>Result Analysis:</p> <ul style="list-style-type: none"> <li>• Theory of Confusion Matrix.</li> <li>• Confusion Matrix with Python.</li> <li>• Accuracy.</li> <li>• Precision.</li> <li>• Recall.</li> <li>• F1-Measure.</li> <li>• Specificity.</li> <li>• AUC Curve.</li> </ul>

	<ul style="list-style-type: none"> <li>• ROC Curve.</li> <li>• Assignment (Real Data Set).</li> <li>• Project on: Cardiovascular Diseases Prediction using ML</li> </ul>
Class 10	<p><b>All about Ensemble Algorithms:</b></p> <ul style="list-style-type: none"> <li>• What are Ensemble Techniques in Machine Learning?</li> <li>• Types of Ensemble Techniques.</li> <li>• Theory of Random Forest.</li> <li>• In Depth Mathematics Behind Random Forest.</li> <li>• Random Forest with Python.</li> <li>• Decision Tree Vs Random Forest</li> <li>• XGBoost</li> </ul> <p><b>Hyper Parameter Tuning in Machine Learning:</b></p> <ul style="list-style-type: none"> <li>• Random Search for Classification</li> <li>• Grid Search for Classification</li> <li>• Genetic Algorithm</li> </ul>
	<p><b>Logistic Regression:</b></p> <ul style="list-style-type: none"> <li>• What is Logistic Regression?</li> <li>• What is Sigmoid Function?</li> <li>• In Depth Mathematics Behind Logistics Regression Algorithm.</li> </ul>



Class 11	<ul style="list-style-type: none"> <li>• Logistic Regression with Python</li> <li>• Linear Regression Vs Logistic Regression</li> <li>• Simple ML Project: Heart Attack Prediction with Python &amp; ML</li> <li>• Assignment (Real Data Set)</li> </ul>
Class 12	<p><b>Feature Engineering:</b></p> <ul style="list-style-type: none"> <li>• What is Feature Selection in Machine Learning?</li> <li>• Theory of Principle Component Analysis.</li> <li>• Principle Component Analysis with Python.</li> <li>• Different Types of Feature Selection Methods.</li> <li>• Theory of Chi Square Test.</li> <li>• Chi Square Test with Python.</li> <li>• Select KBest.</li> <li>• Select kBest with Python.</li> <li>• Correlation Matrix.</li> <li>• Correlation Matrix with Heatmap.</li> <li>• Assignment (Real Data Set).</li> </ul>
Class 13	<p><b>All about K-Nearest Neighbors:</b></p> <ul style="list-style-type: none"> <li>• What is KNN Algorithm?</li> <li>• Euclidean Distance Formula.</li> <li>• KNN for Classification.</li> </ul>

	<ul style="list-style-type: none"> <li>• KNN for Regression.</li> <li>• In Depth Mathematics Behind K-Nearest Neighbors (KNN) Algorithm.</li> <li>• KNN Regressor vs KNN-Classifier.</li> <li>• Tuning: KNN Regress and KNN Classifier</li> <li>• Implementing KNN with Python</li> <li>• Assignment (Real Data Set</li> </ul>
Class 14	<p><b>Important Statistical Analysis:</b></p> <ul style="list-style-type: none"> <li>• Hypothesis Testing (Type 1 &amp; Type 2 Error.</li> <li>• What is Analysis of Variance (ANOVA)?</li> <li>• Example of ANOVA Test.</li> <li>• What is T-Test?</li> <li>• Example of T Test.</li> <li>• ANOVA Vs T-Test.</li> <li>• P Value, T-test, ANOVA When to Use What, Implementation with Python.</li> <li>• Z Score Statistics.</li> <li>• All About Correlation Analysis.</li> <li>• Normal Distribution</li> <li>• Removing Outliers</li> </ul>

Class 15	<p><b>All about Cross Validation:</b></p> <ul style="list-style-type: none"> <li>• What is Cross Validation in Machine Learning?</li> <li>• Cross Validation Techniques.</li> <li>• Theory of K Fold Cross Validation.</li> <li>• Hold Out Cross Validation</li> <li>• K-Fold Cross Validation</li> <li>• Leave One-Out Cross Validation (LOOCV)</li> <li>• Stratified K Fold Cross Validation</li> <li>• Train Test Split Vs K Fold CV.</li> <li>• Assignment (Real Data Set).</li> </ul>
Class 16	<p><b>All about Support Vector Machine:</b></p> <ul style="list-style-type: none"> <li>• Theory of Support Vector Machine (SVM) in Machine Learning.</li> <li>• Hyperplanes and Support Vectors.</li> <li>• Math Behind SVM.</li> <li>• SVM Kernels</li> <li>• Assignment (Real Data Set)</li> <li>• SVM for Linear Data</li> <li>• SVM for Non Linear Data</li> <li>• SVM Implementation with Python.</li> </ul>

## Module 05: Basic NLP

Class 17

### Feature Engineering:

- What is Feature Extraction Techniques?
- Bag of Words Model in NLP.
- What is Count Vectorizer?
- Count Vectorizer with Python.
- What is Tfidf Vectorizer?
- Tfidf Vectorizer with Python.
- What is Hashing Vectorizer?
- Hashing Vectorizer with Python.
- What is Word2vec?
- Word2vec with Python.
- Countvectorizer vs Tfidfvectorizer vs Hashing
- Uses of Vectorizer in NLP.
- Use of Natural Language Toolkit in NLP (NLTK)
- Assignment (Real Data Set)

### All about Naïve Bayes:

- What is Bayes Theorem?
- Statistics & Probability
- Statistics & Probability with Python

Class 18	<ul style="list-style-type: none"> <li>• Naïve Bayes Algorithm</li> <li>• Naïve Bayes Algorithm with Python</li> <li>• Naïve Bayes for Text Classification</li> <li>• Gaussian NB, Bernoulli NB, MultiNomial NB</li> <li>• Simple ML Project: Spam Comments Classification with Python</li> <li>• Assignment (Real Data Set)</li> </ul>
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Module 06 : Unsupervised Learning	
Class 19	<p>Cluster Algorithms:</p> <ul style="list-style-type: none"> <li>• What is Unsupervised Learning?</li> <li>• Types of Clusters.</li> <li>• Theory of K-Means Cluster Algorithm.</li> <li>• Single &amp; Multiple Variable Cluster.</li> <li>• K-Means Cluster with Python.</li> <li>• Hierarchical Clustering.</li> <li>• Optimal Number of Cluster Selection.</li> <li>• Elbow Method.</li> <li>• Elbow Method with Python.</li> <li>• Simple ML Project: Market Basket Analysis.</li> <li>• Assignment (Real Data Set)</li> </ul>

Module 07 : Deep Learning	
Class 20	<p>Neural Network:</p> <ul style="list-style-type: none"> <li>• All about Neural Network</li> <li>• Tensorflow vs Pytorch</li> <li>• What is Deep Learning?</li> <li>• Types of Neural Network</li> <li>• What is Neuron?</li> <li>• Human Brain Vs Artificial Neuron</li> <li>• All about Artificial Neural Network (ANN)</li> <li>• All about Convolutional Neural Network (CNN)</li> </ul>

Module 08 : Unsupervised Learning	
Last Class 21 (Guidelines)	<p>Guidelines:</p> <ul style="list-style-type: none"> <li>• Scope of Higher Studies in Data Science.</li> <li>• Guide to be a Good Programmer.</li> <li>• Sharing Experience for Data Science Journey.</li> <li>• Machine Learning for Future Research.</li> <li>• R for Data Science.</li> <li>• Kaggle Competitions.</li> <li>• ML Jobs, Resume &amp; Salary.</li> <li>• ML Interview Questions 2021</li> </ul>

