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Since 2007

VERSION 2.0

PROFESSIONAL

ELYSIUM ACADEMY PYTHON FOR DATA SCIENTIST COURSE - MACHINE LEARNING

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SR. CODE

EAPL/PROF/PRTC14

COURSE CODE

EAPDS

SUB CATEGORY

DATA SCIENCE AND ANALYTICS

TOTAL DURATION	THEORY TAKEN	PRACTICAL TAKEN
90 HOURS	20 HOURS	70 HOURS

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COURSE DESCRIPTION

The Programming for Data Science with Python program offers learners the opportunity to learn the most important programming languages used by data scientists today. Get started with the fascinating field of data science and learn Python, ML, DL, and applications with the help of experienced instructors. Learners will emerge prepared to tackle real world data analysis problems. Here are some of the skills you will need to learn if you want to become a data scientist.

COURSE GOALS

The Data Science with Python course teaches you to master the concepts of Python programming. Through this Python for Data Science training, you will learn Data Analysis, Machine Learning, Data Visualization, Web Scraping, & NLP.

FUTURE SCOPE

Data Science is an expanding area with emerging tools and technologies. The demand for data science specialists appears to have room to grow over the next ten years, ensuring the profession's future. One reason for this is the industry's constantly growing opportunities and shifting data landscape.

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01
CHAPTER

GETTING STARTED

06 HRS
10 HRS

01. Introduction to Python

a. History and Features of Python
b. Basic Syntax
c. Variables and Datatypes
d. Operators
e. Conditional, Loop & Control Statements
f. Functions
g. Random Modules

02. Introduction to Data Science

a. Data Science
b. Data Science vs. Data Scientist
c. Future scope of data scientist
d. How to link python with DS

03. Basic Terminologies of DS

a. Data Mining
b. Data Sets
c. Python packages
d. Data Collections
e. Data Preprocessing
f. Data Visualization
g. Data Modelling

04. Installation of packages

a. Pandas
b. Numpy
c. Scipy
d. Sckit
e. NLTK

05. Python Scientific Libraries

a. Pandas
b. Numpy
c. Scipy
d. Matplotlib
e. Keras
f. Tensorflow
g. SciKit-Learn
h. PyTorch

02
CHAPTER

DATA COLLECTION AND PREPROCESSING

01 HRS
06 HRS

01. Introduction to Numpy

a. Numpy
b. Create Numpy arrays
c. Numpy operations
d. Numpy for statistical operations

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02. Data Preprocessing

a. Handling Missing/Fill-na/Replace Values
b. Drop Column/row
c. Label Encoding
d. One-Hot Encoding
e. Reshaping
f. Data operations
g. Data frame creations
h. Statistical functions in data operations
i. Pivoting
j. Merging and joining data frame
k. Concatenate

03. Data Normalization

a. What is Data Normalization?
b. Standard Scalar
c. Min-Max Scalar
d. Hands on standard scalar
e. Hands on min-max scalar

04. Data Collection

a. How to collect input data
b. Read CSV Data
c. Read JSON Data
d. Read XLS Data
e. Read HTML Contents
f. View Data

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03
CHAPTER

VISUALIZATIONS

01 HRS

07 HRS 00 MINS

01. Matplotlib Visualization

a. Plotting with matplotlib
b. Bar charts
c. Pie charts
d. Scatter plots
e. Box plots
f. Histogram
g. Bubble Chart
h. Heat maps
i. Graph/line graph
j. Geographical data

02. Seaborn Visualization

a. Plotting with seaborn
b. Histogram with grid
c. Distplot
d. Pairplot
e. Scatter plots
f. Box plots
g. Lmplots
h. Histogram
i. Challenge: Visualize titanic dataset

03. Feature Engineering

a. Feature Extraction
b. Feature Selection
c. EDA
d. Handling outliers
e. Feature Scaling

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04. File Handling

a. open() mode

b. read() mode

c. write() mode

d. append() mode

04
CHAPTER

MACHINE LEARNING

04 HRS

10 HRS

01. Machine Learning

a. AI vs ML vs DL

b. Application of machine learning

c. How do machine learns

d. Types of Machine learning

e. Supervised Learning

f. Un-supervised Learning

02. Naive Bayes

a. What is Naïve Bayes?

b. Types of Naïve Bayes

c. Problem: IRIS Classification

d. Data Processing

e. Train and create model

f. Performance Estimation

g. Analyse and create confusion matrix

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03. Simple Linear Regression

a. Ordinary Least Square and Regression Errors
b. Data Processing
c. Train and Test Model
d. Test the model and Predict Y Values
e. R-Squared and its Importance
f. Score and Get coefficients
g. Calculate RMSE (Root Mean Squared Error)
h. Plot the predictions

04. Support Vector Machine

a. What is SVM?
b. SVM kernel types
c. Problem: IRIS Classification
d. Data Processing
e. Train and create model
f. Performance Estimation
g. Analyse and create confusion matrix

05 CHAPTER

ALGORITHMS

02 HRS

01. Logistic Regression

08 HRS

a. What is Logistic Regression?
b. Problem: Heart Disease Prediction
c. Build Model
d. Performance Estimation
e. Analyse and create confusion matrix

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02. Decision Tree

a. What is decision tree?

b. Decision Tree Parameters

c. Problem: IRIS Classification

d. Data Processing

e. Train and create model

f. Evaluate Model

03. Random Forest

a. What is random forest?

b. Ensemble Learning

c. Bagging and Boosting Classifiers

d. Problem: Cardio Vascular Disease

e. Implementation

f. Evaluate Model

04. K Nearest Neighbor

a. What is KNN?

b. KNN parameters

c. Problem: Cardio Vascular Disease

d. Data collection and preprocessing

e. Implementation

f. Evaluate Model

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06 CHAPTER

EVALUATION METRICS

03 HRS

06 HRS

01. Evaluate Classification metrics

a. Evaluate Accuracy

b. Classification metrics

c. What is Threshold and Adjusting Thresholds

d. AUC ROC Curve

02. Dimension Reduction

a. Why to reduce dimensions and Importance of PCA?

b. Steps to calculate PCA

c. Implementation of PCA

d. Visualization

03. Regression

a. What is Ridge regression?

b. Implement Ridge Regression

c. Plot Ridge Regression Line

d. Lasso Regression or L1 Penalty

e. Implement lasso Regression

f. Plot lasso Regression Line

04. Over fitting and under fitting

a. What is over fitting?

b. How to avoid over fitting?

c. What is under fitting?

d. How to avoid under fitting?

05. Cross Validation

a. What is Cross Validation?

b. How Cross Validation Works

c. Prepare for Cross Validation

d. Parameter and implementation of Cross Validation

e. Understand the results of Cross Validation)

f. Hands On - Analyse the Result

07
CHAPTER

HYPERTUNNING MODEL AND CLUSTERING

02 HRS

03 HRS

01. Hyper Tuning for model

a. What is Hyper parameter Tuning?

b. Grid Search and Randomized Search Approach

c. GridSearchCV Parameters Explained

d. Create GirdSearchCV Object

e. Fit data to GridSearchCV

f. Understand GridSearchCV Results

02. Implementation of hypertuning

a. GridSearchCV using Logistic Regression

b. GridSearchCV using Support Vector

c. Randomized Search using random forest

d. Select Best Model

e. Randomized Search

f. Model Selection Summary

03. Clustering

a. What is Clustering?

b. How the clusters are formed?

c. Problem Understanding: Customer Segmentation

d. Get, Visualize and Normalize the data

e. Import KMeans and Understand Parameters

f. Understanding KMeans++ Initialization Method

g. Create Clusters

h. Visualize and create different number of clusters

i. Understand Elbow Method to Decide number of Cluster

j. Implement Elbow Method

08 CHAPTER

NLP & RECOMMENDATION SYSTEM

02 HRS

08 HRS

01. NLP

a. What is NLP

b. Application of NLP

c. Remove punctuation

d. Tokenize

e. Remove stop words

f. Stem words

g. Lemmatize

h. Padding

i. Part of Speech Tagging

j. Name Entity Relationship

k. Sentiment Analysis

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O2. Build our spam detector

a. Read and preprocess data
b. NLP techniques
c. Tokenization
d. Tokens to vectors
e. Naïve Bayes
f. Logistic Regression
g. Sentiment Analysis
h. Evaluate Metrics

O3. Recommendation System

a. What is Recommendation System?
b. How Do Recommendation Works?
c. Types of Recommendation

O4. Content Based Recommendation

a. What is Content based recommendation?
b. Advantages and drawbacks
c. Hands on Content based recommendation code

O5. Collaborative Filtering

a. What is Collaborative filtering?
b. Advantages and drawbacks
c. Kinds of collaborative filtering
d. Hands on collaborative filtering code

O6. Hybrid Recommendation System

a. What is hybrid recommendation?
b. Advantages and Drawbacks

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09 CHAPTER

DEEP LEARNING

03 HRS

03 HRS

01. Deep Learning

a. What is Neuron and Artificial Neural Network?

b. How Artificial Neural Network works?

c. What is Keras and Tensorflow?

d. What is a Tensor in Tensorflow?

e. Installing Keras, backend and Tensorflow

02. Optimization

a. Keras Model Building and Steps

b. Layers - Overview and Parameters

c. Activation Functions

d. Layers - Softmax Activation Function

e. What is a Loss Function?

f. Cross Entropy Loss Functions

g. Optimization - What is it?

h. Optimization - Gradient Descent

i. Optimization - Stochastic Gradient Descent

j. Optimization - SGD with Momentum

k. Optimization - SGD with Exponential Moving Average

l. Optimization - Adagrad and RMSProp for learning rate decay

m. Optimization – Adam

O3. Deep Neural Layers

e. Initializers - Vanishing and Exploding Gradient Problem

f. Layers - Initializers explained

g. Problem Understanding: Disease Prediction

h. Read and process the data

i. Define the Keras Neural Network Model

j. Compile the Keras Neural Network Model

k. Evaluate the result

10 CHAPTER

PROJECTS

00 HRS

05 HRS

1. Project on Application of data science Part 1

a. Problem understanding: Loan Approval Prediction

b. Read and preprocess data

c. Data splitting

d. Classification – Naïve Bayes

e. Classification – Support Vector Machine

f. Classification - Random Forest

g. Classification – Decision Tree

h. Classification – Logistic Regression

i. Train the model

j. Evaluate performance metrics

k. Visualization using matplotlib and seaborn

O2. Project on Application of data science Part 2

a. Problem understanding:
Zomato Restaurant Review

b. Read and preprocess data

c. NLP

d. Data splitting

e. Classification – Naïve Bayes (Multinomial)

f. Classification – Support Vector Machine

g. Classification - Random Forest

h. Classification – Decision Tree

i. Classification – Logistic Regression

j. Train the model

k. Evaluate performance metrics

l. Visualization using matplotlib and seaborn

O3. Project on Application of data science Part 3

a. Problem understanding:
Product Recommendation

b. Read and preprocess data

c. Collaborative filtering

d. Content based filtering

e. Recommend the product

f. Evaluate metrics

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