Certified Professional Diploma

Data Science & ML with Python

Practical Training on Real World Industrial Projects

Target Learners: Undergraduates and Job Professionals

Pre-requisite: Basic computer technological skills

Duration: 4 Months (2 sessions each week = Total 32 sessions)

Credit Hours: 64 (4 Hours each week)

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Enrollment Form: https://forms.gle/wHUTGTGtAAba5AjN6

Key Takeaways

- Introduction to Python
- Intermediate Python
- Data Science
- Data Cleaning
- Data Analysis with Python (EDA)
- Introduction to Machine Learning
- Regression Analysis
- Classification Algorithms
- Unsupervised Learning and Beyond
- Deep Learning
- Capstone Project

Approved by

ViLabs Academy, Advisory Board Members (ABM) comprises senior educators, industry leaders, and global technology experts who provide strategic guidance across training design and curriculum development. The Board actively reviews course content, ensures alignment with current industry demands, and validates learning outcomes against global skill standards. Their involvement guarantees that all ViLabs Academy programs remain credible, practical, and workforce-ready, giving learners and partners confidence in the quality and relevance of our education.

Software/Tools to be learn

- Google Colab

Course Outline

LEVEL 1 — Intermediate (Month 1 & Month 2)

Week 1: Python Basics

- Overview of Python
- Variables and Data Types

Week 2: Functions and Data Structures

- Functions and Modules
- Lists, Tuples, and Dictionaries

Week 3: Python Libraries

- Pandas for Data Manipulation
- Matplotlib and Seaborn for Data Visualization

Week 4: Data Cleaning and Preprocessing

- Handling Missing Data
- Data Transformation
- Data Aggregation

Week 5: Exploratory Data Analysis (EDA)

- Data Visualization
- EDA Techniques
- One hot Encoding

Week 6: Machine Learning Fundamentals

- Introduction to Machine Learning

- Types of Machine Learning
- Supervised Learning vs. Unsupervised Learning

Week 7: Linear and Logistic Regression

- Simple and Multiple Linear Regression
- Model Evaluation
- Feature Selection
- Binary and Multiclass Classification
- Regularization

Week 8: Decision Trees and Random Forest

- Decision Tree Concepts
- Random Forest Ensembles
- Model Evaluation and Feature Importance

LEVEL 2 — Advanced (Month 3 & Month 4)

Week 9 and 10: Introduction to Deep Learning

- Introduction to deep learning: What is deep learning, its applications, and significance.
- Basics of Neural Networks: Neurons, activation functions, and models.
- Introduction to TensorFlow and Keras
- Building your first neural network using a library (TensorFlow).
- Training an Artificial Neural Network (ANN) for a classification task.
- Understanding loss functions and optimization algorithms (SGD, Adam).

Week 11 and 12: Convolutional Neural Network (CNN)

- Introduction to CNNs and their role in image analysis.
- Convolutional layers, filters, and feature maps.
- Pooling layers and spatial down sampling.

Week 13: Feature Extraction and Fine Tuning on CNN.

- Advanced CNN architectures (VGG, ResNet, etc.) and transfer learning.
- Data augmentation for improved model generalization.
- Concepts of Feature extractions and Fine tuning.
- Case study: Object recognition using pre-trained models.
- Hands-on: Fine-tuning a pre-trained CNN on a custom dataset on VGG-16.

Week 14 and 15: Recurrent Neural Networks (RNNs)

- Introduction to RNNs and their sequential data processing capability.
- Introduction to word embeddings (Word2Vec, GloVe).
- Understanding vanishing gradients.
- Applications of RNNs in NLP: Language modeling, text generation, and sentiment analysis.
- Hands-on: Implementing a basic text generator
- Hands-on: Building a sentiment analysis model for movie reviews using RNN.

Week 16: Deep Learning Best Practices, Future Directions

- Strategies for improving deep learning models: Regularization, hyperparameter tuning.
- Ethical considerations in deep learning: Bias, fairness, and transparency.

- Overview of cutting-edge advancements in deep learning.

Capstone Project

- Project Introduction and Data Selection
- Project Development, Implementation, and Presentation
- Final Assessment and Course Review
- Recap of Key Concepts
- Final Assessment and Evaluation
- Course Review and Feedback

Projects

1. Flower Species Analysis
2. Car insurance Analysis
3. Predicting House Prices
4. Salaries Prediction by Position of Employees
5. Handwritten Digit Recognition using Artificial Neural Networks (ANN) on MNIST
6. Cats and Dogs Image Classification using Convolutional Neural Networks (CNN)
7. VGG-16 Architecture
8. Sentiment Analysis of Twitter Reviews using Recurrent Neural Networks (RNN)
9. **Capstone Project:** Students submit a complete working project: data cleaning, data analysis, regression analysis/classification analysis