

Teaching Guidelines for Introduction to ML, DL, and OpenVino ACC-HPC June 2025

Duration: 24 classroom hours + 24 lab hours

Objective: To Introduce the student to Machine Learning, Artificial Intelligence and Deep Learning Concepts.

Prerequisites: Knowledge of programming in any language like C, C++, basic Mathematics, statistics and computer fundamentals.

Evaluation method: CCEE exam– 40% weightage

Lab exam – 40% weightage

Internal exam – 20% weightage

List of Books / Other training material

Reference Book:

- 1.Introduction to Machine Learning with Python – A guide for Data Scientists by Andreas muller, Sarah Guido.
2. Machine Learning and Deep Learning with Python, scikit-learn, and TensorFlow 2, 3rd Edition by Sebastian Raschka.
3. Hands-On Machine Learning with Scikit-Learn, Keras and Tensor Flow: Concepts, Tools and Techniques to Build Intelligent Systems by Aurelien Geron
4. AI and Machine Learning for Coders: A Programmer's Guide to Artificial Intelligence by Laurence Moroney
5. Artificial Intelligence – A Modern Approach (3rd Edition) By Stuart Russell & Peter Norvig
6. Deep Learning, Ian Goodfellow, Yoshua Bengio, Aaron Courville
7. TensorFlow Deep Learning Cookbook

Note: Each session mentioned is for theory and of 2 hours duration.

Lab assignments are indicatives, faculty need to assign more assignments for better practice.

Session 1 & 2:

- Introduction to Machine Learning (using Scikit Learn)
- ML Applications

- Evaluating ML techniques
- Types of ML
- Steps used to perform ML
- Feature engineering
- Data Pre-Processing

Lab Assignment:

Session 3 & 4:

Supervised Learning

- Classification and Regression
- Linear regression
- Logistic regression
- Decision tree
- Naïve Bayes

Lab Assignment:

Session 5 & 6:

Unsupervised Learning

- Clustering
- K-means clustering
- Association rules
- Dimensionality reduction
- Principal Component Analysis

Lab Assignment:

Session 7:

Ensemble Learning

- Bagging
- Boosting
- Stacking
- Random Forest
- Gradient Boosting
- Cat Boost
- XGBoost

Lab Assignment:

Session 8 & 9:

Deep Learning

- Basics of Neural Network
- CNN -Convolutional Neural Network
- RNN -Recurrent Neural Network
- LSTM Long Short-Term Memory
- Practical Application of Neural Networks

Lab Assignment:

Session 10:

- Open Vino
- Deploy High -Performance
- Deep Learning Inference

Lab Assignment:

Session 11:

Deployment of ML/DL models using Flask.

- Model Training & Exporting
- Flask Application Setup
- Model Loading in Flask
- Building API Endpoints
- Handling Inputs and Outputs
- Running the Flask App
- Deployment
- Scaling and Load Balancing
- Monitoring and Maintenance

Lab Assignment:

Session 12:

ML/DL Framework:

- TensorFlow
- Scikit-learn
- Keras

Lab Assignment