

SYLLABUS
For
Value Added Course
Certificate Course in Machine Learning

Offered by
Department of Computer Applications

TECNIA INSTITUTE OF ADVANCED STUDIES
NAAC ACCREDITED GRADE 'A' INSTITUTE
3 PSP, Institutional Area, Sector – 14, Rohini, Delhi - 110085

COURSE MODULE

Code No.: MCA-502

Duration: 30 Hrs
Credits: 2

Paper: Certificate Course in Machine Learning

INSTRUCTIONS TO PAPER SETTERS:

1. A quiz will be conducted consisting of 20 questions, containing 5 questions from each unit, covering entire syllabus.
2. A practical must be conducted based on the topics covered in the entire syllabus to evaluate analytical/technical skills of candidate.

OBJECTIVE: *The purpose of this course is to make students aware of machine learning concepts, so that they may become able to create applications based on machine learning. The main objective is to enable the students with the basic knowledge on the techniques to build an intellectual machine for making decisions on behalf of humans. This course covers the techniques on how to make learning by a model, how it can be evaluated, what are different algorithms to construct a learning model.*

PRE-REQUISITE:

1. Basics of Python Programming

Unit 1

Introduction to Machine Learning -fundamental concepts of machine learning, Data Preprocessing and Exploration, cleaning of data, handling missing values, outlier detection, and feature scaling.

Supervised Learning Algorithms -machine learning algorithms, linear regression, logistic regression, decision trees, random forests, support vector machines (SVMs), naive Bayes, k-nearest neighbors (KNN), and neural networks. [6 Hrs]

Unit 2

Unsupervised Learning Algorithms –Unsupervised learning algorithms: Introduction to Clustering, K-means Clustering, Hierarchical Clustering, techniques to evaluate the performance of machine learning models, including accuracy, precision, recall, F1 score, and ROC curves.

Feature Engineering – Feature extraction of meaningful features from raw data, dimensionality reduction techniques. [6 Hrs]

Unit 3

Model Evaluation and Validation -Introduction to deep learning and neural networks, architecture of feedforward networks, convolutional networks ,recurrent neural networks.

Evaluation and Validation of Machine Learning Models –working with real-world datasets, feature engineering, model selection, evaluation. [7 Hrs]

Unit 4

Deep Learning and Neural Networks –implementing machine learning algorithms using programming languages.

Reinforcement Learning -implications of using machine learning algorithms, potential biases in data and models

Practical Implementations and Projects - Project experience, working to solve a real-world problem. [11 Hrs]

Text Books

1. GeronAurelien, “Hands-On Machine Learning with Scikit-Learn & TensorFlow”, O’REILLY, First Edition, 2017.
2. “Understanding Machine Learning: From Theory To Algorithms”, Shai Shalev-Shwartz, Shai Ben-David, 2015.
3. Fausett Laurence, “Fundamentals of Neural Networks”, Pearson, Ninth Edition, 2012.

References

1. “Machine Learning”, Tom Mitchell, First Edition, McGraw- Hill, 1997.
2. “Exploring Python”, Budd T A, McGraw-Hill Education, 1st Edition, 2011.
3. “Python Data Science Handbook”, Jake VanderPlas, O’Reilly,1st Edition,2017.

Evaluation Pattern

On the basis of Quiz and Practical conducted on the syllabus, followed by Viva.