Course: Machine Learning & Artificial Intelligence

4.5 months – 120 hours

Pre-requisites: One RDBMS, Python, Tableau/Metabase/PowerBI, Data loading

Introduction to Machine Learning (5 hours)

- What cannot be done by manual analysis and need for ML
- Concepts of Supervised learning, unsupervised learning
- Training data, test data – industry datasets
- Introduction to ANN (artificial neural networks)

Mathematics for Machine Learning (10 hours)

- Linear Algebra, equations
- Probability Theory, Eigen values and Eigen vectors
- PCA - Principal Component Analysis
- Line of best fit, curve of best fit

Advanced Statistics using Python (25 hours)

- Intro to statistics
- What are dependent data and independent data?
- Running a basic linear regression code
- Population parameter estimation method
- Confidence interval estimation method
- Hypothesis testing
- Ttest and ztest

Regression & Classification for Business Applications (50 hours)

Time series forecasting

- Exploratory Data Analysis - Pandas
- Seaborn
- Exponential Smoothening, Holt Winters
- ARIMA, Auto ARIMA

Regression

- Linear Regression – K-best, K-fold, train-test, cross validation, normalization
- Subset Regression
- Regularization - bias, variances, lasso, ridge and elastic net

Classification

- Logistic Regression
- SVM
- Naïve Bayes classification
- Random Forest
- KNN

Clustering

- K Means Clustering
- Fuzzy K Means Clustering

AutoML

- H20
- DataRobot
- Nyckel

Advanced Topics (TensorFlow) (30 Hours)

- Set up TensorFlow virtual environment for python
- Keras - Create Neural Network
- Keras Models Construction
- Layers in Keras Models
- Build Convolutional NN with Keras
- Introduction to deep learning
- Regression and prediction using ANN
- Image Classification using CNN

Project work (30 hours – outside class hours)

- Load large sets of data in postgres or ClickHouse
- Carry out EDA
- Build dashboards using Tableau or Metabase or PowerBI
- Create prediction models using Python
- Compare and present results using multiple models

*** Apart from the above hours, students are supposed to put an additional effort of 30-40 hours on self-learning.