## Machine Learning with Python Programming

### Session 1: Introduction to Python Programming
- ✔ Data Types, Control Statement, Looping
- ✔ File Handling, Object Oriented Programming
- ✔ INSERT, UPDATE, DELETE and SELECT Operations
- ✔ List, Tuples, Dictionaries, Functions
- ✔ Working with Databases
- ✔ Numpy and Matplotlib in Python

### Session 2: Introduction to Machine Learning
- ✔ Introduction to Machine Learning and its uses
- ✔ Understanding Working Environment in MC
- ✔ Supervised and Unsupervised Learning
- ✔ Pandas, Scikit-Learn

### Session 3: Linear Regression and Linear Algebra
- ✔ Model Representation, Cost Function, Gradient Descent
- ✔ Matrices and Vectors, Addition and Scalar Multiplication, Inverse and Transpose
- ✔ Gradient Descent for Multiple Variables, Features of Polynomial Regression, Normal Equation
- ✔ Gradient Descent for Linear Regression
- ✔ Setting up your programming assignment environment, Installing Octave on Windows
- ✔ Normal Equation Noninvertibility

### Session 4: Logistics Regression
- ✔ Classification of Logistics Regression
- ✔ Cost Function, Simplified Cost Function
- ✔ Hypothesis Representation, Decision Boundary
- ✔ Gradient Descent, Advanced Optimization

### Session 5: Regularization
- ✔ The Problem of Overfitting, Cost Function
- ✔ Regularized Linear Regression & Logistic Regression

### Session 6: Getting Started with Anaconda
- ✔ Downloading and Installing Anaconda
- ✔ Downloading the IRIS Datasets
- ✔ Managing Environment, Navigating with Spyder and Jupyter Notebook Interface
- ✔ Data Exploration and Analysis

### Session 7: Support Vector Machine (SVM)
- ✔ Introduction to Support Vector Machine
- ✔ Linear SVM Classification, Polynomial Kernel
- ✔ Support Vector Regression
- ✔ Support Vector Machine Concepts
- ✔ Gaussian Radial Basis Function
- ✔ Advantages and Disadvantages of SVM

### Session 8: Tree
- ✔ Decision Tree, Visualizing a Decision Trees
- ✔ Decision Tree Regression, Overfitting and Grid Search
- ✔ Decision Tree Learning Algorithm
- ✔ Loading and Processing Data and Modeling

### Session 9: Ensemble Machine Learning
- ✔ Introduction to Ensemble Machine Learning
- ✔ AdaBoost, Gradient Boosting Machine, XGBoost
- ✔ Bagging, Random Forests, Extra Trees
- ✔ Human Resources Analytics in Machine Learning

### Session 10: k-Nearest Neighbors (kNN)
- ✔ Introduction to kNN and its Concepts
- ✔ Introduction to Cancer Detection Project
- ✔ kNN and IRIS Dataset Demo, Distance Metric

### Session 11: Dimensionality Reduction
- ✔ Dimensionality Reduction Concept
- ✔ LDA & Comparison between LDA and PCA
- ✔ PCA Introduction, Kernel PCA

### Session 12: Unsupervised Learning: Clustering
- ✔ Clustering Concepts, MLextend
- ✔ Truncating Dendrogram, k-Means Clustering
- ✔ Ward’s Agglomerative Hierarchical Clustering
- ✔ Elbow Method, Silhouette Analysis, Mean Shift

### Session 13: Artificial Neural Networks
- ✔ The neuron, The Activation Function
- ✔ Gradient Descent, Stochastic Gradient Descent
- ✔ How do Neural Networks work
- ✔ Back propagation, How to get the dataset

### Session 14: Project
- ✔ Working with Machine Learning Projects