

1.	Basic concepts: Definition of learning systems, Goals and applications of machine learning
2.	Aspects of developing a learning system: training data
3.	concept representation, function approximation
4.	History of ML, Introduction of Machine Learning Approaches – (Artificial Neural Network, Clustering)
5.	History of ML, Introduction of Machine Learning Approaches – (Reinforcement Learning, Decision Tree Learning)
6.	History of ML, Introduction of Machine Learning Approaches – (Bayesian networks, Support Vector Machine, Genetic Algorithm)
7.	Issues in Machine Learning and Data Science Vs Machine Learning
8.	Types of Learning: Supervised learning and unsupervised learning
9.	Overview of classification: setup, training, test
10.	Overview of classification: validation dataset, over fitting
11.	Classification Families: linear discriminative, non-linear discriminative, decision trees
12.	Classification: Decision Trees – Attribute Selection Measures and Tree Pruning;
13.	Bayesian and Rule-based Classification; Model Evaluation and Selection; Cross-Validation;
14.	Classification Accuracy; Bayesian Belief Networks; Classification by Backpropagation; and Support Vector Machine
15.	Regression: Linear Regression and Logistic Regression, Perceptron, Exponential family
16.	Generative learning algorithms, Gaussian discriminant analysis, Naive Bayes,
17.	Support vector machines: Optimal hyper plane, Kernels. Model selection and feature selection
18.	Combining classifiers: Bagging, boosting (The Ada boost algorithm)
19.	Combining classifiers: Evaluating and debugging learning algorithms, Classification errors

20.	Introduction to Weka: a machine learning tool for Classifiers
21.	Introduction to Weka: a machine learning tool for Clustering
22.	Decision Tree Learning - Decision tree learning algorithm
23.	Inductive bias, Inductive inference with decision trees
24.	Entropy and information theory, Information gain
25.	ID-3 Algorithm
26.	Issues in Decision tree learning
27.	INSTANCE-BASED LEARNING – k-Nearest Neighbour Learning
28.	Locally Weighted Regression, Radial basis function networks
29.	Case-based learning
30.	Clustering, K-means
31.	EM Algorithm
32.	Mixture of Gaussians, Factor analysis
33.	PCA (Principal components analysis)
34.	ICA (Independent components analysis)
35.	latent semantic indexing, Spectral clustering
36.	Markov models Hidden Markov models (HMMs).
37.	Reinforcement Learning–Introduction to Reinforcement Learning
38.	Learning Task,Example of Reinforcement Learning in Practice
39.	Learning Models for Reinforcement – (Markov Decision process , Q Learning - Q Learning function, Q Learning Algorithm )
40.	Application of Reinforcement Learning
41.	Introduction to Deep Learning
42.	Genetic Algorithms: Introduction, Components
43.	GA cycle of reproduction, Crossover, Mutation
44.	Genetic Programming
45.	Models of Evolution and Learning, Applications