



COURSE CURRICULUM

Week	Day	Date	Outline of the lecture
1	Day 1	11 Sept 2023	Course Introduction, Setting up of the working environment, Python and Jupyter Notebook Overview, Importing libraries
	Day 2	12 Sept 2023	Python Basics: Data Types-Numbers, Strings, Printing, Lists, Dictionaries, Booleans, Tuples, Sets and their usage
	Day 3	13 Sept 2023	Python for Data Analysis: Overview of Pandas and Numpy, Arrays, Operations, Indexing, GroupBy, Merging, Concatenating, Joining
	Day 4	14 Sept 2023	Range, List comprehension, Functions, Lambda Expressions, Map & Filter, Method, Built-In Methods: Arrange, Zeros & Ones, Linspace, Eye
	Day 5	15 Sept 2023	Python for Data Exploration: Overview of Matplotlib and Seaborn, Categorical and Distribution plots, Grids and Regression Plots
2	Day 1	18 Sept 2023	Data Preprocessing: Taking care of Missing Data and Outliers, Encoding categories, Splitting Data into Training and Test set, Feature Scaling
	Day 2	19 Sept 2023	Machine Learning basics and Applications, Introduction to Supervised and Unsupervised learning, Linear Regression, Least Squares
	Day 3	20 Sept 2023	Assumptions in Linear Regression, Anscombe's quartet Linear Regression with Multiple Variable, Polynomial Regression
	Day 4	21 Sept 2023	Categorical Variables, Dummy Variables, One Hot Encoding, Gradient descent, Cost Function, Multiple Regression, Support Vector Regression (SVR)
	Day 5	22 Sept 2023	SVR ϵ - Insensitive Tube, Slack Variables Regularization, Kernel Introduction
3	Day 1	25 Sept 2023	Decision Trees (Regression) and Random Forest (Regression)
	Day 2	26 Sept 2023	Likelihood, Loss Function, FPR, FNR, Precision, Recall, F-1, Receiver Operating Characteristic (ROC) Curve, Cumulative Accuracy Profile (CAP) Curve
	Day 3	27 Sept 2023	Introduction to Logistic Regression, Maximum Likelihood, Binary Classification, Sigmoid/ Logit Function, R- Squared and P-value, Residuals
	Day 4	28 Sept 2023	Multi-Class Classification, Regularization: Ridge (L2) and Lasso (L1) Regression, Elastic Net Regression
	Day 5	29 Sept 2023	K-Nearest Neighbor, Hyperparameter, Logistic Regression Hands-On Activity, Assignment-1



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Week	Day	Date	Outline of the lecture
4	Day 1	02 Oct 2023	Bias And Variance, Overfitting, Underfitting
	Day 2	03 Oct 2023	Support Vector Machines (SVM) ,Hyperplanes, Marginal Distance, Regularization
	Day 3	04 Oct 2023	SVM Kernel, Mapping to Higher Dimension,Polynomial Kernel, Radial Basis Function(RBF), Kernel Trick
	Day 4	05 Oct 2023	Probability, Conditional Probability, Bayes Theorem, Naive Bayes classifier
	Day 5	06 Oct 2023	Decision Trees, Purity of Split, Numeric and Continuous Variables, Pruning
5	Day 1	09 Oct 2023	Entropy, Information Gain, Gini Impurity
	Day 2	10 Oct 2023	Ensemble Learning, Bagging/Bootstrap Aggregation Random Forest Classifier
	Day 3	11 Oct 2023	Boosting, ADAboost, Gradient Boost, Hyperparameter tuning, Stacking
	Day 4	12 Oct 2023	Unsupervised Learning, Use cases of Clustering, K-means Clustering, The Elbow Method
	Day 5	13 Oct 2023	Euclidean vs Manhattan distance, Hierarchical Clustering and Dendrograms
6	Day 1	16 Oct 2023	Hierarchical Agglomerative Clustering, DBSCAN, Mean Shift
	Day 2	17 Oct 2023	Dimensionality Reduction Techniques, Principal Component Analysis (PCA)
	Day 3	18 Oct 2023	Linear Discriminant Analysis (LDA), Kernel Principal Component Analysis (PCA)
	Day 4	19 Oct 2023	Model Selection, k-Fold Cross Validation, Grid Search
	Day 5	20 Oct 2023	Introduction to Reinforcement Learning, Introduction to Natural Language Processing, Assignment-2