



COURSE CURRICULUM

Week	Day	Date	Outline of the lecture
1	Day 1	08 Jan 2024	Course Introduction, Setting up of the working environment, Python and Jupyter Notebook Overview, Importing libraries
	Day 2	10 Jan 2024	Python Basics: Data Types-Numbers, Strings, Printing, Lists, Dictionaries, Booleans, Tuples, Sets and their usage
	Day 3	12 Jan 2024	Python for Data Analysis: Overview of Pandas and Numpy, Arrays, Operations, Indexing, GroupBy, Merging, Concatenating, Joining
2	Day 1	15 Jan 2024	Range, List comprehension, Functions, Lambda Expressions, Map & Filter, Method, Built-In Methods: Arrange, Zeros & Ones, Linspace, Eye
	Day 2	17 Jan 2024	Python for Data Exploration: Overview of Matplotlib and Seaborn, Categorical and Distribution plots, Grids and Regression Plots
	Day 3	19 Jan 2024	Data Preprocessing: Taking care of Missing Data and Outliers, Encoding categories, Splitting Data into Training and Test set, Feature Scaling
3	Day 1	22 Jan 2024	Machine Learning basics and Applications, Introduction to Supervised and Unsupervised learning, Linear Regression, Least Squares
	Day 2	24 Jan 2024	Assumptions in Linear Regression, Anscombe's quartet Linear Regression with Multiple Variable, Polynomial Regression
	Day 3	26 Jan 2024	Categorical Variables, Dummy Variables, One Hot Encoding, Gradient descent, Cost Function, Multiple Regression
4	Day 1	29 Jan 2024	Introduction to Support Vector Regression (SVR)
	Day 2	31 Jan 2024	SVR ϵ - Insensitive Tube, Slack Variables Regularization, Kernel Introduction
	Day 3	02 Feb 2024	Decision Trees (Regression) and Random Forest (Regression)
5	Day 1	05 Feb 2024	Likelihood, Loss Function, FPR, FNR, Precision, Recall, F-1
	Day 2	07 Feb 2024	, Receiver Operating Characteristic (ROC) Curve, Cumulative Accuracy Profile (CAP) Curve
	Day 3	09 Feb 2024	Introduction to Logistic Regression, Maximum Likelihood,
6	Day 1	12 Feb 2023	Binary Classification, Sigmoid/ Logit Function, R- Squared and P-value, Residuals
	Day 2	14 Feb 2023	Multi-Class Classification, Regularization: Ridge (L2) and Lasso (L1) Regression, Elastic Net Regression
	Day 3	16 Feb 2023	K-Nearest Neighbor , Hyperparameter, Logistic Regression Hands-On Activity , Assignment-1

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Week	Day	Date	Outline of the lecture
7	Day 1	19 Feb 2023	Bias And Variance, Overfitting, Underfitting
	Day 2	21 Feb 2023	Support Vector Machines (SVM) ,Hyperplanes, Marginal Distance, Regularization
	Day 3	23 Feb 2023	SVM Kernel, Mapping to Higher Dimension,Polynomial Kernel, Radial Basis Function(RBF), Kernel Trick
8	Day 1	26 Feb 2023	Probability, Conditional Probability, Bayes Theorem, Naive Bayes classifier
	Day 2	28 Feb 2023	Decision Trees, Purity of Split, Numeric and Continuous Variables, Pruning
	Day 3	01 Mar 2023	Entropy, Information Gain, Gini Impurity
9	Day 1	04 Mar 2023	Ensemble Learning, Bagging/Bootstrap Aggregation Random Forest Classifier
	Day 2	06 Mar 2023	Boosting, ADABOOST, Gradient Boost, Hyperparameter tuning, Stacking
	Day 3	08 Mar 2023	Unsupervised Learning, Use cases of Clustering, K-means Clustering, The Elbow Method
10	Day 1	11 Mar 2023	Euclidean vs Manhattan distance, Hierarchical Clustering and Dendrograms
	Day 2	13 Mar 2023	Hierarchical Agglomerative Clustering, DBSCAN, Mean Shift
	Day 3	15 Mar 2023	Dimensionality Reduction Techniques, Principal Component Analysis (PCA)
11	Day 1	18 Mar 2023	Linear Discriminant Analysis (LDA), Kernel Principal Component Analysis (PCA)
	Day 2	20 Mar 2023	Model Selection, k-Fold Cross Validation, Grid Search
	Day 3	22 Mar 2023	Introduction to Reinforcement Learning, Introduction to Natural Language Processing, Assignment-2