

COURSE CURRICULUM

Week	Day	Date	Outline of the lecture	Tentative Duration	Speaker	Institution/Organization
1	Day 1	12 June 2023	Course Introduction, Setting up of the working environment, Python and Jupyter Notebook Overview, Importing libraries	2 hrs	Nishant Soni	Ritvij Bharat Pvt. Ltd.
	Day 2	13 June 2023	Python for Data Analysis: Overview of Pandas and Numpy, Arrays, Operations, Indexing, GroupBy, Merging, Concatenating, Joining	2 hrs	Nishant Soni	Ritvij Bharat Pvt. Ltd.
	Day 3	14 June 2023	Recap: Python for Data Exploration: Overview of Matplotlib and Seaborn, Categorical and Distribution plots, Grids and Regression Plots	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
	Day 4	15 June 2023	Data Preprocessing: Taking care of Missing Data and Outliers, Encoding categories, Splitting Data into Training and Test set, Feature Scaling	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
	Day 5	16 June 2023	Machine Learning basics and Applications, Supervised and Unsupervised learning, Linear Regression, Least Squares, Assignment - 1	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
2	Day 1	19 June 2023	Assignment-1 discussion, Linear Regression with One Variable: Mathematical significance, Ordinary Least Squares	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
	Day 2	20 June 2023	Assumptions in Linear Regression, Anscombe's quartet Linear Regression with Multiple Variable, Polynomial Regression	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
	Day 3	21 June 2023	Categorical Variables, Dummy Variables, One Hot Encoding, Gradient descent, Cost Function, Multiple Regression, Support Vector Regression (SVR)	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
	Day 4	22 June 2023	SVR ϵ - Insensitive Tube, Slack Variables Regularization, Kernel Introduction	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
	Day 5	23 June 2023	Decision Trees (Regression) and Random Forest (Regression), Assignment-2	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
3	Day 1	26 June 2023	Assignment -2 discussion, Confusion Matrix, Type - 1 , Type - 2 Error, Sensitivity and Specificity	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
	Day 2	27 June 2023	Likelihood, Loss Function, FPR, FNR, Precision, Recall, F-1, Receiver Operating Characteristic (ROC) Curve, Cumulative Accuracy Profile (CAP) Curve	2 hrs	Nishant Soni	Ritvij Bharat Pvt. Ltd.
	Day 3	28 June 2023	Introduction to Logistic Regression, Maximum Likelihood, Binary Classification, Sigmoid/ Logit Function, R- Squared and P-value, Deviance Residuals	2 hrs	Nishant Soni	Ritvij Bharat Pvt. Ltd.
	Day 4	29 June 2023	Multi-Class Classification, Regularization: Ridge (L2) and Lasso (L1) Regression, Elastic Net Regression	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
	Day 5	30 June 2023	K-Nearest Neighbor , Hyperparameter, Logistic Regression Hands-On Activity , Assignment-3	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.

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4	Day 1	03 July 2023	Assignment-2 discussion, Bias And Variance, Overfitting, Underfitting	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
	Day 2	04 July 2023	Support Vector Machines (SVM) ,Hyperplanes, Marginal Distance, Regularization	2 hrs	Nishant Soni	Ritvij Bharat Pvt. Ltd.
	Day 3	05 July 2023	SVM Kernel, Mapping to Higher Dimension,Polynomial Kernel, Radial Basis Function(RBF), Kernel Trick	2 hrs	Nishant Soni	Ritvij Bharat Pvt. Ltd.
	Day 4	06 July 2023	Probability, Conditional Probability, Bayes Theorem, Naive Bayes classifier	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
	Day 5	07 July 2023	Decision Trees, Purity of Split, Numeric and Continuous Variables, Pruning, Assignment-4	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
5	Day 1	10 July 2023	Assignment-4 discussion, Entropy, Information Gain, Gini Impurity	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
	Day 2	11 July 2023	Ensemble Learning, Bagging/Bootstrap Aggregation Random Forest Classifier	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
	Day 3	12 July 2023	Boosting, ADAboost, Gradient Boost, Hyperparameter tuning, XGBoost, Stacking	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
	Day 4	13 July 2023	Unsupervised Learning, Use cases of Clustering, K-means Clustering, The Elbow Method	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
	Day 5	14 July 2023	Euclidean vs Manhattan distance, Cosine and Jacard Distance, Hierarchical Clustering and Dendrograms	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
6	Day 1	17 July 2023	Hierarchical Agglomerative Clustering, DBSCAN, Mean Shift	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
	Day 2	18 July 2023	Dimensionality Reduction Techniques, Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), Kernel Principal Component Analysis (PCA)	2 hrs	Shreyas Shukla	Ritvij Bharat Pvt. Ltd.
	Day 3	19 July 2023	Model Selection, k-Fold Cross Validation, Grid Search	2 hrs	Nishant Soni	Ritvij Bharat Pvt. Ltd.
	Day 4	20 July 2023	Introduction to Deep Learning, Neuron, Neural Network, Forward and Backward Propagation	2 hrs	Nishant Soni	Ritvij Bharat Pvt. Ltd.
	Day 5	21 July 2023	Introduction to Reinforcement Learning, Sequential Decision Making,Markov Decision Process, Introduction to Natural Language Processing	2 hrs	Nishant Soni	Ritvij Bharat Pvt. Ltd.