

Shortcourse on Data Science & Analytics
Under TEQIP-III Initiative (MHRD, Govt. of Gujarat)
17th Feb to 27th Feb, 2020

Date/Day	Session 1	Session 2	Morning Tea Break	Session 3	Session 4	Lunch Break	Session 5	Session 6	Evening Tea Break	Session 7	Session 8
TIME/Room (Only Day 1)	9:30 - 10:00/ AB7/109	10:00 - 10:30/ AB7/109	10:30 - 11:00 / AB7/109	11:00-12:00/ AB7/109	12:00-01:00/ AB7/109	1:00-2:00 Ab 4/112	2:00-3:00/ AB 4/112	3:00-4:00/ AB 4/112	4:00 - 4.30 AB 4/112	4:30-5:15 AB 4/112	5:15-6:00 AB7/109
17-02-2020 Monday	Introduction (Prof. Mayank and Nipun)	Quiz (Prof. Mayank and Nipun)	AB 7/109 (10.30 - 11.00am)	Basics of Python (file handling, case-folding, spell check, split, strip, Regex, find, replace, etc.) (Prof. Mayank)	Toolkits using Python: Matplotlib, NumPy, Scikit-learn, NLTK (Prof. Mayank)	AB 4/112 (1.00 - 2.00pm)	Multivariate calculus (Prof. Anirban)	Types of Machine learning – Supervised, Unsupervised, Semi-supervised. (Prof. Nipun)	AbB 4/112 (4.00 - 4.30pm)	Metrics (Prof. Udit)	Data structures Lab (Prof. Mayank)
Time All Days	09:00:00	10:00:00	Morning Tea Break	12:00	Lunch Break		02:00	03:00	Evening Tea Break	4:30-6.00	
18-02-2020 Tuesday	Overview of Machine learning concepts – Bias/variance, overfitting and train/test splits. (Prof. Nipun) (AB 4/112)	Linear Regression (Prof. Nipun) (AB 4/112)	11:30 to 12:00 AB 4/112	Linear Algebra: Vectors, Matrices (Prof. Shanmuga) (AB 4/112)	1:00pm to 2:00pm (AB 4/112)		Logistic Regression (Prof. Nipun) (AB 4/112)	NN-1 (Prof. Ashish) (AB 4/112)	4:00 - 4.30 AB 4/112	NN-2 (Prof. Ashish) (AB 4/112)	
19-02-2020 Wednesday	Complexity Lab (AB 7/109)	NN-3 (Prof. Ashish) (AB 4/112)	11:30 to 12:00 (AB 4/112)	NN-lab (Prof. Ashish) Lab (AB 7/109)	(AB 4/112) 1:30pm to 2.30pm		Linear Regression, Logistic Regression (Prof. Nipun) Lab (AB 7/109) (2.30 pm to 4:00 pm)		4:00 - 4.30 AB 1/201	Statistics: Describing a Single Set of Data, Correlation, Simpson's Paradox, Correlation and Causation (Prof. Udit) (AB 1/201)	
20-02-2020 Thursday	Data Structures Lab (AB 7/109)	Optimization: Unconstrained, Constrained, KKT conditions (Prof. Nipun) (AB 1/201)	11:30 to 12:00 AB 1/201	Probability: 1 (Prof. Shanmuga) (AB 1/201)	1:00pm to 2:00pm (AB 1/201)		Working with data: Reading Files, Scraping the Web, Using APIs (Example: Using the Twitter APIs), Cleaning and Munging, Manipulating Data, Rescaling, Dimensionality Reduction (Prof. Mayank) Lab (AB 7/109)	Visualizing Data: Bar Charts, Line Charts, Scatterplots Lab (AB 7/109)	4:00 - 4.30 AB 1/201	Hypothesis and Inference: Statistical Hypothesis Testing, Confidence Intervals, P-hacking, Bayesian Inference (Prof. Udit) (AB 1/201)	

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21-02-2020 Friday	Cross-Validation, Metrics (Prof. Nipun) Lab (AB 7/109)	Probability: 2 (Prof. Shanmuga) (AB 1/201)	11:30 to 12:00 AB 1/201	Probability: 3 (Prof. Shanmuga) (AB 1/201)	1:00pm to 2:00pm (AB 1/201)		Hidden Markov Models (Prof. Anirban) (AB 1/201)	decision trees and induction rules (Prof. Nipun) (AB 1/201)	4:00 - 4.30 AB 1/201	Analysis of Time Series (Prof. Udit) (AB 1/201)	
22-02-2020 Saturday	Bagging and Boosting (to balance bias and variance) and random forest (Prof. Nipun) (AB 1/201) 10:00 to 11: 30 am		11:30 to 12:00 AB 1/201	Probability 4 (Prof. Shanmuga) (AB 1/201) 12:00-1:00pm	1:00pm to 2:00pm (AB 1/201)		RL (Prof. Shivram) (AB 1/201) 2:00 to 3:30pm		3:30 - 4:00 AB 1/201	Naive Bayes (Prof. Udit) AB 1/201 4:00-5:00pm	Regularization (lasso, ridge, elastic net) from both the statistical and Bayesian inference viewpoint (Prof. Nipun) AB 1/201, 5:00-6:00pm.
24-02-2020 Monday	Introduction to Anomaly Detection Algorithms (statistical as well as non-parametric) (Prof. Girish) (AB 1/201) 10:00-11:30am.		11:30 to 11:45 AB 1/201	Fraud detection in stock market trading Fraud detection in insurance Python implementation of anomlay detection (Prof. Girish) Lab (AB 7/109) 11:45 - 12:30pm	12:45pm - 1.45pm (AB 1/201)		Case Study - Energy (Prof. Amarjeet) (AB 1/201) 2:00pm - 3:30pm		3:30 - 4:00 AB 1/201	Case Study - Climate (Prof. Udit) (AB 1/201) 4:00pm - 6:00pm	Official Dinner
25-02-2020 Tuesday	Ensemble Learning, Decision Trees (Prof. Nipun) Lab (AB 7/109) 10:00 - 11:30am.		11:30 to 12:00 AB 1/201	Probability 5 (Prof. Shanmuga) (AB 1/201) 12:00 - 1:00pm	1:00pm to 2:00pm (AB 1/201)		Unsupervised learning: KMeans and Hierarchical clustering (Prof. Anirban) (AB 1/201) 2:00pm - 3:30pm		3:30 - 4:00 AB 1/201	KNN (Prof. Udit) (AB 1/201) 4:00pm - 5:00pm	SVM-1 (Prof.Nipun) (AB 1/201) 5:00pm - 6:00pm
26-02-2020 Wednesday	Linear Regression, Regularisation (Prof.Nipun) Lab (AB 7/109) 09:00 - 10:00am.	Naive Bayes (Prof.Nipun) Lab (AB 7/109) 10:00 - 11:30am	11:30 to 12:00 AB 1/201	SVM-2 (Prof.Nipun) (AB 1/201)	1:00pm to 2:00pm (AB 1/201)		SVM, KNN (Prof.Mayank) Lab (AB 7/109)		3:30 - 4:00 AB 1/201	Linear Regression (Tutorial) (Prof.Udit) (AB 1/201)	
27-02-2020 Thrusday	SVM (Tutorial) (Prof.Nipun) (AB 1/201) 10:00-11:00am.	Case Study - Vision (Prof.Shanmuga) (AB 1/201) 10:00-11:00am.	11:45 to 12:00 AB 1/201	Neural Networks (Tutorial) (Prof. Mayank) (AB 1/201)	1:00pm to 2:00pm (AB 1/201)		Feedback & Discussion (Prof. Mayank and Nipun) (AB 1/201) 2-3pm	Vote of Thanks (Prof. Mayank and Nipun) (AB 1/201) 3-3:30pm	High-Tea (3:30-4:00pm) (AB 1/201)		