

1.	Title of the course	Machine Learning
2.	Course number	CS303L/CS519L
3.	Structure of credits	3-0-0-3
4.	Offered to	UG
5.	New course/modification to	Modification To CS3109/12-CS5103/12
6.	To be offered by	Department of Computer Science and Engineering
7.	To take effect from	July 2022
8.	Prerequisite	CoT
9.	Course Objective(s): To impart knowledge on core concepts in machine learning. To impart a skill on data science way of problem formulation, data representation, processing and inference. To impart knowledge on standard practices via diverse application scenarios and hands-on exercises.	
10.	Course Content: Review of basic concepts in python, vector algebra, multivariate calculus, random variables, probability distributions and statistical metrics; Supervised learning algorithms: vector representation, linear regression, logistic regression, evaluation metrics, bias-variance, cross validation, regularization, decision tree and ensembles and support vector machines; Practical modeling aspects: class imbalance, missing values, noise, batch processing, data seasonality; Artificial neural networks: backpropagation, activation functions and principles of deep networks; Unsupervised learning algorithms: clustering, principal component analysis and data visualization; Hands-on exercises on pertinent software platforms for various application scenarios.	
11.	Textbook(s): 1. Geron A, <i>Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems</i> , 1st Edition, Shroff/O' Reilly (2017). 2. Shalev-Shwartz S and Ben-David S, <i>Understanding Machine Learning: From Theory to Algorithms</i> , 1st Edition, Cambridge University Press (2014).	
12.	Reference(s): 1. Abu-Mostafa Y S, Magdon-Ismael M and Lin H T, <i>Learning from Data: A Short Course</i> , 1st Edition, AMLBook (2012). 2. Goodfellow I, Bengio Y and Courville A, <i>Deep Learning</i> , 1st Edition, MIT Press (2017). 3. Rumelhart D E and McClelland J L, <i>Parallel and Distributed Processing: A Handbook of Models</i> , 1st Edition, MIT Press (1989).	