

1.	Title of the course	Probabilistic Machine Learning
2.	Course number	CS532L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To CS5030/18
6.	To be offered by	Department of Computer Science and Engineering
7.	To take effect from	January 2022
8.	Prerequisite	CoT
9.	Course Objective(s): To introduce the probabilistic perspective of various machine learning techniques. To study and develop machine learning probabilistic models, and study inference under uncertainty.	
10.	Course Content: Review on concepts in probability and statistics; Bayesian concept learning; Exponential family; Directed graphical models; Gaussian models; Bayesian linear regression; Generalized linear models; Learning with hidden variables: Expectation maximization; Mixture models; HMMs; Exact inference; Factor analysis; Sparse linear models; Kernel methods; Gaussian processes; Markov random fields; Variational inference; MCMC; LDA and topic models.	
11.	Textbook(s): 1. David B, <i>Bayesian Reasoning and Machine Learning</i> , 1st Edition, Cambridge University Press (2012). 2. Kevin P M, <i>Machine Learning - A Probabilistic Perspective</i> , 1st Edition, MIT Press (2012).	
12.	Reference(s): 1. Carl E R and Christopher K I W, <i>Gaussian Processes for Machine Learning</i> , 1st Edition, MIT Press (2005). 2. Christopher M B, <i>Pattern Recognition and Machine Learning</i> , 1st Edition, Springer (2010). 3. Trevor H, Robert T and Jerome F, <i>The Elements of Statistical Learning</i> , 2nd Edition, Springer (2009).	