

**INDIAN INSTITUTE OF INFORMATION TECHNOLOGY  
DESIGN AND MANUFACTURING (IIITD&M) KANCHEEPURAM**

Course Title	Machine Learning	Course No	To be allotted later on by the office		
Specialization	Computer Science and Engineering	Structure (IPC)	3	0	3
Offered for	UG, PG and Ph.D. from the Dept. of CSE and ECE with COT	Status	Core <input type="checkbox"/>		Elective <input checked="" type="checkbox"/>
Pre-requisite	Programming and Data Structures	To take effect from			
Objectives	To solve many real world problems, mathematical characterization of solution is extremely difficult. Nowadays huge volume of data are available from various sources. Such data can be analyzed to understand the system which generated the data. This understanding can be used to predict the behavior of the system, and solve problems related to the system. Machine learning aims at solving problem by learning from data. Application of machine learning to robotics control, data mining, autonomous navigation, bioinformatics, speech recognition, text and web data processing will be discussed				
Course Outcomes	In this course, students will be exposed to various machine learning algorithms with case studies. Machine learning course will help students learn and do projects in other related areas such as Data Mining, Image Processing, Speech Processing, Computer Vision etc. At the end of the course, students will be able to design and implement Machine Learning algorithms to solve real world problems				
Contents of the course <i>(With approximate break up of hours)</i>	Introduction to Machine Learning, Supervised Learning -linear regression, logistic regression, Perceptron. Exponential family, generalized linear models. Generative learning algorithms. Gaussian discriminant analysis. Naive Bayes. Support vector machines. Bias/variance tradeoff Model selection and feature selection. Evaluating and debugging learning algorithms, Introduction to deep learning. Unsupervised learning-clustering -K-means, EM, Mixture of Gaussians, Factor Analysis,. Dimensionality reduction -PCA and ICA. Reinforcement learning -MDPs, Bellman equations, Value iteration and policy iteration, Linear quadratic regulation (LQR),Q-learning. Value function approximation.				
Text and References	<p><b>Text Book:</b></p> <p>1) Christopher Bishop. Pattern Recognition and Machine Learning. Springer, 6e, 2011</p> <p><b>Reference Books:</b></p> <p>1) T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning, 2e, 2008.</p> <p>2) Tom M. Mitchell. Machine Learning, Mc Graw Hill, 2017</p>				