

**INDIAN INSTITUTE OF INFORMATION TECHNOLOGY DESIGN
AND MANUFACTURING (IIITDM) KANCHEEPURAM**

Course Title	Machine Learning	Course No	CS51XX			
Department/ Specialization	Computer Science and Engineering	Credits	L	T	P	C
			3	0	2	4
Faculty proposing the course	Dr. V. Masilamani	Status	Core	<input type="checkbox"/>	Elective	■
Offered for	UG, PG	Type	New	<input type="checkbox"/>	Revision	■
To take effect from		Submitted for approval	48 th Senate			
Prerequisite	Programming and Data Structures					
Learning Objectives	To solve many real world problems, mathematical characterization of solution is extremely difficult. Nowadays huge volumes 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 image classification, data mining, autonomous navigation, bioinformatics, speech recognition, text and web data processing will be discussed					
Learning 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					
Course Contents (with approximate breakup of hours for lecture/ tutorial/practice)	Introduction to Machine Learning, Supervised Learning -linear regression, logistic regression, Perceptron. Exponential family, generalized linear models. (8) Generative learning algorithms. Gaussian discriminant analysis. Naive Bayes. Support vector machines. Bias/variance tradeoff Model selection and feature selection. Evaluating and debugging learning algorithms, Decision Trees, Random Forest. (10) Introduction to deep learning – Convolution Neural Network. (4) Unsupervised learning-clustering - K-means, EM, Mixture of Gaussians, Factor Analysis,. Dimensionality reduction - ICA. (8) Reinforcement learning -MDPs, Bellman equations, Value iteration and policy iteration, Linear quadratic regulation (LQR), Q-learning. Value function approximation. (12)					
Essential Reading	1. Christopher Bishop. Pattern Recognition and Machine Learning. Springer, 6e, 2011					
Supplementary Reading	1. T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning, 2e, 2008. 2. Tom M. Mitchell. Machine Learning, Mcgraw Hill, 2017					