

COURSE CODE	COURSE TITLE	L	T	P	C
1152CS140	MACHINE LEARNING TECHNIQUES	3	0	0	3

Course Category: Program Elective

A. Preamble :

To provide an in-depth knowledge about machine learning concepts and identify applications suitable for different types of machine learning with suitable justification

B. Prerequisite Courses:

Sl. No	Course Code	Course Name
1.	1151CS107	Database Management System

C. Related Courses:

S. No	Course Code	Course Name
1	1156CS601	Minor Project
2	1156CS701	Major Project

D. Course Outcomes :

Upon the successful completion of the course, students will be able to:

CO Nos.	Course Outcomes	Level of learning domain (Based on revised Bloom's taxonomy)
CO1	Outline the basic concepts of machine learning	K2
CO2	Summarize supervised learning and classification techniques	K2
CO3	Apply the concept of unsupervised learning and Clustering for applications	K3
CO4	Illustrate the concept of Dimensionality Reduction.	K2
CO5	Infer theoretical and practical aspects of reinforcement learning	K2

E. Correlation of COs with POs :

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	H					L						L	L		
CO2	H	H	H	L		L		L	L		L	L	H	M	L
CO3	H	H	M	L		L		L	L		L	L	H	M	L
CO4	H	L	M	L		L						L			
CO5	H	L	H			L		L				L		L	

H- High; M-Medium; L-Low

F. Course Content

UNIT I	INTRODUCTION	5
Machine Learning - Examples of machine learning applications- Types of machine learning –Model selection and generalization – Guidelines for Machine Learning Experiments		
UNIT II	SUPERVISED LEARNING	10
Classification - Decision Trees – Univariate Tree –Multivariate Tree - Pruning –Perceptron – Multilayer Perceptron - Back Propagation – Cross Validation and Resampling Methods		
UNIT III	UNSUPERVISED LEARNING	10
Clustering- Mixture densities -K-means - EM Algorithm – Supervised Learning After Clustering- Hierarchical Clustering		
UNIT IV	DIMENSIONALITY REDUCTION	10
The Curse of Dimensionality –Subset Collection - Principal Component Analysis - Factor Analysis – Linear Discriminant Analysis		
UNIT V	REINFORCEMENT LEARNING	10
Single State Case – Elements of Reinforcement Learning - Model Based Learning – TemporalDifference Learning –Generalization in Reinforcement Learning - Policy Search		
		TOTAL: 45 Hours

G. Learning Resources

i. TEXT BOOK

1. EthemAlpaydin, Introduction to Machine Learning MIT Press, 2014.

ii. REFERENCE BOOK

1. Tom M Mitchell, Machine Learning, First Edition, McGraw Hill Education, 2013
2. Richard S. Sutton and Andrew G. Barto: Reinforcement Learning: An Introduction. MIT Press