SWARNANDHRA
COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
Accredited by National Board of Accreditation, AICTE, New Delhi, Accredited by NAAC with "A" Grade – 3.32 CGPA, Recognized under 2(f) & 12(B) of UGC Act 1956, Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada
Seetharampuram, W.G.DT., Narsapur-534280, (Andhra Pradesh)

DEPARTMENT OF ARTIFICIAL INTELLIGENCE & MACHINE LEARNING
TEACHING PLAN

Course Code	Course Title	Semester/ Regulation	Branch	Contact Periods /Week	Academic Year	Date of commencement of Semester
23AD5T01	PRINCIPLES OF MACHINE LEARNING	V	AI & DS	6	2025-2026	09-07-2025

COURSE OBJECTIVES	
1	The objectives of the course are to Define machine learning and its different types (supervised and unsupervised) and understand their applications.
2	Apply supervised learning algorithms including decision trees and k-nearest neighbors (k-NN).
3	Implement unsupervised learning techniques, such as K-means clustering.

COURSE OUTCOMES	
1	Enumerate the Fundamentals of Machine Learning
2	Build Nearest neighbor-based models
3	Apply Models based on decision trees and Bayes rule
4	Make use of Linear discriminants for machine Learning
5	Choose appropriate clustering technique

UNIT	Out Comes / Bloom's Level	Topics s No.	Topics/ Activity	Text Book/ Reference	Contact Hour	Delivery Method
			Introduction to Machine Learning	T1,R1		
I	CO – 1	1.1	Evolution of Machine Learning	T1,R1	1	Chalk , talk
		1.2	Paradigms for ML	T1,R1	2	Chalk, talk
		1.3	Learning by Rote, Learning by Induction,	T1,R1	1	Chalk, talk
		1.4	Reinforcement Learning	T1,R1	1	Chalk, talk
		1.5	Types of Data, Matching,	T1,R1	1	Chalk, talk
		1.6	Stages in Machine Learning	T1,R1	1	

		1.7	Data Acquisition	T1,R1	1	Chalk, talk
		1.8	Feature Engineering, Data Representation	T1,R2	1	Chalk, talk
		1.9	Model Selection, Model Learning, Model Evaluation, Model Prediction	T1,R2	2	Chalk, talk
		1.10	Search and Learning	T1,R1	1	Chalk, talk
		1.11	Data Sets	T1,R3	1	Chalk, talk
	CBS		Distance Metric Learning		1	
	Total:				14	
	Nearest Neighbor-Based Models					
II	CO-2	2.1	Introduction to Proximity Measures, Distance Measures	T1,R2	2	Chalk, talk
		2.2	Non-Metric Similarity Functions	T1,R2	1	Chalk, talk
		2.3	Proximity Between Binary Patterns	T1,R2	1	Chalk, talk
		2.4	Different Classification Algorithms Based on the Distance Measures	T1,R2	1	Chalk, talk
		2.5	K-Nearest Neighbor Classifier	T1,R3	2	Chalk, talk
		2.6	Radius Distance Nearest Neighbor Algorithm	T1,R3	2	Chalk, talk
		2.7	KNN Regression, Performance of Classifiers, Performance of Regression Algorithms	T1,R3	2	Chalk, talk
CBS			Ensemble and Probabilistic Learning: Gradient Boosting and Bayesian Ensemble Methods		1	Chalk, talk
			Total		12	
Models Based on Decision Trees						
III	CO – 3	3.1	Decision Trees for Classification	T1,R1	2	chalk,talk Chalk, talk
		3.2	Impurity Measures, Properties, Regression Based on Decision Trees,	T1,R1	1	Chalk, talk
		3.3	Bias–Variance Trade-off,	T1,R1	2	Chalk, talk
		3.4	Random Forests for Classification and Regression.	T1,R1	2	Chalk, talk
		3.5	**The Bayes Classifier:** Introduction to the Bayes Classifier,	T1,R1	1	Chalk, talk

		3.6	Bayes' Rule and Inference, The Bayes Classifier and its Optimality	T1,R1	2	Chalk, talk
		3.7	Multi-Class Classification |Class Conditional Independence and Naive Bayes Classifier (NBC)	T1,R1	1	Chalk, talk
		CBS	Deep Learning and Advanced Neural Network Architectures		1	Chalk, talk
			Total		12	
Linear Discriminants for Machine Learning						
IV	CO – 4	4.1	Introduction to Linear Discriminants, Linear Discriminants for Classification, P.	T1,R2	1	Chalk, talk
		4.2	Perceptron Classifier, Perceptron Learning Algorithm,	T1,R2	1	Chalk, talk
		4.3	Support Vector Machines,	T1,R2	1	Chalk, talk
		4.4	Linearly Non-Separable Case	T1,R2	1	Chalk, talk
		4.5	Non-linear SVM, Kernel Trick	T1,R2	1	Chalk, talk
		4.6	Logistic Regression,	T1,R2	1	Chalk, talk
		4.7	Linear Regression	T1,R2	1	Chalk, talk
		4.8	Multi-Layer Perceptron's (MLPs)	T1,R2	1	Chalk, talk
		4.9	Backpropagation for Training an ML	T1,R2	1	Chalk, talk
	CBS		Advanced and Deep Clustering Techniques		1	Chalk, talk
Total					10	
Clustering						
V	CO-5	5.1	Introduction to Clustering, Partitioning of Data	T1,R2	1	Chalk, talk
		5.2	Matrix Factorization Clustering of Patterns	T1,R2	1	Chalk, talk
		5.3	Divisive Clustering,Agglomerative Clustering	T1,R3	1	Chalk, talk
		5.4	Partitional Clustering	T1,R3	1	Chalk, talk
		5.5	K-Means Clustering, Soft Partitioning, Soft Clustering,	T1,R3	1	Chalk, talk
		5.6	Fuzzy C-Means Clustering, Rough Clustering,.	T1,R3	2	Chalk, talk
		5.7	Rough K-Means Clustering Algorithm,	T1,R3	1	Chalk, talk

		5.8	Expectation Maximization-Based Clustering,	T1,R3	2	Chalk, talk
		5.9	Spectral Clustering	T1,R3	1	Chalk, talk
	CBS		Advanced and Deep Clustering Techniques		1	
				Total	12	
				CUMULATIVE PROPOSED PERIODS	60	

Text Books:

S. No	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	M N Murthy, V S Ananthanarayana, Machine Learning Theory and Practice Universities Press (India), 2024

Reference Books:

S. No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	Tom M. Mitchell, Machine Learning, McGraw-Hill Publication, 2017
2	Peter Harrington, Machine Learning in Action, DreamTech,2012
3	Pang-Ning Tan, Michel Stenbach, Vipin Kumar, Introduction to Data Mining,7th Edition, 2019.

		Name	Signature with Date
i.	Faculty	Mr.P Venkatesh	
ii.	Course Coordinator	Mr V Durga Rao	
iii.	Module Coordinator	Dr G Sudhakar	
iv.	Programme Coordinator	Dr. B. RAMA KRISHNA	

Principal