Course code	21CSESE06	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	L	T	P	C
Core/Elective/Supportive		Elective	4			4
Pre-requisite		Basics of Mathematical Probabilities and Computer Programming	Syllabus Version		2021-2022	

Course Objectives:

1. To articulate key problems, both technical and philosophical, in the development of artificialintelligence
2. To apply the machine learning algorithms for variousapplications.
3. To understand the Concepts of Machine learning algorithms of different probabilistic,rE

Expected Course Outcomes:

CO1	Understand and Apply AI technique in the development of problem-solving and learning systems	K1
CO2	Understand the problems where artificial intelligence techniques are applicable	K2
CO3	Apply the concepts of machine learning	K2
CO4	Understand the theoretical concepts of probabilistic and linear methods	K4
CO5	Distinguish Supervised, Unsupervised and semi supervised learning	K4, K3,K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6**– Create

Unit:1	Artificial Intelligence	**12—hours**

Introduction to Artificial Intelligence – Intelligent Agents – Problem solving – Solving problems by searching – search in complex environments – Adversarial Search and Games – Constraints Satisfaction Problems

Unit:2	Knowledge, reasoning and planning	**12—hours**

Logical Agents – First –Order Logic – Inference in First –Order Logic – Knowledge Representation – Automated Planning – Uncertain knowledge and reasoning – Quantifying Uncertainty – Probabilistic Reasoning – Probabilistic Programming – Multi Agent Decision Making

Unit:3	Machine Learning	**12—hours**

Machine Learning Foundations –Overview – applications - Types of machine learning - basic concepts in machine learning Examples of Machine Learning -Applications - Linear Models for Regression - Linear Basis Function Models - The Bias-Variance Decomposition- Bayesian Linear Regression - Bayesian Model Comparison

Unit:4	Models for Classification	**12—hours**

Supervised Learning Linear Models for Classification - Discriminant Functions - Probabilistic Generative Models - Probabilistic Discriminative Models - Bayesian Logistic Regression. Decision Trees - Classification Trees- Regression Trees - Pruning. Neural Networks -Feed-forward Network Functions - Error Back propagation - Regularization - Mixture Density and Bayesian Neural Networks - Kernel Methods - Dual Representations - Radial Basis Function Networks. Support Vector Machines - Ensemble methods- Bagging Boosting – Evaluation Methods

Unit:5	Clustering	**12—hours**

Unsupervised Learning Clustering- K-means - EM - Mixtures of Gaussians - The EM Algorithm in General - Model selection for latent variable models - high-dimensional spaces - - The Curse of Dimensionality - Dimensionality Reduction - Factor analysis - Principal Component Analysis - Probabilistic PCA- Independent components analysis