Subject Code	Subject Name	Credits
26CS009	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	04

Course Objectives:

1. Understand the basics of AI and Machine Learning
2. Learn core ML algorithms
3. Gain hands on experience with AI tools and Libraries
4. Build predictive models and intelligent systems.

Learning Objectives:

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

1. Differentiate between supervised and unsupervised learning tasks.
2. State the need of pre-processing, feature scaling and feature selection.
3. Formulate classification, regression and clustering problems as optimization problems
4. Implement various machine learning algorithms learnt in the course.

Unit 1 - Introduction to artificial intelligence (12 hrs.):
Definition and History of AI, Applications of AI. Types of AI – Narrow, General and Super. Intelligent Agents, PEAS, Agent Types. Agents and Environments: How agents perceive and act. Rational Agent.

Unit 2 - Foundations of machine learning (12 hrs.):
What is Machine Learning? Types of Machine Learning: Supervised, Unsupervised and Semi-Supervised. Dataset Concepts. Model Selection, Feature scaling, Feature Selection techniques. Dimensionality reduction methods.

Unit 3 – Regression (12 hrs.):
Linear regression with one variable, linear regression with multiple variables, Gradient descent, over-fitting, regularization. Regression evaluation metrics.

Unit 4 – Classification (12 hrs.)
Decision trees, Bayes Theorem: Naive Bayes classifier, Logistic regression, k-nearest neighbour classifier, Artificial Neural Networks, Support Vector Machine (SVM): Linear and Non-linear SVM. Combining Classifier: Bagging and Boosting

Unit 5 – Clustering (12 hrs.)
Approaches for Clustering, Distance metrics, K-means Clustering, K-Medoids, Hierarchical, Density and Grid based clustering. EM algorithm.

Reference Books:

1. Mitchell, T.M. Machine Learning, McGraw Hill Education, 2017.
2. Artificial Intelligence: A Modern Approach – Stuart Russell & Peter Norvig
3. Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow – Aurélien Géron
4. Pattern Recognition and Machine Learning – Christopher Bishop