MACHINE LEARNING TECHNIQUES

Course Code	20IT3601	Year	III	Semester	II
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Linear algebra, Statistics and Probability.
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		
CO1	Understand the basic concepts of machine learning.	L2
CO2	Apply machine learning techniques on appropriate problems.	L3
CO3	Apply Evaluation, hypothesis tests and compare learning techniques for various problems.	L3
CO4	Analyze real time problems in different areas and solve using Reinforcement learning technique.	L4

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												2	2
CO2	3	3			3	2							2	2
CO3	3								3	3			2	2
CO4		3	3		3	2							2	2

Unit No.	Contents	Mapped CO
	Syllabus	
I	**Introduction:** What Is Machine Learning?, Examples of Machine Learning Applications - Learning Associations, Classification, Regression, Unsupervised learning, Reinforcement learning. [TB-1]	**CO1,C02**
II	**Supervised Learning: Regression:** Introduction to Linear Regression and Multiple Linear Regression, KNN. Measuring regression model performance - R Square, Mean Square Error(MSE),Root Mean Square Error(RMSE), Mean Absolute Error(MAE) **Classification**: Support vector machine- Characteristics of SVM, Linear SVM, Naive Bayes Classifier, KNN classifier, Logistic Regression. [TB-2] **Measuring Classifier Performance:** Precision, Recall, Confusion Matrix. [TB1]	**CO1,CO2,CO3**
III	**Combining Multiple Learners**– Model Combination schemes, voting, Bagging, Boosting. [TB1] **UnSupervised Learning:** K-Means, Expectation Maximization Algorithm, supervised learning after clustering, spectral clustering, choosing number of clusters.[TB-1]	**CO1,CO2,CO3**
IV	**Multilayer Perceptrons:** The Perceptron, Training a Perceptron, Learning Boolean Functions, Multilayer Perceptrons, MLP as a Universal Approximator, Backpropagation Algorithm, Training Procedures, Dimensionality Reduction, Learning Time. [TB-1]	**CO1,CO2,CO3**
V	**Reinforcement Learning**: Single State Case: K-Armed Bandit, Elements of Reinforcement learning, Model based Learning, Temporal Difference learning, Generalizing from examples. [TB-1]	**CO1,CO3,CO4**

Learning Resources
Text Book
1.Introduction to Machine Learning, Ethem Alpaydin, Second Edition, 2010, Prentice Hall of India. 2.Introduction to Data Mining, Tan, Vipin Kumar, Michael Steinbach, 9th Edition, 2013, Pearson.
References
1. Machine Learning by Tom M. Mitchell, International Edition 1997, McGraw Hill Education. 2. Machine Learning, Anuradha Srinivasaraghavan, and Vincy Joseph, Kindle Edition, 2020, WILEY. 3.Machine Learning a Probabilistic Perspective, Kevin P Murphy & Francis Bach, First Edition, 2012, MIT Press. 4. "Deep Learning", Ian Goodfellow, Yoshua Bengio, Aaron Courville, 2016, MIT Press.
e-Resources and other Digital Material
1.https://www.coursera.org/learn/machine-learning 2.https://nptel.ac.in/courses/106/106/106106139/