MACHINE LEARNING

Course Code	20EC4601E	Year	III	Semester	II
Course Category	Program Elective II	Branch	ECE	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 the performance of learning techniques forvarious problems	L3
CO4	Analyze Reinforcement learning to address the real time problems in different areas	L4

Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)
Note: 1- Weak correlation   2-Medium correlation   3-Strong correlation
   * - Average value indicates course correlation strength with mapped PO

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	2	-	-	-	-	-	-	2	-	2	-	2	-	-
CO2	3	-	-	-	-	-	-	3	-	3	-	-	3	-
CO3	3	-	-	-	3	-	-	3	-	3	-	-	2	-
CO4	-	2	-	-	-	-	-	2	-	2	-	-	-	2
Average * (Rounded to nearest integer)	3	2	-	-	3	-	-	3	-	3	-	2	3	2

Syllabus		
Unit No.	Contents	Mapped CO
I	**Introduction**: What is Machine learning, Designing a Learning System, Perspectives and Issues in Machine Learning, Applications of Machinelearning.	CO1
II	**Supervised Learning**: Decision Trees, Bayes Theorem, Naive Bayes Classifier, Measuring Classifier Accuracy, Estimating HypothesisAccuracy	CO1, CO2, CO3
III	**Instance Based Learning** – Support vector machine, Ensemble Methods, k-Nearest Neighbor Learning, Expectation Maximization Algorithm, Case Based Reasoning	CO1, CO2, CO3

IV	**Un Supervised Learning:** Partition methods of Clustering, Hierarchical methods, Density based clustering, Scalable Clustering Algorithms, Cluster Evaluation measures Association analysis: Apriori algorithm, efficiently finding frequent itemsets with FP-growth		CO1, CO2, CO3
V	**Reinforcement learning:** The learning Task, Elements of Reinforcement learning, Q-Learning, Model based Learning, Temporal Difference learning		CO1, CO4

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