MACHINE LEARNING

B.E., VIII Semester, Electronics & Communication Engineering/ Telecommunication Engineering

[As per Choice Based Credit System (CBCS) Scheme]

Course Code	**17EC834**	**CIE Marks**	**40**
Number of Lecture Hours/Week	**03**	**SEE Marks**	**60**
Total Number of Lecture Hours	**40 (8 Hours / Module)**	**Exam Hours**	**03**

CREDITS – 03

Course Objectives: This course will enable students to:

- Introduce some concepts and techniques that are core to Machine Learning.
- Understand learning and decision trees.
- Acquire knowledge of neural networks, Bayesian techniques and instant based learning.
- Understand analytical learning and reinforced learning.

Module-1

Learning: Designing Learning systems, Perspectives and Issues, Concept Learning, Version Spaces and Candidate Elimination Algorithm, Inductive bias. **L1, L2**

Module-2

Decision Tree and ANN: Decision Tree Representation, Hypothesis Space Search, Inductive bias in decision tree, issues in Decision tree. Neural Network Representation, Perceptrons, Multilayer Networks and Back Propagation Algorithms. **L1, L2**

Module-3

Bayesian and Computational Learning: Bayes Theorem, Bayes Theorem Concept Learning, Maximum Likelihood, Minimum Description Length Principle, Bayes Optimal Classifier, Gibbs Algorithm, Naïve Bayes Classifier. **L1, L2**

Module-4

Instant Based Learning and Learning set of rules: K- Nearest Neighbour Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning. Sequential Covering Algorithms, Learning Rule Sets, Learning First Order Rules, Learning Sets of First Order Rules. **L1, L2**

Module-5

Analytical Learning and Reinforced Learning: Perfect Domain Theories, Explanation Based Learning, Inductive-Analytical Approaches, FOCL Algorithm, Reinforcement Learning. **L1, L2**

Course outcomes: At the end of the course, students should be able to:

- Understand the core concepts of Machine learning.
- Appreciate the underlying mathematical relationships within and across Machine Learning algorithms.
- Explain paradigms of supervised and un-supervised learning.
- Recognize a real world problem and apply the learned techniques of Machine Learning to solve the problem.

Text Book:

Machine Learning-Tom M. Mitchell, McGraw-Hill Education, (Indian Edition), 2013.

Reference Books:

1. **Introduction to Machine Learning-** Ethem Alpaydin, 2nd Ed., PHI Learning Pvt. Ltd., 2013.
2. **The Elements of Statistical Learning**-T. Hastie, R. Tibshirani, J. H. Friedman, Springer; 1st edition, 2001.

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