4/4 B.Tech - SECOND SEMESTER

IT8T3C **MACHINE LEARNING** **Credits:3**

Lecture: 3 Periods/week **Internal assessment: 30 marks**

Practice/Interaction: 1Period/week **Semester end examination: 70 marks**

Objectives:

- To introduce machine learning problems corresponding to different applications.
- To learn concepts of Decision tree learning and artificial neural networks.
- To discuss Bayesian learning and computational learning theory.
- To provide basic Knowledge on Instance based learning.

Outcomes:

Students will be able to

- Understand the perspectives and issues in machine learning.
- Understand the concepts of decision tree learning and artificial neural networks.
- Design and implement various concepts in Bayesian learning.
- Apply the concept of computational learning theory.
- Know the concept of instance based learning.

Prerequisite:

Data Mining and Data Warehousing.

Syllabus

UNIT – I

Introduction: Well- posed learning problems, designing a learning system, Perspectives and issues in machine learning

Concept Learning and the General to Specific Ordering: Concept learning task, concept learning as search, Find-S: finding a Maximally Specific hypothesis, Version Spaces and the Candidate-Elimination algorithm and inductive bias.

UNIT – II

Decision Tree Learning: Hypothesis space search in Decision Tree learning, inductive bias in Decision Tree learning, Issues in Decision Tree learning.

Artificial Neural Networks: Neural Network representations, appropriate problems for Neural Network learning, Perceptrons, Multilayer Networks and the Back propagation algorithm and remarks on the Back propagation algorithm.

UNIT – III

Bayesian Learning: Bayes theorem and concept learning, maximum likelihood and least squared error hypotheses, maximum likelihood hypotheses for predicting probabilities, minimum description length principle, Bayes optimal classier, Naive Bayes classier, Bayesian belief networks.

UNIT – IV

Computational learning theory: Introduction, probably learning an approximately Correct hypothesis, sample complexity for finite hypothesis spaces, and sample complexity for infinite hypothesis spaces and mistake bound model of learning.

UNIT – V

Instance Based Learning: Introduction, k-Nearest Neighbor learning, locally weighted regression, radial basis functions, Case Based Reasoning and remarks on Lazy and Eager learning.

Text Book:

1. Tom M. Mitchell, “Machine Learning”, Mc. Graw Hill Publishing

e-Learning Resources:

1. http://ocw.mit.edu
2. http://www.cs.cmu.edu/~tom/10701_sp11/lectures.shtml