VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

MACHINE LEARNING

SYLLABUS FOR B.E. V-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code:**U19PC540CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*
To formulate machine learning problems corresponding to an application.	1 Explain the basics of concept learning and inductive learning. 2 Design decision tree neural network solve classification problems. 3 Comprehend probabilistic methods for learning. 4 Explain the instance based learning and reinforcement learning. 5 Build optimal classifiers using Genetic Algorithm and deep learning.

UNIT-I:
Introduction: Well-Posed Learning Problems, Designing a Learning System, Issues in Machine Learning.
The Concept Learning: A concept Learning Task, General –to- Specific Ordering of Hypothesis, Find-S, The List-Then-Eliminate Algorithm, Candidate Elimination Learning Algorithm, Inductive bias.

UNIT-II:
Decision Tree Learning: Introduction, Decision Tree Representation, The Basic Decision Tree Algorithm, Hypothesis space search in Decision Tree Learning, Issues in Decision Tree Learning.
Artificial Neural Networks: Introduction, Neural Network Representation, Perceptrons, Gradient descent and the Delta rule, Multilayer Networks, Derivatives of back propagation rule. Back propagation algorithm- Convergence, Generalization.
Evaluating Hypotheses: Estimating hypotheses Accuracy, Basics of sampling theory, Comparing learning algorithms.

UNIT-III:

Bayesian Learning: Introduction, Bayes Theorem, Concept Learning, Bayes Optimal Classifier, Naïve Bayes Classifier, Bayesian Belief networks, EM algorithm.

Computational Learning Theory: Introduction, Probably Learning an Approximately Correct Hypothesis, Sample Complexity for Finite Hypothesis Spaces, Sample Complexity for Infinite Hypothesis Spaces, The Mistake Bound Model of Learning.

UNIT-IV:

Instance-based Learning: Introduction, k-Nearest Neighbor-Distance Weighted Nearest Neighbor Algorithm, Locally Weighted Regressions, Radial Basis Functions, Case –based learning.

Reinforcement Learning: Introduction, Learning Task, Q Learning.

UNIT-V:

Genetic Algorithms: Motivation, Genetic Algorithm-Representing Hypotheses, Genetic Operators, Fitness Function and Selection, An Illustrative Example, Hypothesis Space Search, Genetic programming, Models of Evolution and Learning.

Deep Learning: Convolutional neural networks, recurrent neural networks.

Learning Resources:

1. Tom Mitchell, "Machine Learning", McGraw-Hill Science, First edition.
2. Christopher Bishop, "Pattern Recognition and Machine learning", Springer (2006).
3. Stephen Marsland,"Machine Learning –an algorithmic perspective", CRC Press.
4. Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville, "Deep learning ", An MIT Press book in preparation (2015).
5. Daniela witten, Trevor Hastie Robert Tibshirani and Gareth James, "An introduction to statistical Learning with applications in R, Springer 2013
6. https://onlinecourses.nptel.ac.in/noc18_cs26/preview
7. https://www.coursera.org/learn/machine-learning
8. http://www.holehouse.org/mlclass
9. https://in.udacity.com/course/intro-to-machine-learning--ud120
10. https://github.com/JannesKlaas/MLiFC

The break-up of CIE: Internal Tests   + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test :	30
2	No. of Assignments	:	3	Max. Marks for each Assignment :	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test :	5

Duration of Internal Tests   :   1 Hour 30 Minutes