ADVANCED MACHINE LEARNING
(Effective from the academic year 2018 -2019)
SEMESTER – VII

Subject Code	18AI72	**CIE Marks**	40
Number of Contact Hours/Week	4:0:0	**SEE Marks**	60
Total Number of Contact Hours	50	**Exam Hours**	3 Hrs

CREDITS –4

Course Learning Objectives: This course will enable students to:

- Demonstrate the fundamentals of GDT
- Illustrate the use of KNN
- Explore the Text feature Engineering concepts with Applications
- Demonstrate the use of Ensemble Methods

Module 1	Contact Hours
Advanced Machine Learning: Overview, Gradient Descent algorithm, Scikit-learn library for ML, Advanced Regression models, Advanced ML algorithms, KNN, ensemble methods. **T2: Chapter 6 (upto 6.5.4)** **Forecasting:**Overview, components, moving average, decomposing time series, auto-regressive Models. **T2: Chapter: 8**	10
Module 2	
Hidden Markov Model: Introduction, Issues in HMM(Evalution, decoding, learning, classifier) **T3: Chapter 12** **CLUSTERING** **Introduction,** Types of clustering, Partitioning methods of clustering (k-means, k-medoids), hierarchical methods **T3: Chapter 13**	10
Module 3	
Recommender System: Datasets, Association rules, Collaborative filtering, User-based similarity, item-based similarity, using surprise library, Matrix factorization **Text Analytics:** Overview, Sentiment Classification, Naïve Bayes model for sentiment classification, using TF-IDF vectorizer, Challenges of text analytics **T2: Chapter 9 and** 10	10
Module 4	
Neural networks and genetic algorithms: Brief history and Evolution of Neural network, Biological neuron, Basics of ANN,Activation function, MP model. **T3: Chapter 6** Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Genetic Algorithms – Hypothesis Space Search – Genetic	10

Programming – Models of Evolution and Learning. **T1: Chapter 4 & 9**	
Module 5	
Instant based learning and learning set of rules: Evaluating Hypothesis: Motivation, Estimating hypothesis accuracy, Basics of sampling theorem, General approach for deriving confidence intervals, Difference in error of two hypothesis, Comparing learning algorithms. Instance Based Learning: Introduction, k-nearest neighbor learning(review), locally weighted regression, radial basis function, cased-based reasoning, Reinforcement Learning: Introduction, Learning Task, Q Learning **T1 :Sections: 5.1-5.6, 8.1-8.5, 13.1-13.3**	10

Course Outcomes: The student will be able to :

- Apply effectively ML algorithmsto solve real world problems.
- Apply Instant based techniques and derive effectively learning rules to real world problems.

Question Paper Pattern:

- The question paper will have ten questions.
- Each full Question consisting of 20 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Textbooks:

T1. Tom M. Mitchell, Machine Learning, McGraw-Hill Education, 2013

T2. Machine Learning using Python ,Manaranjan Pradhan, U Dinesh Kumar, Wiley 2019

T3. Machine Learning, Anuradha Srinivasaraghavan, VincyJoeph, Wiley 2019

Reference Books:

1. EthemAlpaydin, Introduction to Machine Learning, PHI Learning Pvt. Ltd, 2nd Ed., 2013
2. T. Hastie, R. Tibshirani, J. H. Friedman, The Elements of Statistical Learning, Springer, 1st edition, 2001
3. Machine Learning, SaikatDutt, Subramanian Chandramouli, Amit Kumar Das, Pearson,2020