Birla Institute of Technology & Science, Pilani
Hyderabad Campus

SECOND SEMESTER 2022-2023

Course Handout Part II

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Date: 16/01/2023

Course No. **:** BITS F464
Course Title **:** Machine Learning
Instructor In Charge **: Dr. N.L.BHANU MURTHY**
Team of Instructors : **Dr. N.L.Bhanu Murthy**

Scope and Objectives of the course:
Machine Learning addresses the problem of identifying patterns in data. The major goal of machine learning is to allow computers to learn (potentially complex) patterns from data, and then make decisions based on these patterns. The course covers design, implementation and applications of many supervised and unsupervised machine learning algorithms. The classification algorithms, namely, Logistic Regression, Support Vector Machines, Artificial Neural Networks, Decision Trees, Bayesian methodologies will be studied exhaustively.
The objectives of the course are to

- Learn theoretical and practical aspects of linear models for classification
- Understand probabilistic discriminative and generative models for classification
- Learn theoretical and practical aspects of SVM and ANN
- Understand decision tree learning and ensemble methods

3. TEXT BOOK :
T1. Christopher Bishop: Pattern Recognition and Machine Learning, Springer International Edition
T2. Tom M. Mitchell: Machine Learning, The McGraw-Hill Companies, Inc..

COURSE PLAN:

Lecture No.	Learning objectives	Topics to be covered	Chapter in the Text Book
1 - 2	To introduce the course	Course Introduction & Motivation	Lecture Notes
3 - 7	To understand linear models for classification	Discriminant Functions – Fisher's linear discriminant, perceptron algorithm	T1 – Ch. 4.1
8 - 12	To understand probabilistic generative models	Probabilistic generative models – Maximum likelihood solution, Naïve Bayes classifier	T1 – Ch.4.2 T2 – Ch.6
13 - 17	To understand probabilistic discriminative models	probabilistic discriminative models - Logistic Regression	T1 – Ch. 4.3
18 - 21	To understand decision tree learning	Decision Tree Learning	T2 – Ch. 3
22 - 28	To understand ANN	Artificial Neural Networks	T1 – Ch. 5
29 - 35	To understand SVM	Support Vector Machines	T1 – Ch. 6 and Ch. 7
36 – 40	To understand ensemble methods	Boosting, Tree-based models, Mixture of logistic models, Gradient Boosting	T1 – Ch.14

EVALUATION SCHEME:

Component	Duration	Date & Time	Weightage	Nature of Component

Mid Test	**90 mins**	**9.30 - 11.00AM, 12/03**	**30%**	**Close Book**
Assignments (10% will be evaluated before Mid Sem)			**25%**	**Open Book**
Comprehensive	**3 Hrs**	**FN, 14/05**	**45%**	**Close Book**

7. CHAMBER CONSULTATION HOUR: Tuesday 1700Hrs – 1800Hrs @H119
8. Make-up: Make-up will be granted only to genuine cases with prior permission only.
9. NOTICES: All notices about the course will be put on CSIS Notice Board.
10. **Academic Honesty and Integrity Policy**: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor-in-charge
BITS F464