



Birla Institute of Technology & Science, Pilani
Hyderabad Campus

FIRST SEMESTER 2023-2024

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:

11/08/2023

Course No. : BITS F464
Course Title : Machine Learning
Instructor In Charge : Manik Gupta

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, Perceptron, Logistic Regression, Support Vector Machines, Artificial Neural Networks, Decision Trees, Ensembles will be studied in details.

The objectives of the course are to

- Learn theoretical and practical aspects of linear models for regression and 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 Slides
3 - 6	To understand linear models for classification	Linear Regression, Polynomial regression	T1 – Ch. 1.1 T1 – Ch. 3.1
7 – 13	To understand linear models for classification	Discriminant functions, Least squares for classification, perceptron algorithm	T1 – Ch. 4.1
14 - 20	To understand probabilistic generative and discriminative models	Probabilistic generative models – Maximum likelihood solution, Naïve Bayes classifier, probabilistic discriminative models – Logistic Regression	T1 – Ch.4.2 T1 – Ch. 4.3 T2 – Ch 6
21 – 26	To understand ANN	Feed forward Neural Networks, Backpropagation	T1 – Ch. 5.1, 5.2, 5.3 T2 – Ch. 4
27 – 32	To understand SVM	Maximum margin classifiers	T1 – Ch. 7.1
33 - 34	To understand unsupervised learning	Clustering and Expectation Maximization	T1 – Ch. 9.1, 9.2
35 – 36	To understand	Decision Tree Learning	T2 – Ch. 3

	decision tree learning		
37 – 40	To understand ensemble methods	Bias Variance tradeoff, Bagging and Boosting	T1 – Ch.14.2, 14.3

EVALUATION SCHEME:

Component	Duration	Date & Time	Weightage	Nature of Component
Mid Sem Exam	90 mins	09/10 - 11.30 - 1.00PM	30%	Closed Book
Assignments		To be announced later	30%	Open Book
Comprehensive Exam	3 Hrs	06/12 AN	40%	Closed Book

7. Office Hours: Monday 1200Hrs – 1300Hrs @H126

8. Make-up:

1. No Make-up requests for project submissions will be catered to.
2. Prior permission of the Instructor-in-Charge is required to get make-up for the mid-semester exam. Only on producing documentary proof of absence minimum one day prior to the exam, proving that student would be physically unable to appear for the exam, the decision of granting the make-up will be taken. The recommendation from chief warden is necessary to request for a make-up.
3. Prior permission of Dean, AUGSD is required to get make-up for the comprehensive exam.
4. Instructor-in-charge's decision in the matter of granting make-up would be final.

9. Notices: All notices about the course will be put on CMS/Google Classroom.

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