



**Birla Institute of Technology & Science, Pilani**  
Hyderabad Campus

## **FIRST 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: 29/08/2022

**Course No.** : BITS F464

**Course Title** : Machine Learning

**Instructor In Charge** : Prof.N.L.Bhanu Murthy

**Instructor** : Mr. Amit Kumar

#### **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. This course also encompasses regression techniques like linear regression of one variable and different variables.

The objectives of the course are to

- Learn theoretical and practical aspects of supervised learning algorithms
- Understand Bayesian perspective of some of the supervised learning algorithms
- Learn linear regression and understand Bayesian perspective of linear regression

### **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:**

<b>Lecture No.</b>	<b>Learning objectives</b>	<b>Topics to be covered</b>	<b>Chapter in the Text Book</b>
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 - 37	To understand SVM	Support Vector Machines	T1 – Ch. 6 and Ch. 7
38 – 42	To understand ensemble methods	Boosting, Tree-based models, Mixture of logistic models, Gradient Boosting	T1 – Ch.14

**EVALUATION SCHEME:**

<b>Component</b>	<b>Duration</b>	<b>Date &amp; Time</b>	<b>Weightage</b>	<b>Nature of Component</b>
<b>Mid Test</b>	<b>90 mins</b>	05/11 11.00 -	<b>30%</b>	<b>Closed Book</b>

		12.30PM		
<b>Assignments</b>			<b>30%</b> (Min 10% pre mid sem)	<b>Open Book</b>
<b>Comprehensive</b>	<b>3 Hrs</b>	29/12 FN	<b>40%</b>	<b>Closed Book</b>

**7. CHAMBER CONSULTATION HOUR:** Saturday 1500Hrs – 1600Hrs

**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 up on Google Class Room / CMS course page.

**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**