MSCS-4-01T: Machine Learning

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 4
Pass Percentage: 40%

INSTRUCTIONS FOR THE PAPER SETTER/EXAMINER

1. The syllabus prescribed should be strictly adhered to.
2. The question paper will consist of three sections: A, B, and C. Sections A and B will have four questions from the respective sections of the syllabus and will carry 10 marks each. The candidates will attempt two questions from each section.
3. Section C will have fifteen short answer questions covering the entire syllabus. Each question will carry 3 marks. Candidates will attempt any ten questions from this section.
4. The examiner shall give a clear instruction to the candidates to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.
5. The duration of each paper will be three hours.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt any two questions each from the sections A and B of the question paper and any ten short questions from Section C. They have to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.

Course: Machine Learning	
Course Code: MSCS-4-01T	
Course Outcomes (COs) After the completion of this course, the students will be able to:	
CO1	Understand the fundamental concepts and principles of machine learning.
CO2	Apply and evaluate various supervised learning algorithms
CO3	Explore and apply unsupervised learning techniques
CO4	Apply machine learning techniques to solve real-world problems
CO5	Evaluate the strengths and limitations of different machine learning approaches

Detailed Contents:

Module	**Module Name**	**Module Contents**
Section-A		

Module I	**Introduction to Machine Learning**	Introduction to ML, Applications of Machine learning, machine learning as a future; Data Pre-processing: Importing the libraries, Importing the dataset, taking care of missing data, encoding categorical data, Splitting the dataset into training set and test set, Feature scaling. Simple linear regression, Multiple linear regression, Logistic Regression, K-Nearest Neighbors, Support vector machine, Decision tree classification, Random forest classification, k-means clustering
Module II	**Introduction to Artificial Neural Networks**	Introduction to ANNs, Biological Neural Networks; Usefulness and Applications of ANNs; Architectures of ANNs: Single layer, Multilayer, Competitive layer; Learning: Supervised and Unsupervised; Activation functions; Linear and Non-linear Separability
Section-B		
Module III	**Supervised Models**	**Hebb Net:** introduction, algorithm, application for AND problem; **Perceptron:** architecture, algorithm, application for OR Problem; **ADALINE:** architecture, algorithm, application for XOR problem; **MADALINE:** architecture, algorithm, application for XOR problem; **Back propagation Neural Network:** architecture, parameters, algorithm, applications, different issues regarding convergence
Module IV	**Unsupervised Models**	**Kohonen Self –Organizing Maps:** architecture, algorithm, application, **Adaptive Resonance Theory:** introduction, basic architecture, basic operation, ART1 and ART

Books

1. Andreas C. Müller, "Introduction to Machine Learning with Python: A Guide for Data Scientists", Sarah Guido, 2016
2. E. Alpaydin, "Introduction to Machine Learning", 3rd Edition, PHI Learning, 2015
3. K. P. Murphy, "Machine Learning:A Probabilistic Perspective", MIT Press, 2012
4. https://www.udemy.com/course/machinelearning