P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010
Reaccredited at 'A+' level by NAAC
Autonomous & ISO 9001:2015 Certified

Title of the Course : MACHINE LEARNING
Semester : III

Course Code	22MA3D6	Course Delivery Method	Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2023-24	Year of offering : 2023-24	Year of Revision:	Percentage of Revision :

Course Objectives:
The objective of the course is to understand the concepts of Machine Learning, Basics of Data Preprocessing and Feature Engineering, Supervised Learning Algorithms, Regression Algorithms, Unsupervised Learning Algorithms, Concepts of Neural Networks.

Course Outcomes: Upon successful completion of the course, the student will be able to

CO-NO	COURSE OUTCOME	BTL	PO	PSO
CO1	know the concepts of Machine Leaning.	**K3**	**1**	**1**
CO2	understand basics of Data Pre-processing and Feature Selection.	**K3**	**1**	**1**
CO3	execute Supervised Learning and Regression Algorithms.	**K3**	**4**	**2**
CO4	understand the concepts of Unsupervised Learning.	**K3**	**3**	**1**
CO5	understand the concepts of Neural Networks.	**K3**	**1**	**1**

Mapping of Course Outcomes:

CO-PO-PSO MATRIX										
22MA3D6	**CO-PO**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
	CO1	**2**							**2**	
	CO2	**2**							**2**	
	CO3				**3**					**3**
	CO4			**3**					**2**	
	CO5	**3**							**2**	

UNIT I

Introduction to Machine Learning: Human Learning and Machine Learning - Types of Machine Learning - Languages and Tools in Machine Learning - Framework for Developing Machine Learning Models - Preparing to Model - Modeling and Evaluation Metrics.

UNIT II

Basics of Data Preprocessing and Feature Engineering: Feature Transformation - Feature Scaling- Feature Construction and Feature Subset Selection - Dimensionality Reduction - Explorative Data Analysis, - Hyper Parameter Tuning

UNIT III

Supervised Learning: Introduction - Classification -Common Classification Algorithms: Naive Bayes, KNN, Decision Trees, Random Forest

Regression(Common Regression Algorithms): Simple Linear Regression, Multiple Linear Regression, Polynomial Regression and logistic regression

UNIT IV

Unsupervised Learning: Introduction - Unsupervised Vs Supervised Learning - Unsupervised Learning Models - Dimensionality Reduction - Clustering: Association Rule Mining

UNIT V

Introduction to Neural Networks: Artificial Neural Networks - What is Artificial Neural Network?, Biological Neuron, Working process of Biological Neural Network, What is Artificial Neuron?, Biological Neuron vs. Artificial Neuron, Define Perceptron, How perceptron works? Types of Perceptron. Hand Digit Classification ,Convolution Neural Networks - Image Classification

Reference Text Books:

1. Hastie, T., R. Tibshirani, and J. H. Friedman. , The Elements of Statistical Learning: Data Mining, Inference and Prediction, New York, NY: Springer, 2011, ISBN: 97803879
2. Ethem Alphaydin, An introduction to Machine Learning, PHI Learning Private Limited, 2020
3. Aurelien Geron, Hands-On Machine Learning with Scikit Learn, Keras and Tensor Flow, O'REILY -2019
4. Tom Mitchell, Machine Learning, Tata McGraw Hill, 2013
5. Francois Chollet, Deep Learning with Python, Manning , 2019

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE

(An Autonomous College in the jurisdiction of Krishna University)

M.Sc.(Mathematics)

Third Semester

Machine Learning- 22MA3D6

Time: 3 Hours **Max Marks: 70 Marks**

SECTION-A

All Questions Carry Equal Marks. **(5×4=20Marks)**

1. (a) Difference between traditional programming and machine learning (CO1, K2)

(or)

(b) What are the different tools used in Machine Learning? (CO1, K2)

2. (a) What are the techniques of Feature Scaling? (CO2, K2)

(or)

(b) Define Dimensionality Reduction and explain its Techniques. (CO2, K2)

3. (a) Define classification .What are the various algorithms used for Classification? (CO3, K2)

(or)

(b) Define Logistic Regression. (CO3, K2)

4. (a) Explain Clustering and list out different Clustering Algorithms? (CO4, K2)

(or)

(b) Explain the Applications of Unsupervised Learning? (CO4, K2)

5. (a) Explain about Multi Layer Percepton. (CO5, K3)

(or)

(b) Explain Hand Digit Classification (CO5, K3)

SECTION-B

Answer ALL questions. All Questions Carry Equal Marks. **(5×10=50Marks)**

6. (a) Explain Supervised and Unsupervised Learning with Examples. (CO1, K2)

(OR)

(b) How to Train a Model for Supervised Learning in Machine Learning? (CO1, K2)

7. (a) Discuss Feature Transmission in detail. (CO2, K4)

(OR)

(b) Discuss about Feature Subset Selection. (CO2, K4)

8. (a) Explain K-Nearest Neighbor Classification algorithm with example/ (CO3, K4)

(OR)

(b) Explain simple Linear and Multiple Linear Regression. (CO3, K4)

9. (a) Comparisons between supervised learning and unsupervised learning (CO4, K2)

(OR)

(b) Explain k-means clustering algorithm with example (CO4, K2)

10. (a) Define Biological Neuron. Explain how biological neural networks work with diagram . (CO5, K3)

(or)

(b) Define Convolution Neural Networks. Explain its architecture and layers used in CNN. (CO5, K3)

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