PVP20

PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY

(Autonomous)
Kanuru, Vijayawada-520007

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (Data Science)

III B. Tech – I Semester CSE (Data Science)

Machine Learning

Course Code	20DS3501	**Year**	III	**Semester**	I
Course Category	PCC	**Branch**	CSE(Data Science)	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Artificial Intelligence
Continuous Internal Evaluation	30	**Semester End Examination**	70	**Total Marks**	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		
CO1	Describe the fundamental concepts, principles, and techniques in machine learning.	**L2**
CO2	Apply supervised learning algorithms to build predictive models for classification and regression problems.	**L3**
CO3	Apply concepts of ANNs, Ensemble Learning, and RNNs to solve practical machine learning problems.	**L3**
CO4	Analyze machine learning problems, choose suitable algorithms, and critically assess their performance and limitations.	**L4**

Contribution of Course Outcomes towards achievement of Program Outcomes& Strength of correlations (3:High,2:Medium, 1:Low)

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2													
CO2												2	3	
CO3	3											2		
CO4		3										2		

Syllabus		
Unit No.	**Contents**	**Mapped CO**
I	**Introduction to Machine Learning:** Definition, Need of Machine Learning, Types of Machine Learning, Applications, Challenges of Machine Learning. **End-to-End Machine Learning Project:** Frame the Problem, Get the data, Explore and visualize the data to Gain Insights, Prepare the data for Machine Learning Algorithms, Select a Model and Train it, Evaluation, Fine-tune model, Deployment and Maintain System, CRISP DM	CO1
II	**Linear Regression**: Introduction, Simple Linear Regression, Multiple Linear Regression, Model Fitting, Gradient Descent optimization algorithm, Evaluation Metrics, Assumptions and Limitations, Applications. **Non-Linear Regression**: Polynomial Regression, Applications. **Logistic Regression**: Binary Classification, Evaluation metrics, Applications.	CO1, CO2, CO4
III	**K-Nearest Neighbors (KNN):** Introduction, Algorithm, Distance Metrics, Strengths and Limitations, Applications. **Support Vector Machine (SVM):** Introduction, Concept of Margin, Support Vectors, Linear SVM Classification Algorithm, Applications.	CO1, CO2, CO4
IV	**Artificial Neural Networks (ANN):** Introduction, Biological Neurons, Artificial Neurons, Perceptron, Multi-layer Perceptron, performing logical operations, Feed forward Network, Back propagation Algorithm, Applications.	CO1, CO3, CO4
V	**Introduction to Ensemble Learning**: Definition, Motivation, advantages of ensemble methods, Types of ensemble methods: bagging, boosting, and stacking, Random Forests Algorithm, AdaBoost Algoritm. **Recurrent Neural Networks(RNN):** Introduction, Architecture, Training RNNs, Long Short-Term Memory (LSTM) networks, Applications	CO1, CO3, CO4

Learning Resources

Text Books

1. Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems, AurelienGeron, Third Edition, 2022, O'Reilly
2. Pattern Recognition and Machine Learning, Christopher M. Bishop, First Edition, 2016, Springer

Reference Books

1. Machine Learning, Tom M. Mitchell, First Edition, 2017, McGraw Hill Education
2. Machine Learning: A Probabilistic Perspective, Kevin P. Murphy, 2012, MIT Press

e- Resources & other digital material

1. Introduction to Machine Learning : https://nptel.ac.in/courses/106105152
2. Introduction to Machine Learning : https://nptel.ac.in/courses/106106139
3. Machine Learning : https://nptel.ac.in/courses/106106202
4. Machine Learning by StatQuest with Josh Starmer https://www.youtube.com/user/joshstarmer
5. Introduction to Machine Learning by Google Developers https://www.youtube.com/@GoogleDevelopers/videos
6. Machine Learning Lectures by Nando de Freitas (University of Oxford) https://www.youtube.com/user/ProfNandoDF
7. Machine Learning by Andrew Ng (Coursera) - Published by Stanford Online https://www.youtube.com/watch?v=jGwO_UgTS7I&list=PLoROMvodv4rMiGQp3WXShtMGgzqpfVfbU