

PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY
(Autonomous)
Kanuru, Vijayawada-520007

DEPARTMENT OF CSE(Data Science)

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

Machine Learning

Course Code	23DS3501	Year	III	Semester	I
Course Category	PCC	Branch	CSE (Data Science)	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Mathematics
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 of machine learning to understand machine learning models.	L2
CO2	Apply supervised learning algorithms to build predictive models for classification and regression problems.	L3
CO3	Utilize unsupervised learning techniques to discover meaningful patterns and groupings within unlabeled data.	L3
CO4	Analyze machine learning problems, choose suitable algorithms, and critically assess their performance and limitations.	L4

[illegible]

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Syllabus		
Unit No.	Contents	Map ped 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	Decision Tree Induction: Introduction, Decision Tree Representation, Attribute Selection Measures, Decision Tree Learning Algorithm, Metrics for Evaluating Classifier Performance K-Nearest Neighbors (KNN): Introduction, Algorithm, Distance Metrics, Strengths and Limitations, Applications. Bayes Classification Methods: Bayes' Theorem, Naïve, Bayesian Classification algorithm, Applications.	CO1, CO2, CO4
IV	Support Vector Machine (SVM): Introduction, Concept of Margin, Support Vectors, Linear SVM Classification Algorithm, Applications. Artificial Neural Networks (ANN): Introduction, Biological Neurons, Artificial Neurons, Perceptron, Multi-layer Perceptron, performing logical operations, Feedforward Network, Backpropagation Algorithm, Applications.	CO1, CO2, CO4
V	Cluster Analysis: Introduction to Cluster Analysis, Basic Clustering Methods, Measures of Similarity and Dissimilarity, Metrics for Evaluating Clustering Performance, Applications. Partitioning Methods: K-Means and K-Medoids algorithms, Applications. Hierarchical Methods: Agglomerative and Divisive Approaches, Linkage Criteria.	CO1, CO3, CO4

Learning Resources
Text Books
<ol style="list-style-type: none"> Hands-On Machine Learning with Scikit-Learn, Keras, and Tensor Flow: Concepts, Tools, and Techniques to Build Intelligent Systems, Aurelien Geron, Third Edition, 2022, O'Reilly Pattern Recognition and Machine Learning, Christopher M. Bishop, First Edition, 2016, Springer

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Reference Books
<ol style="list-style-type: none">1. Machine Learning, Tom M. Mitchell, First Edition, 2017, McGraw Hill Education2. Machine Learning: A Probabilistic Perspective, Kevin P. Murphy, 2012, MIT Press
e- Resources & other digital material
<ol style="list-style-type: none">1. Introduction to Machine Learning : https://nptel.ac.in/courses/1061051522. Introduction to Machine Learning : https://nptel.ac.in/courses/1061061393. Machine Learning : https://nptel.ac.in/courses/1061062024. Machine Learning by StatQuest with Josh Starmer https://www.youtube.com/user/joshstarmer5. Introduction to Machine Learning by Google Developers https://www.youtube.com/@GoogleDevelopers/videos6. Machine Learning Lectures by Nando de Freitas (University of Oxford) https://www.youtube.com/user/ProfNandoDF7. Machine Learning by Andrew Ng (Coursera) - Published by Stanford Online https://www.youtube.com/watch?v=jGwO_UgTS7I&list=PLoROMvody4rMiGQp3WXShtMGgzqpfVfbU