Machine Learning

Course Code	23EC4601D	Year	III	Semester	II
Course Category	PE-II	Branch	ECE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	---
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	BL
CO1	Summarize the fundamentals of machine learning, including learning types, system design, challenges, and applications.	L2
CO2	Implement supervised learning algorithms such as decision trees, logistic regression, and k-nearest neighbors to solve classification and regression problems.	L3
CO3	Analyze unsupervised learning algorithms including K-means and hierarchical clustering to uncover patterns in unlabeled datasets.	L4
CO4	Evaluate machine learning models using suitable performance metrics and model validation techniques for classification, regression, and clustering tasks.	L4
CO5	Summarize the fundamentals of machine learning, including learning types, system design, challenges, and applications.	L2

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of Correlations (3:High, 2:Medium, 1:Low)												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2								1		1	2	
CO2	3											3	
CO3	3	3										3	1
CO4	3	3							1		1	3	2
CO5	3	3							1		1	3	2
Avg	2								1		1	2	

Syllabus		
UNIT No.	Contents	Mapped COs
1	**Introduction:** What is Machine learning, Designing a Learning System, Types of Machine Learning Systems, Perspectives and Issues in Machine Learning, Applications of Machine learning	CO1, CO2
2	**Supervised Learning:** Classification and Regression, Generalization, Overfitting and Under fitting, Some Sample Datasets, k-Nearest Neighbors, Linear Models, Bayes Theorem, Naive Bayes Classifier, Decision Trees	CO1, CO2, CO3
3	Instance Based Learning – Support vector machine, Ensemble Methods, k-Nearest Neighbor Learning, Expectation Maximization Algorithm, Case Based Reasoning	CO1, CO2, CO3

4	Un Supervised Learning: What is Unsupervised Machine Learning? General architecture of Unsupervised Machine Learning, Challenges in Unsupervised ML Introduction to Clustering, Types of Clustering, Partition methods of Clustering, Hierarchical methods	CO1, CO4
5	Reinforcement learning: The learning Task, Elements of Reinforcement learning, Q-Learning, Nondeterministic Rewards and actions , Temporal Difference learning, Relationship to Dynamic Programming	CO1, CO3, CO4

Learning Recourses

Text Book(s)

1. Tom M. Mitchell, Machine Learning, McGraw Hill Education, 1st Ed., International Edition, 1997.

2. Andreas C. Müller and Sarah Guido, Introduction to Machine Learning with Python, O'Reilly Publications, 1st Ed., 2016.

References

1. Anuradha Srinivasa Raghavan and Vincy Joseph, Machine Learning, Wiley India, Kindle Edition, 2020.

2. Aurélien Géron, Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow, O'Reilly Publications, 2nd Ed., 2019.

E-Resources :

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