VELAMMAL COLLEGE OF ENGINEERING AND TECHNOLOGY, MADURAI-625 009
(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
2023-2024 ODD SEMESTER
COURSE PLAN

Degree	B.E-CSE
Course Code-Title	21CS303 –Artificial Intelligence and Machine Learning
Batch	2021-2025
Year/Semester/section	III/V/B
Course Component	Professional core
Name of the Instructor	Dr.R.Vijayalakshmi

Session No	Topic to be covered	Text/Reference Book Page No.	Mode of Delivery	Teaching Aid	No. of Hours	Cumulative No. of Hours
Dissemination and Explanation of Vision,Mission (Institute and Department),PEOs,Pos,PSOs,Course Objectives and Course Outcomes					
	UNIT I PROBLEM SOLVING					
1	Introduction to AI	T1(1-5)	L+I	BB,LCD	1	1
2	AI Applications	T1(6-27)	L+I	BB,LCD	1	2
3	Problem solving agents, search algorithms	T1(59--67)	L+I	BB,LCD	2	4
4	uninformed search strategies , Heuristic search strategies	T1(73-81,94-105) R1(63-94)	CL(S)	BB,LCD	2	6
5	Local search and optimization problems , adversarial search	T1(110-116) T1(161-183)	L+I	BB,LCD	2	8
6	constraint satisfaction problems (CSP)	T1(137-155)	L+D	BB,LCD	1	9
	UNIT II PROBABILISTIC REASONING					
7	Acting under uncertainty	T1(462-465)	L+I	BB,LCD	1	10
8	Bayesian inference	T1(504-510)	L+D	BB,LCD	1	11
9	Naïve Bayes models.	T1(92-102)	L+I	BB,LCD	2	13
10	Probabilistic reasoning	T1(102-108)	L+I	BB,LCD	1	14

11	Bayesian networks , exact inference in BN, approximate inference in BN	T1(559-565)	L+I	BB,LCD	2	16
12	causal networks	T1(161-167)	L+I	BB,LCD	2	18
UNIT III KNOWLEDGE REPRESENTATION						
13	First Order Predicate Logic	T1(285-303)	L+I	BB,LCD	2	20
14	Prolog Programming	T2(3-24)	L+I	BB.LCD	1	21
15	Unification	T1(275-278)	L+I	BB.LCD	1	22
16	Forward Chaining-Backward Chaining	T1(280-294)	L+I	BB,LCD	1	23
17	Ontological Engineering-Categories and Objects	T1(320-327)	L+I	BB.LCD	1	24
18	Events - Mental Events and Mental Objects	T1(341-344)	L+I	BB,LCD	1	25
19	Reasoning Systems for Categories	T1(453-457)	L+I	BB,LCD	1	26
20	Reasoning with Default Information	T1(458-461)	L+I	BB,LCD	1	27
UNIT IV SUPERVISED LEARNING						
21	Introduction to machine learning –	T2(1-12)	L+I	BB,LCD	2	29
22	Linear Regression Models -Least squares - single & multiple variables-	R1(385-388)	L+I	BB.LCD	2	31
23	Bayesian linear regression- gradient descent- Linear	R4(143-171)	L+I	BB.LCD	2	33
24	Classification Models- Discriminant function – Probabilistic discriminative model -	R4(177-198)	L+I	BB,LCD	1	34
25	Logistic regression - Probabilistic generative model – Naive Bayes-	T2(236-237)	L--I	BB.LCD	2	36
26	Maximum margin classifier – Support vector machine - Decision Tree - Random forests	T2(173-190,218-225)	L+D	BB,LCD	1	37
UNIT V UNSUPERVISED LEARNING AND ENSEMBLE TECHNIQUES						
27	Unsupervised learning - K-means	T1(860-865)	L+I	BB,LCD	2	39
28	- Instance Based Learning –KNN - Gaussian mixture models and Expectation maximization-	T1(867-873)	L+I	BB.LCD	1	40
29	Combining multiple learners-	T1(873-882)	L+I	BB.LCD	1	41
30	Model combination schemes –	T1(888-897)	L+I	BB,LCD	2	43
31	Voting- Ensemble Learning –	T2(354) T3(309-311)	L+I	BB.LCD	1	44
32	bagging -Boosting –	T2(360)	L+I	BB,LCD	1	45

No.	Topic				Hours	Cumulative
33	stacking	T1(986-1003)	L+I	BB,LCD	1	46

PRACTICAL COMPONENT

Topic	Hours	Cumulative
1. Create the Tic-Tac-Toe game using any adversarial searching algorithm.	3	49
2. Design the Towers of Hanoi problem using search algorithms.	3	52
3. Create the environment for probabilistic inference using a Bayesian network.	3	55
4. Design a program using naïve Bayesian classifier for a sample training data set stored as a .CSV file.	3	58
5. Model the Greedy Best-First and A* search algorithms in generic ways. 6. Design a program in k-Nearest Neighbour algorithm to classify the iris data set.	6	64
7. Model the K-Means Algorithm for Colour Compression. 8. Create Linear Regression models using Python	6	70
9. Model the Decision Trees for data classification, using the real-time data set. 10. Design data classification for the real-time data set using Support Vector Machine	6	76

TEXT BOOKS:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence – A Modern Approach", 4th Edition, Pearson Education,2021
2. Ethem Alpaydin,"Introduction to MachineLearning",4th Edition, MIT Press,2020.
3. Saikat Dull, S. Chjandramouli, Das, "Machine Learning ",1st Edition, Pearson,2018

REFERENCES:

1. Kevin Night,Elaine Rich,andNairB., "Artificial Intelligence",3rd Edition, McGraw Hill,2017
2. Mehryar Mohri, Afshin Rostamizadeh and Ameet Talwalkar, "Foundations of Machine Learning", 2nd Edition, MIT Press, 2018.
3. Deepak Khemani,"Artificial Intelligence", 2nd Edition,Tata McGraw Hill Education,2013
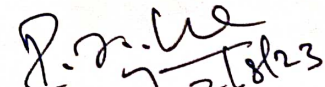
WEB MATERIALS

W1. http://nptel.ac.in
W2. Springer International Journal on "AI&Society", ISSN Print: 0951-5666 ISSN Online: 1435-5655.

Link: http://www.springer.com/computer/ai/journal/146
W3. https://medium.com/analytics-vidhya/minimax-algorithm-in-tic-tac-toe-adversarial-search-example-702c7c1030eb
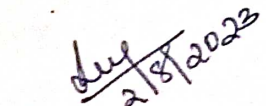W4. https://www.freecodecamp.org/news/analyzing-the-algorithm-to-solve-the-tower-of-hanoi-problem-686685f032e3/
W5.https://data-flair.training/blogs/bayesian-networks-inference/

Course In charge   **Course Coordinator**   **Module Coordinator**   **HoD/CSE**