

	SRI INDU COLLEGE OF ENGG & TECH			Prepared on Rev1: Page: 5
	LESSON PLAN			
	(Regulation :R20)			
	Department of Information Technology			
Sub. Code & Title		(R20CSE3201) Machine Learning		
Academic Year: 2022-23		Year/Sem./Section	III/I	
Faculty ,Name & Designation		G.SIRISHASSISTANT PROFESSOR		

### **QUESTION BANK WITH BLOOMS TAXONOMY LEVEL (BTL)**

(1. Remembering 2. Understanding 3. Applying 4. Analyzing 5. Evaluating 5. Creating)

UNIT-1 Machine Learning									
1 MARKS QUESTIONS								BT Level	Course Outcome
1.	Define Machine Learning.?							I	CO1
2.	Discuss applications of ML?							VI	CO1
3.	What is well- posed learning problems.?							I	CO1
4..	Explain the steps in designing a learning systems in detail.?							II	CO1
5.	Explain different perspective and issues in machine learning.?							II	CO1
6.	Define concept learning task?							I	CO1
7.	Explain the General-to-Specific Ordering of Hypotheses?``							II	CO1
8	Define Consistent Hypothesis ?							I	CO1
9	DefineVersion Space.?							I	CO1
10	Write LIST-THEN-ELIMINATE algorithm.							II	CO1
10 MARKS QUESTIONS									
1.	Define Machine Learning. Explain with examples why machine learning isimportant							I	CO1
2.	.Describe the following problems with respect to Tasks, Performance and Experience: a.A Checkers learning problem b.A Handwritten recognition learning problem c.A Robot driving learning problem							II	CO1
3.	Write FIND-S algorithm and explain with example given below							//	CO1
	Example	Sky	AirTemp	Humidity	Wind	Water	Forecas t	Enj	
	1	Sunny	Warm	Normal	Stron g	Warm	Same	Yes	
	2	Sunny	Warm	High	Stron g	Warm	Same	Yes	
	3	Rainy	Cold	High	Stron g	Warm	Change	No	
	4	Sunny	Warm	High	Stron g	Cool	Change	Yes	
4.	Write the final version space for the below mentioned training examples using candidate elimination algorithm.							II	CO1

Size

Color

Shape

Class

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Origin	Manufacturer	Color	Decade	Type	Example Type
Japan	Honda	Blue	1980	Economy	Positive
Japan	Toyota	Green	1970	Sports	Negative
Japan	Toyota	Blue	1990	Economy	Positive
USA	Chrysler	Red	1980	Economy	Negative
Japan	Honda	White	1980	Economy	Positive
Japan	Toyota	Green	1980	Economy	Positive
Japan	Honda	Red	1990	Economy	Negative
Big		Red	Circle	No	
Small		Red	Triangle	No	
Small		Red	Circle	Yes	
Big		Blue	Circle	No	
Small		Blue	Circle	Yes	

5.	Explain in detail the Inductive Bias of Candidate Elimination algorithm.	II	C01
6.	Define Consistent Hypothesis and Version Space.	I	C01
7.	Define concept learning and discuss with example.	I	C01
8.	Explain the steps in designing a learning systems indetail.	II	C01
9.	What is well- posed learningproblems.explain with example.	I	C01
10	Remarks on version spaces and candidate elimination algorithm?	I	C01

### Unit -II : DECISION TREE LEARNING

#### 1 MARKS QUESTIONS

1.	What is decision tree and decision tree learning?	I	C02
2.	What are appropriate problems for Decision tree learning?	I	C02
3.	What is overfitting of data?	VI	C02
4.	What are issues in learning decision trees	I	C02
5.	What is perceptron?	VI	C02
6.	What is Artificial Neural Network?	I	C02
7.	What is linear and non-linear seperable of data?	VI	C02
8.	Derive the Gradient Descent Rule	II	C02
9.	Write Gradient Descent algorithm for training a linear unit.	VI	C02
10	Derive the Back Propagation Rule	II	C02

#### 10 MARKS QUESTIONS

1	Explain the Back Propagation algorithm?	II	C02
2.	Issues in Decision Tree Learning?	II	C02
3.	Write a note on (i) Perceptron Training Rule (ii) Gradient Descent and Delta Rule	VI	C02



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4. How a single perceptron can be used to represent the Boolean functions such as AND,OR I C02

5. Design a two-input perceptron that implements the boolean function  $A \wedge \neg B$ . Design atwo-layer network of perceptron's that implements  $A \text{ XOR } B$ . VI C02

6 Give Decision trees for the following set of training examples VI C02

Day	Outlook	Temperature	Humidity	Wind	PlayTennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

7 Consider the following set of training examples. III C02  
 a) What is the entropy of this collection of training example with respect to the target function classification?  
 b) What is the information gain of  $a_2$  relative to these training examples?

Instance	Classification	$a_1$	$a_2$
1	+	T	T
2	+	T	T
3	-	T	F
4	+	F	F
5	-	F	T
6	-	F	T

8 Explain backpropagation algorithm with an example? VI C02

9 What are Restriction Biases and Preference Biases and differentiate between them. I C02

10 Discuss Inductive Bias in Decision Tree Learning. II C02



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10		II	CO2
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### Unit – III : BAYESIAN LEARNING

#### 1 MARKS QUESTIONS

1.	Define Bayesian theorem?	I	CO3
2.	Explain the practical difficulties of Bayesian theorem.	II	CO3
3.	What are Consistent Learners?	I	CO3
4.	Explain Brute force Bayes Concept Learning	II	CO3
5.	Describe the concept of MDL.	II	CO3
6.	Explain the concept of EM Algorithm	II	CO4
7.	Explain Binomial Distribution with an example.	II	CO4
8.	What are instance based learning?	I	CO4
9.	Define the following terms with respect to K - Nearest Neighbour Learning	I	CO4
10.	Explain radial basis function	II	CO4

#### 10 MARK QUESTION

1.	Write about bayes optimal classifier	I	CO3
2.	Define Bayesian theorem? What is the relevance and features of Bayesian theorem? Explain the practical difficulties of Bayesian theorem.	I	CO3
3.	Define is Maximum a Posteriori (MAP) Maximum Likelihood (ML) Hypothesis. Derive the relation for $h_{MAP}$ and $h_{ML}$ using Bayesian theorem.	II	CO3
4.	What is gibbs Algorithm ? Naïve bayes classifier?	I	CO3
5.	What is weighted majority algorithm?	I	CO3
6.	Explain the concept of EM Algorithm. Discuss what are	II	CO4



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### Gaussian Mixtures

7.

Describe the concept of MDL. Obtain the equation for hMDL

II

CO4

8.

K-Nearest Neighbouring algorithm?

VI

CO4

9

What is genetic algorithm? How to parallelizing genetic algorithms.

II

CO4

10

Write about case based reasoning?

II

CO4



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### Unit-IV: Learning Sets of Rules

#### 1 MARKS QUESTIONS

1.	What are the Learning Sets of Rules?	III	C05
2.	Explain about Sequential covering algorithm?	II	C05
3.	Describe Learn-One-Rule?	I	C05
4.	Write Learning First-Order Rules?	III	C05
5.	What are the Specializing Rules in FOIL?	III	C05
6.	Defined inverted Induction?	I	C05
7.	Defined inverted Ddeduction?	II	C05
8.	Explain Learning First-Order Rules?	II	C05
9.	Defined PROGOL	I	C05
10.	Defined CIGOL?	I	C05

#### 10 MARK QUESTIONS

1.	Discus about PROGOL ?	I	C05																								
2.	Describe in details of Inverting Resolution?	I	C05																								
3.	Explain details of Learning Sets of Rules?	II	C05																								
4.	Write the Sequential Covering Algorithm? With examample.	III	C05																								
5.	Describe First Order Rule for Classifying Web Pages.	I	C05																								
6.	Discus about PROGOL ?	I	C05																								
7.	Defend Induction as Inverted Deduction .	V	C05																								
8	What are the Deduction Resolution Rule.	III	C05																								
9	Classify the First order resolution.	II	C05																								
10	Write the Sequential Covering Algorithm .Demonstrate the whether forecasting example.?	III	C05																								
	<table><tr><td>Day</td><td>Outlook</td><td>Temperature</td><td>Humidity</td><td>Wind</td><td>PlayTennis</td></tr><tr><td>D1</td><td>Sunny</td><td>Hot</td><td>High</td><td>Weak</td><td>No</td></tr><tr><td>D2</td><td>Sunny</td><td>Hot</td><td>High</td><td>Strong</td><td>No</td></tr><tr><td>D3</td><td>Overcast</td><td>Hot</td><td>High</td><td>Weak</td><td>Yes</td></tr></table>	Day	Outlook	Temperature	Humidity	Wind	PlayTennis	D1	Sunny	Hot	High	Weak	No	D2	Sunny	Hot	High	Strong	No	D3	Overcast	Hot	High	Weak	Yes		
Day	Outlook	Temperature	Humidity	Wind	PlayTennis																						
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D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No



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**V-Combining Inductive and Analytical Learning**

**1 MARKS QUESTIONS**

1.	Defind Combining Inductive and Analytical Learning?	I	CO6
2.	Defferentiate the Inductive and Analytical Learning?	IV	CO6
3.	Defind Domain Theory?	I	CO6
4.	Describe KBANN?	II	CO6
5.	Defind Hypothesis Space.	I	CO6
6.	Describe EBNN.	II	CO6
7.	Demonstrate TangetProp.	III	CO6
8.	Describe FOCL.	I	CO6
9.	Discus Reinforcement Learning	I	CO6
10.	Describe the Using Prior Knowledge to Augment Search Operators	I	CO6

**10 MARK QUESTIONS**

1.	Discuss the FOCL Algorithm in detail.	II	CO6
2.	Memorize the Domain Theory.give a traning example.	I	CO6
3.	Discuss Combining Inductive and Analytical Learning in detail. explain motivation.	II	CO6
4.	Implement the Neural Net Equivalent to Domain Theory	III	CO6
5.	Explain Motivation Inductive-Analytical Approaches to Learning	II	CO6
6.	Discuss the EBNN Algorithm	II	CO6
7.	Discuss the TangentProp Algorithm. n Illustrative Example	II	CO6
8.	Explain KBANN Algorithm.Give an Example	II	CO6
9.	Discuss about Hypothesis Space Search.Demonstrate the Using Prior Knowledge to Initialise the Hypothesis	II	CO6
10.	What is nthe Motivation.Explain Motivation Inductive-Analytical Approaches to Learning	III	CO6





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