JHARKHAND Rai University
RANCHI

End Semester/Reappear (Semester VI) Examination May 2025

Programme: B. Tech (CSE)
Course: Machine Learning **Full Marks: 70**
Course Code:3TECCS312 **Time: 3 Hrs.**
Enrolment no. _____

Q.No.	Questions	CO	Bloom Taxonomy Category	Marks
	Section I			
1	**Short Answer type questions.**			**4 x 5 = 20**
a	Compare and contrast Supervised, Unsupervised and Reinforcement learning with suitable example.	CO1	Understand	
	or			
	Explain the role of a target function in Machine Learning with an example.	CO1	Understand	
b	Illustrate with an example how pruning helps in decision trees.	CO2	Apply	
	or			
	Describe a decision tree. List its main components.	CO2	Remember	
c	Explain the concept of gradient descent in the context of neural network training.	CO3	Understand	
	or			
	Differentiate between logistic regression and linear regression in terms of output and use cases.	CO3	Understand	
d	Justify the necessity of Bagging method for classification process.	CO5	Understand	
	or			
	Differentiate bagging and boosting.	CO5	Understand	
	Section II			
	Long Answer type questions.			**3 x 10 = 30**
2	Critically analyse the performance of Linear Regression with other basic Machine Learning algorithms. When would you prefer Linear Regression?	CO1	Evaluate	
	a. Outline the differences between Training data and Testing data. b.Define Linear regression.	CO1	Understand & Remember	
3	Differentiate between Divisive and Agglomerative hierarchical clustering algorithm. Also illustrate the methods using example and dendrogram.	CO2	Understand	
	or			
	Classify different distance measures methods used in K-mean algorithm. Explain why Euclidean distance is preferred over Manhattan distance in K mean algorithm?	CO2	Analyze	
4	Why is activation function used in artificial neurons network? Explain different types of activation functions.	CO4	Understand	
	or			
	Design the three phases of Back Propagation Neural Network model. Elucidate the error propagation phase in the backward direction.	CO4	Evaluate	
	Section III			
	Application based questions			**1 x 20 = 20**
5	Considering the dataset given below, demonstrate the procedure for finding the best splitting attribute in decision tree-based classification.	CO4	Evaluate	

Height (cm)	Weight (kg)	Class
172	74	F
169	91	M
184	86	M
156	51	F
176	79	F

	or			
	Solve the following classification problem with the perceptron learning rule. Apply each input vector in order, for two repetitions as it takes to ensure that the problem is solved. Assume initial weight and bias as zero. $\left\{\mathbf{p}_1 = \begin{bmatrix}2\\2\end{bmatrix}, t_1 = 0\right\}\left\{\mathbf{p}_2 = \begin{bmatrix}1\\-2\end{bmatrix}, t_2 = 1\right\}\left\{\mathbf{p}_3 = \begin{bmatrix}-2\\2\end{bmatrix}, t_3 = 0\right\}\left\{\mathbf{p}_4 = \begin{bmatrix}-1\\1\end{bmatrix}, t_4 = 1\right\}$	CO4	Evaluate	

COURSE OUTCOME

CCO1 Formulate machine learning problems corresponding to different applications: data, model selection, model complexity
CO2 Demonstrate understanding of a range of machine learning algorithms along with their strengths and weakness
CO3 Implement machine learning solutions to classification, regression, and clustering problems
CO4 Design and implement various machine learning algorithms in a range of real-world application
CO5 Evaluate and analyse the performance of machine learning algorithm or a system based on machine learning algorithm