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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VI**

Branch: Medical Electronics Engineering **Duration: 3 hrs.**

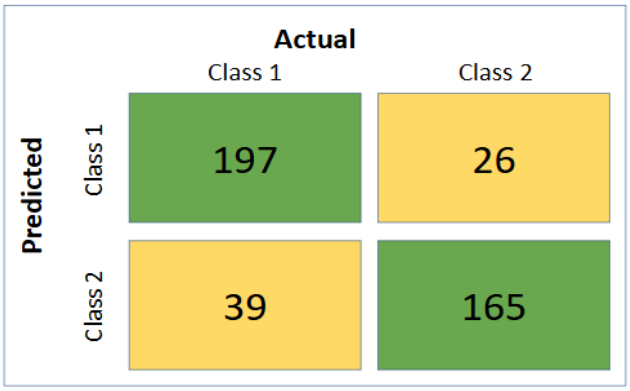
Course Code: 23MD6PCMLM **Max Marks: 100**

Course: Machine Learning for Medical Engineering

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	*CO*	*PO*	Marks
1	a)		Explain the following with an example syntax w.r.t Python i. Enumerate ii. While loop	*1*	*2*	**10**
	b)		Compare the use of if, if-else, and if-elif-else statements in Python with example codes.	*1*	*2*	**10**
			OR			
2	a)		Explain the following with an example syntax with respect to Python i. For Loop iI. Range	*1*	*2*	**10**
	b)		Describe the data science lifecycle using a flowchart and explain each phase with a suitable example.	*1*	*2*	**10**
			UNIT - II			
3	a)		What is Exploratory Data Analysis (EDA)? Explain its role in machine learning.	*2*	*1,3*	**10**
	b)		Explain the steps involved in data preprocessing in Machine Learning.	*2*	*1,3*	**10**
			OR			
4	a)		Why are geospatial visualizations considered one of the earliest forms of information visualization, and how are they useful in modern data analysis?	*2*	*1,3*	**10**
	b)		Evaluate the role of correlation matrices in feature selection.	*2*	*1,3*	**10**
			UNIT - III			
5	a)		Briefly explain the various Evaluation Metrics in Regression.	*3*	*4,3*	**10**
	b)		Write a Python program using Random Forest Regression to predict the salary of an employee based on their position level.	*5*	*3,4,5*	**10**

			The dataset Salaries.csv contains the following columns: • Position: The job title (e.g., Business Analyst, Manager) • Level: A numerical value representing the position level • Salary: The corresponding salary for that position			
			OR			
	6	a)	What is cost and cost function? Derive residual from cost function.	*3*	*4,3*	**10**
		b)	Differentiate between Bagging and Boosting in Ensemble learning?	*3*	*4,3*	**10**
			UNIT - IV			
	7	a)	Analyze the limitations of using accuracy as a performance metric for machine learning models, especially in the context of imbalanced datasets. Provide justification.	*3*	*4,3*	**10**
		b)	What is Naive Bayes Classifier? Analyze its advantages and limitations.	*3*	*4,3*	**10**
			OR			
	8	a)	Evaluate the different types of Feature Selection Algorithms with the help of relevant flowchart.	*3*	*4,3*	**10**
		b)	For the given confusion matrix calculate the following  • Sensitivity • Specificity • Precision • Recall • F1 Score • Accuracy	*3*	*4,3*	**10**
			UNIT - V			
	9	a)	What is Explainable AI (XAI)? What are the key components or constituents of Explainable AI?	*4*	*5,9*	**5**
		b)	What are the pros and cons of Pickle python library?	*4*	*5,9*	**10**
		c)	What is IaaS, PaaS, and SaaS?	*4*	*5,9*	**5**
			OR			
	10	a)	What is causing the transition towards Explainable AI (XAI)? Discuss why it is essential in sectors like healthcare, finance, and other critical domains.	*4*	*5,9*	**10**
		b)	Explain the difference between ELI5 and Skater.	*4*	*5,9*	**10**

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