Graphic Era HILL UNIVERSITY

Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

Mid Term (Odd) Semester Examination October 2024

Roll no.....

Name oftheCourse and semester:B.Tech.(CSE)& V
Name ofthePaper:Deep LearningFundamentals
CourseCode: TCS 592

Time: 1.5 Hour

Maximum Marks: 50

Note:

(i) All Questions are compulsory.

(ii) Each question carries 10 marks.

Q.1 **(10 Marks) CO1**

(a) Discuss the major milestones in the evolution of Information Technology from the invention of the first computers to the rise of cloud computing and artificial intelligence. Highlight key innovations that shaped modern computing.

OR

(b) Define Machine Learning (ML). Explain the difference between supervised, unsupervised, and reinforcement learning with real-world examples for each.

Q.2 **(10 Marks) CO1**

(a) Explain the concept of linear regression. Derive the formula for the best-fit line using the least squares method. How is the coefficient of determination (R-squared) used to evaluate the performance of a linear regression model?

OR

(b) What is logistic regression, and how does it differ from linear regression? Describe the sigmoid function and explain how it is used to predict probabilities in logistic regression.

Q.3 **(10 Marks) CO1**

(a) Explain the basic structure of an artificial neural network (ANN). Define the role of the input layer, hidden layer, output layer, and activation functions. How does backpropagation work to train an ANN?

OR

(b) Define clustering in the context of unsupervised learning. Compare the k-means algorithm and hierarchical clustering. What are the advantages and disadvantages of each method?

Q.4 **(10 Marks) CO2**

(a) What is deep learning, and how is it related to machine learning? Explain the concept of deep neural networks and the significance of having multiple hidden layers in DL models.

OR

(b) Describe the role of gradient descent in training linear and logistic regression models. Compare batch gradient descent, stochastic gradient descent (SGD), and mini-batch gradient descent.

Q.5 **(10 Marks) CO2**

(a) Explain how clustering models are evaluated. Define silhouette score, and describe how they are used to assess the quality of clustering.

OR

(b) Discuss two real-world applications of artificial neural networks and deep learning. In your explanation, describe how the models work and why they are suitable for these applications.