

ZIMBABWE EZEKIEL GUTI UNIVERSITY



**FACULTY OF SCIENCE, TECHNOLOGY, AGRICULTURE AND FOOD SYSTEMS
DEVELOPMENT**

DEPARTMENT OF INFORMATION SYSTEMS

EXAMINATION PAPER

COURSE CODE: BIS416
COURSE TITLE: MACHINE LEARNING
SPECIAL REQUIREMENTS: NONE
LEVEL: 4
EXAM DURATION: 3 hours
DATE: 08 JUN 2026

INSTRUCTIONS TO CANDIDATES:

1. Answer any **FIVE** questions
2. Number your answers accordingly
3. Start each question on a new page
4. You can use a calculator.

Question 1

- a) Explain with examples the two types of linear regression [4 marks]
- b) Explain any some of the assumptions that linear regression makes [6 marks]
- c) Describe three strategies that can be help reduce over-fitting in decision trees [10 marks]

Question 2

- a) Explain what is meant by a classification problem in machine learning and give three examples of such problems. [6 marks]
- b) Outline the advantages of the random forest algorithm [6 marks]
- c) Briefly explain how the KNN algorithms works [8 marks]

Question 3

- a) Explain what feature engineering is and how it affects a model's performance. [4 marks]
- b) Explain with the aid of diagrams the difference between Manhattan Distance (MD) and Euclidean Distance (ED) [6 marks]
- c) Use an example to explain what a confusion matrix is. [10 marks]

Question 4

- a) Data can have missing values. What are some of the methods of handling missing data values? [6 marks]
- b) Use real world examples to briefly explain different types of machine learning. [10 marks]
- c) Explain feature engineering in machine learning. [4 marks]

Question 5

- a) Use diagrams to illustrate the difference between Euclidean Distance and Manhattan Distance [6 marks]
- b) Bias can be prevalent in the data used in machine learning models. Describe some of the ways used to reduce bias in model data [10 marks]
- c) Outline the assumptions made with the linear regression algorithm [4 marks]

Question 6

- a) Discuss the two types of propagation found in neural networks. [6 marks]
- b) Overfitting is one of the most common problems every Machine Learning practitioner faces. Explain some methods to avoid overfitting in Neural Networks. [8 marks]
- c) Compare and contrast logistic regression and linear regression [6 marks]

END

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