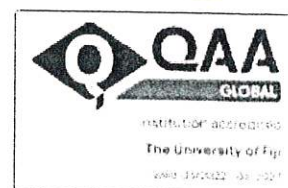




The University of Fiji
(An Entity of Arya Pratinidhi Sabha of Fiji)



SCHOOL OF SCIENCE AND TECHNOLOGY
Semester 1, 2024

FINAL EXAMINATION PAPER

**ITC416: ADVANCED BUSINESS
INTELLIGENCE SYSTEM**

Important Instructions to Students:

1. Please read the questions, instructions carefully and answer the questions.
2. You are allowed an **extra 10 minutes of reading time** (during this time, you are not allowed to write with a pen) and **180 minutes (3 Hours)** to complete this paper.
3. Silent, non-programmable calculators are allowed but not supplied.
4. Write all your answers in the answer booklet provided. If you need extra sheets, please ask the supervisor. In the answer booklet and the attendance sheet, write your name, course code, and student identification number.
5. **This Final Course Examination Paper is worth 100 marks and contributes 50% of the total course assessments.** Students must **score 40%** in this final exam to pass the course.
6. This paper contains two (2) sections: A and B. All questions are compulsory to answer.
7. Write all your answers legibly. The marker has the right to award zero for unreadable answers.
8. This is a **Closed Book Examination**. The University views plagiarism, cheating, and dishonest practice as serious offences, and if they are found, offenders are penalized.

Examination Paper Content (Format):

<u>Section</u>	<u>Question</u>	<u>Content</u>	<u>Marks</u>	<u>Suggested Time</u>
A	1-10	Short Answer Questions	50	90 minutes
B	11-15	Essay Answer Questions	50	90 minutes
		TOTAL	100	180 Minutes

Section A: Short Questions

(5 marks for each question. The approximate answer would be half a page of A4 paper)

1. What is regression analysis, and how does it differ from other classification techniques? Is it connected with Time Series Analysis?
2. What assumptions underlie Linear Regression, and how do violations of these assumptions affect the model's validity?
3. Can you explain the differences between Linear and Multiple Linear regression? You may explain with the help of a diagram.
4. How do you evaluate the significance of predictor variables in a regression model? Is there any unique solution for this task?
5. How can Machine Learning algorithms be utilized to forecast customer churn for a business owner, drawing insights from historical interactions, demographics, and usage patterns?
6. As an IT officer at ANZ Bank, how can you assist your manager in detecting fraudulent transactions or activities across banking, insurance, or e-commerce platforms by analyzing anomalous behavior patterns?
7. In your recent role as a loan application assessor for a financial organization, how would you evaluate applications as low, medium, or high-risk based on factors like credit history and income, aiding the organization in decision-making?
8. As an IT expert in the medical domain at CWM Hospital, how can you leverage business intelligence tools to analyze medical images, patient records, or symptoms provided by your manager to aid in disease diagnosis and treatment recommendations?
9. What are the primary objectives of clustering analysis in data science, and can you explain the difference between hierarchical clustering and k-means clustering algorithms?
10. How does Association Rule Mining contribute to pattern association and decision-making in data science? Additionally, could you describe the Apriori algorithm and its significance in discovering meaningful associations within large datasets?

Section B: Essay questions

(10 Marks for each question. The approximate answer would be one page of A4 paper)

11. Suppose you're analyzing Lautoka city house prices in 2024. How would you formulate a multiple linear regression model to predict house prices based on factors like square footage, number of bedrooms, and distance to the nearest school? Additionally, explain how you would interpret the coefficients of each predictor variable in the context of this model.
12. Imagine you have a dataset containing UniFiji ITC 416 data about whether students pass or fail an exam based on two features: hours studied and previous exam scores. How would you explain the concept of a Support Vector Machine (SVM) to someone new to machine learning? Additionally, how could SVM be applied to classify students into pass or fail categories based on these features?
13. New World Supermarket asked you to predict whether a customer will purchase a product based on two features: age group (young, middle-aged, or senior) and income level (low, medium, or high). How would you describe the Decision Tree classification model to someone unfamiliar with Machine Learning? Furthermore, could you explain how a Decision Tree could classify customers into "purchase" or "no purchase" categories based on these features?
14. You have a dataset with information on individuals' heights and weights. Explain the concept of the K-Means clustering algorithm to someone unfamiliar with Machine Learning. Additionally, describe how K-Means could be used to categorize individuals into distinct groups based on their heights and weights.
15. Consider you work for a grocery store and are tasked with analyzing customer purchase data. How would you describe association rule mining in the context of market basket analysis to someone new to data mining? Additionally, could you provide an example of how association rule mining could help identify patterns in customer purchases, such as discovering which products are often bought together?

The End

