COLLEGE OF CREATIVE INNOVATION

Programme

Master of Software Engineering

(Level 9) 180 Credits

Course

MSE803: Data Analytics

(15 Credits)

Assessment 2

Case Study with Presentation

Weighting within the course:

50%

Assessment Tasks to Learning Outcome and GPOs mapping

Tasks	Learning Outcomes	GPOs
Task 1	LO3	GPO1
Task 2	LO4	GPO3

Objective

The aim of the assessment is to develop your ability to critically evaluate advanced statistical analytics skills, particularly in handling large datasets, to create and assess data-based models for software engineering applications. Additionally, the assessment aims to enhance your skills in critically analyzing data usage, guided by culturally relevant and ethically responsible approaches to problem-solving.

Assessment Instructions

- This assessment is an open book activity, you can use your own course and review notes as well as offline or online resources, such as textbooks or online journals.
- You can always ask your tutor if you need further explanation or if the instructions are not clear.
- By completing and submitting an assessment you are authenticating that you are the original creator and/or author of all the submitted work and that it does not violate plagiarism or copyright law. All written work such as essays, reflections, reports must be in your own words. Please refer to the Academic Misconduct and Authenticity of Assessment Evidence statement in your Student Handbook for more information.
- Please ensure the completion of the assessment by **week 15.**
- Grades and feedback will be returned within 15 days of the submission date.

Learning Outcomes

LO3: Critically evaluate advanced statistical analytics skills, from large datasets to create and assess data-based models for software engineering applications.
LO4: Critically analyse data usage guided by culturally relevant and ethically responsible approaches to problem solving.

Graduate Profile Outcomes (GPOs) covered.

GPO1: Develop advanced software engineering knowledge and skills and apply these to solve emerging or existing problems.
GPO3: Develop and apply professional and ethical standards in software engineering to meet the industry's expectations and the ability to work with integrity in compliance with organisational criteria.

Success Criteria: You need to meet all the requirements of each of the learning outcomes and receive 50% or more to pass this assessment. You are allowed a maximum of three attempts. To meet all the requirements of each of the learning outcomes, you must achieve PASS results for each task item.

Grading: The final grade will be determined by the score achieved in this assessment based on the following table. Should a second or third attempt be required the maximum contribution toward the overall mark for the tasks that required a second or third assessment attempt is 50%. A late submission is considered a second attempt, so the contribution will be capped at 50%.

Grade	Mark Band Range
A+	Meet all course requirements, mark range (90-100)
A	Meet all course requirements, mark range (85-89)
A-	Meet all course requirements, mark range (80-84)
B+	Meet all course requirements, mark range (75-79)
B	Meet all course requirements, mark range (70-74)
B-	Meet all course requirements, mark range (65-69)
C+	Meet all course requirements, mark range (60-64)
C	Meet all course requirements, mark range (55-59)
C-	Meet all course requirements, mark range (50-54)
D	Did not meet all course requirements, mark range (40-49)
E	Did not meet all course requirements, mark range (0-39)

Submission requirements:

- Submit a written report detailing your analysis, modeling approach and findings. The submission must have your name and ID number clearly printed.
- Submission should be typed, double-spaced, and adhere to a standard citation format if external sources are referenced.
- A presentation summarising your findings and recommendations, with a focus on ethical considerations and cultural relevance.

Additional Information:

- You may use any software tools or programming languages commonly used in data analytics and software engineering.
- Ensure that your analysis and recommendations are well-supported by evidence from the dataset and relevant literature.
- Consider the broader implications of your findings for software engineering practice and the potential impact on users and society.

Assessment Tasks

Task1: Advanced Statistical Analysis for Software Engineering.

LO3: Critically evaluate advanced statistical analytics skills, from large datasets to create and assess data-based models for software engineering applications.

Scenario:

You are a data scientist working for a leading software development company. The company has been tasked with improving the performance of a popular mobile app used for fitness tracking. The app has a large user base and collects various types of data, including user activity, location, and health metrics. Your team has been provided with a below dataset containing user interactions and app usage data for the past year.

User ID	Gender	Age	Activity Level	Location	App Sessions	Distance Traveled (km)	Calories Burned
1	Male	30	Active	Urban	100	50	500
2	Female	25	Moderate	Rural	50	20	200
3	Male	40	Sedentary	Suburban	200	100	1000
4	Female	35	Active	Urban	150	75	750
5	Male	28	Moderate	Rural	75	30	300

- Analyse the provided dataset to identify relevant features and patterns related to user engagement and app performance.
- Apply advanced statistical techniques (e.g., regression analysis, clustering, etc.) to create models that predict user behaviour and app usage patterns.
- Evaluate the performance of your models using appropriate metrics and discuss the implications for software engineering decision-making.

Task2: Ethical and Culturally Relevant Data Analysis

LO4: Critically analyse data usage guided by culturally relevant and ethically responsible approaches to problem solving.

Scenario: Imagine you are part of a software development team tasked with creating a new feature for a fitness tracking app. The goal of the feature is to provide personalized workout recommendations based on user data. As part of your analysis, you will need to consider the ethical implications of collecting and analyzing user data, as well as the cultural relevance of your recommendations. Please refer to the above data in Task 1.

- Consider the ethical implications of collecting and analyzing user data for software engineering purposes. Discuss potential privacy concerns and strategies for mitigating risks.

- Analyse the dataset with a focus on cultural relevance, considering how different user demographics might impact the interpretation of the data and the development of software solutions.

- Propose ethical guidelines for data collection and usage within the software development process, ensuring compliance with industry standards and ethical principles

Marking Rubric

Task 1: Advanced Statistical Analysis for Software Engineering.

LO1: Apply data analytical concepts, methods, tools, and techniques to solve problems in real world contexts and communicate these solutions effectively.

Criterion & Weighting		A (80-100) %	B (65-79) %	C (50-64) %	D (40-49) %	E (0-39) %
Data Analysis	25%	Demonstrated a comprehensive understanding of the dataset and identified relevant features and patterns related to user engagement and app performance. Advanced statistical techniques were applied effectively to create models that accurately predicted user behaviour and app usage patterns.	Demonstrated a good understanding of the dataset and identified some relevant features and patterns. Advanced statistical techniques were applied adequately to create models that partially predicted user behaviour and app usage patterns.	Demonstrated a basic understanding of the dataset but failed to identify all relevant features and patterns. Advanced statistical techniques were applied but with limited success in creating models that predicted user behaviour and app usage patterns.	Demonstrated a poor understanding of the dataset and failed to identify relevant features and patterns. Advanced statistical techniques were not applied effectively to create models.	Demonstrated a very poor understanding of the dataset and did not identify any relevant features or patterns. Did not apply advanced statistical techniques effectively to create models.
Model Performance Evaluation	20%	Evaluated the performance of their models using appropriate metrics, such as accuracy, precision, and recall. Provided a thorough discussion of the implications of the model performance for	Evaluated the performance of their models using some appropriate metrics but may not have provided a comprehensive discussion of the implications. Provided a discussion of the implications of the model performance for	Evaluated the performance of their models using basic metrics but failed to provide a clear discussion of the implications. Provided a limited discussion of the implications of the model performance for software	Did not effectively evaluate the performance of their models or discuss the implications. Did not provide a discussion of the implications of the model performance	Did not effectively evaluate the performance of their models or discuss any implications. Did not provide any discussion of the implications of the model performance for software

		software engineering decision-making.	software engineering decision-making.	engineering decision-making.	for software engineering decision-making.	engineering decision-making.
Presentation and Clarity	15%	Presented the analysis and findings clearly and concisely, with well-organized content and effective use of visual aids. The report was highly professional and demonstrated a thorough understanding of the subject matter.	Presented the analysis and findings clearly, with mostly well-organized content and some use of visual aids. The report was professional and demonstrated a good understanding of the subject matter.	Presented the analysis and findings adequately, with some organization and minimal use of visual aids. The report was satisfactory but may have lacked clarity in some areas.	Presented the analysis and findings poorly, with little organization or use of visual aids. The report lacked clarity and coherence. The report was poorly organized and lacked clarity.	Presented the analysis and findings very poorly, with no organization or use of visual aids. The report lacked any clarity and coherence. The report was extremely poorly organized and lacked any clarity.

Task2: Ethical and Culturally Relevant Data Analysis

LO4: Critically analyse data usage guided by culturally relevant and ethically responsible approaches to problem solving.

Criterion & Weighting		A (80-100) %	B (65-79) %	C (50-64) %	D (40-49) %	E (0-39) %
Ethical Implications	10%	Demonstrated a comprehensive understanding of the ethical implications of collecting and analysing user data. Discussed potential privacy concerns in-depth and proposed detailed strategies for mitigating risks.	Demonstrated a good understanding of the ethical implications of collecting and analysing user data. Discussed potential privacy concerns and proposed strategies for mitigating risks.	Demonstrated a basic understanding of the ethical implications of collecting and analysing user data. Discussed some potential privacy concerns and proposed basic strategies for mitigating risks.	Demonstrated a poor understanding of the ethical implications of collecting and analysing user data. Discussion of potential privacy concerns and strategies for mitigating risks was incomplete or inaccurate.	Demonstrated a very poor understanding of the ethical implications of collecting and analysing user data. Discussion of potential privacy concerns and strategies for mitigating risks was completely absent or entirely inaccurate.
Cultural Relevance	10%	Analysed the dataset with a deep understanding of cultural relevance, considering how different user demographics might impact data interpretation and software development. Provided detailed insights into how cultural factors influence data analysis and software solutions.	Analysed the dataset with a good understanding of cultural relevance, considering how different user demographics might impact data interpretation and software development. Provided some insights into how cultural factors influence data analysis and software solutions.	Analysed the dataset with a basic understanding of cultural relevance, considering how different user demographics might impact data interpretation and software development. Provided limited insights into how cultural factors influence data analysis and software solutions.	Analysed the dataset with a poor understanding of cultural relevance, failing to consider how different user demographics might impact data interpretation and software development. Provided inaccurate or irrelevant insights into how cultural factors influence data analysis and software solutions.	Analysed the dataset with no understanding of cultural relevance, failing to consider how different user demographics might impact data interpretation and software development. Provided no insights into how cultural factors influence data analysis and software solutions or provided entirely inaccurate and irrelevant insights.

Ethical Guidelines	10%	Proposed comprehensive ethical guidelines for data collection and usage within the software development process. Guidelines were detailed, well-reasoned, and demonstrated a clear understanding of industry standards and ethical principles.	Proposed ethical guidelines for data collection and usage within the software development process. Guidelines were clear and demonstrated an understanding of industry standards and ethical principles.	Proposed basic ethical guidelines for data collection and usage within the software development process. Guidelines were somewhat clear but may have lacked detail or thoroughness.	Proposed incomplete or inadequate ethical guidelines for data collection and usage within the software development process. Guidelines may have been unclear or failed to demonstrate an understanding of industry standards and ethical principles.	Proposed incomplete or inadequate ethical guidelines for data collection and usage within the software development process. Guidelines were entirely unclear or failed to demonstrate any understanding of industry standards and ethical principles.
Presentation and Clarity	10%	Presented analysis and proposals clearly and concisely, with well-organized content and effective use of language. Presentation demonstrated professionalism and a thorough understanding of the subject matter	Presented analysis and proposals clearly, with mostly well-organized content and some use of language. Presentation demonstrated a good understanding of the subject matter.	Presented analysis and proposals adequately, with some organization and use of language. Presentation was satisfactory but may have lacked clarity in some areas.	Presented analysis and proposals poorly, with little organization or use of language. Presentation lacked clarity and coherence.	Presented analysis and proposals very poorly, with no organization or use of language. The presentation lacked any clarity and coherence.

Note: *The ranges for each grade level encompass the full 11-point grading system as outlined in the accompanying table. Please refer to the table for detailed percentage ranges associated with each letter grade.*