CCT College Dublin Continuous Assessment

Programme Title:	*Diploma in Data Analytics for Business*		
Cohort:	*PT Sept 2023*		
Module Title(s):	*Machine Learning I and Machine Learning II*		
Assignment Type:	*Individual*	**Weighting(s)**:	*50%*
Assignment Title:	*Integrated CA2*		
Lecturer(s):	*Marina Iantorno*		
Issue Date:	*28th of May*		
Submission Deadline Date:	*30th of June, 23.55 hs*		
Late Submission Penalty:	Late submissions will be accepted up to **5** calendar days after the deadline. All late submissions are subject to a penalty of **10%** of the mark awarded. Submissions received more than 5 calendar days after the deadline above **will not** be accepted and a mark of 0% will be awarded.		
Method of Submission:	**Moodle**		
Instructions for Submission:	*You must submit a Word/PDF document with the report and a Jupyter Notebook file with the code and the outcome*		
Feedback Method:	**Results posted in Moodle gradebook**		
Feedback Date:	*Approximated 3 weeks after submission*		

Attainment of the learning outcomes is the minimum requirement to achieve a Pass mark (40%). Higher marks are awarded where there is evidence of achievement beyond this, in accordance with QQI *Assessment and Standards, Revised 2013*, and summarised in the following table:

Percentage Range	**CCT Performance Description**	**QQI Description of Attainment**	
		Level 6, 7 & 8 awards	**Level 9 awards**
90% +	Exceptional	Achievement includes that required for a Pass and in **most** respects is significantly and consistently beyond this	Achievement includes that required for a Pass and in **most** respects is significantly and consistently beyond this
80 – 89%	Outstanding		
70 – 79%	Excellent		
60 – 69%	Very Good	Achievement includes that required for a Pass and in **many** respects is significantly beyond this	Achievement includes that required for a Pass and in **many** respects is significantly beyond this
50 – 59%	Good	Achievement includes that required for a Pass and in **some** respects is significantly beyond this	Attains all the minimum intended programme learning outcomes
40 – 49%	Acceptable	Attains all the minimum intended programme learning outcomes	
35 – 39%	Fail	Nearly (but not quite) attains the relevant minimum intended learning outcomes	Nearly (but not quite) attains the relevant minimum intended learning outcomes
0 – 34%	Fail	Does not attain some or all of the minimum intended learning outcomes	Does not attain some or all of the minimum intended learning outcomes

Please review the CCT Grade Descriptor available on the module Moodle page for a detailed description of the standard of work required for each grade band.

The grading system in CCT is the QQI percentage grading system and is in common use in higher education institutions in Ireland. The pass mark and thresholds for different grade bands may be different from what you have experience of in the higher education system in other countries. CCT grades must be considered in the context of the grading system in Irish higher education and not assumed to represent the same standard the percentage grade reflects when awarded in an international context.

Learning Outcomes:

- Identify the distinguishing features of the two fundamental types of supervised learning (Linked to PLO3).
- Explore a range of classification and regression techniques and ascertain their suitability for a variety of problem domains (Linked to PLO 5).
- Evaluate and optimise the performance of classification and regression models (Linked to PLO 3).

Assessment Task

You are a data analyst at an IT company that provides cloud-based solutions to businesses. Your company wants to leverage data analytics to predict demand for various software products over time and classify incoming system issues based on their severity to streamline response strategies.

Assessment Details

Data Exploration and Preprocessing

1. Conduct an initial exploratory data analysis on the provided time series dataset to identify trends, seasonality, and any data inconsistencies. Clean the dataset to prepare for further analysis. **[0-20%]**.

Time Series Forecasting for Software Demand

2. Develop a time series model to forecast monthly demand for the company's top software products for the next year. Evaluate the model based on its accuracy and ability to handle seasonal variations. **[0-20%].**

Classification and anomaly detection

3. Build a classification model to categorize incoming system issues into 'Urgent', 'High', 'Medium', or 'Low' based on factors like issue type, system component affected, and customer impact. **[0-10%]**
4. Implement an anomaly detection algorithm to identify unusual patterns in system logs that could indicate potential security threats or failures. **[0-10%]**

Recommendation system

5. The company offered the services to an online retail store. The service offers them the possibility to have at the end of the day a list with the most common items sold in the online store. Place a recommendation system and identify 3 possible recommendations for 3 random customers. **[0-20%]**

Reporting

6. Compile a comprehensive report detailing your methodologies, findings, and recommendations. The report should include data visualizations, a discussion on model selection, and actionable insights for the IT team. **[0-20%].**

Submission Requirements

All assessment submissions must meet the minimum requirements listed below. Failure to do so may have implications for the mark awarded.

All assessment submissions must:

- Add required word count if applicable (2500 words minimum).
- Submission of a Word document and. JPYNB file containing the code. The name of the file should be dip_YOUR_NAME_Year.
- Be submitted by the deadline date specified or be subject to late submission penalties.
- Use Harvard Referencing when citing third party material.
- Be the student's own work.

- Include the CCT assessment cover page.

Additional Information

- Lecturers are not required to review draft assessment submissions. This may be offered at the lecturer's discretion.
- In accordance with CCT policy, feedback to learners may be provided in written, audio or video format and can be provided as individual learner feedback, small group feedback or whole class feedback.
- Results and feedback will only be issued when assessments have been marked and moderated / reviewed by a second examiner.
- Additional feedback may be requested by emailing the lecturer up to one week after the grade is released. Additional feedback may be provided as individual, small group or whole class feedback. Lecturers are not obliged to respond to email requests for additional feedback where this is not the specified process or to respond to further requests for feedback following the additional feedback.
- Following receipt of feedback, where a student believes there has been an error in the marks or feedback received, they should avail of the recheck and review process and should not attempt to get a revised mark / feedback by directly approaching the lecturer. Lecturers are not authorised to amend published marks outside of the recheck and review process or the Board of Examiners process.
- Students are advised that disagreement with an academic judgement is not grounds for review.
- For additional support with academic writing and referencing students are advised to contact the CCT Library Service or access the CCT Learning Space.
- For additional support with subject matter content students are advised to contact the CCT Student Mentoring Academy
- For additional support with IT subject content, students are advised to access the CCT Support Hub.