PROJECT HANDBOOK

Master of Science (Data Science)

1.1 Introduction

Master Project is a core course in Masters of Science (Data Science) program curriculum. It aims to equip students with a range of valuable skills, knowledge, and experiences that are essential for success in the field of data science and related professions. Students are required to complete these courses for the eligibility of being awarded with Masters of Science (Data Science).

1.2 Project Phases

The master project consists of TWO PHASES, which are Project 1 (MCSD 6215) and Project 2 (MCSD 6227)

1.2.1 Project 1

Project 1 is the project proposal that outlines the scope, objectives, methodology, and expected outcomes of a data science project. The report for Project 1 is as follows:

Front page cover
Abstract
Table of contents
List of Figures (if necessary)
List of Tables (if necessary)
List of Abbreviation (if necessary)
Appendices (i.e: Gant Chart)

1. Chapter 1: Introduction
    a. Introduction**:** An introduction to the project, providing background information and context. This section should explain why the project is important and relevant.
    b. Objective**:** Clearly state the main objectives or goals of the project. What problem or question are you trying to address with this project?
    c. Scope**:** Define the boundaries of the project. What data will you work with? Are there any constraints or limitations?
2. Chapter 2: Literature review/Problem background
    a. Review relevant literature and research in the field to provide context for your project.
3. Chapter 3: Methodology
    a. Follow the data science project life cycle
    b. Description of data sources and data collection methods.
    c. Data pre-processing steps, including cleaning, transformation, and feature engineering.

4. Chapter 4: EDA/Initial Results
    a. Case 1: Primary data
        i. **Exploratory Data Analysis (EDA):**
            1. Visualizations and descriptive statistics to explore the data.
            2. Initial insights gained from EDA.
            3. Feature engineering
    b. Case 2: Secondary data
        i. **Exploratory Data Analysis (EDA):**
            1. Visualizations and descriptive statistics to explore the data.
            2. Initial insights gained from EDA.
            3. Feature engineering
        ii. Machine Learning (initial result)
5. Chapter 5: Discussion and Future Work
    a. Interpretation of the results in the context of the research question.
    b. Discussion of the implications of your findings.
    c. Comparison to previous research (if applicable).

1.2.2 Project 2

Project 2 is the execution of project proposal. It include but not limited to; thorough analysis of data, the development of dashboard to communicate the finding from data analysis and coding of machine learning algorithm to obtain the insight. The report for Project 2 is as follows:

1. Chapter 1: Introduction
    - Introduction to the problem or research question.
    - Background and context for the project.
    - Objectives and scope of the project.
    - A brief overview of the methodology.

2. Chapter 2: Literature review/Problem background
    - Review relevant literature and research in the field to provide context for your project.

3. Chapter 3: Methodology
    - Follow the data science project life cycle
    - Description of data sources and data collection methods.
    - Data pre-processing steps, including cleaning, transformation, and feature engineering.

4. Chapter 4: EDA
    - Exploratory Data Analysis (EDA):
        1. Visualisations and descriptive statistics to explore the data.
        2. Initial insights gained from EDA (Diagnostic Analytics)
        3. Feature engineering
    - Machine learning (Predictive Analytics)
    - Prescriptive Analytics (optional)

- Note: For primary data, the focus will be on the EDA process. For secondary data, the focus will be on EDA and machine learning.

5. Chapter 5: Model Development
   - Discuss all processes and experiments involved in the models' development
   - Evaluate the performance of the models or methods.
   - Use appropriate metrics to assess the quality of your analysis and models.
   - Discuss process in dashboard development including the storytelling.

6. Chapter 6: Results and Discussion/Interpretation
   - Data pipeline if applicable
   - Visualisations (dashboard) and tables to support your results.
   - Interpretation of the results in the context of the problem background identified in chapter 1.
   - Discussion of the implications of your findings.
   - Comparison to existing work (if applicable).

7. Chapter 7: Conclusion
   - Summary of the key findings
   - Concluding remarks on the project's success and limitations
   - Suggestions for future research or improvements.

Report for Project 2 should **STRICTLY** follow the UTM Thesis format. Refer to guideline given in "Panduan Menulis Thesis" prepared by Sekolah Pengajian Siswazah, Universiti Teknologi Malaysia at http:www.sps.utm.my.

1.3 Supervisor

Students are responsible for finding a supervisor to supervise them in the execution of their project. The appointed supervisor will supervise the student's project for both Project 1 and Project 2. Students should have a discussion with a few lecturers before appointing them in order to identify:

a. A supervisor who has sufficient knowledge of the intended project
b. A supervisor who has the same interest in the intended project.
c. Co-supervisor, if the intended project is a cross-discipline area.

1.4 Intellectual Property and Conflicts of Interest

If the Master's project is carried out on the premises of a company outside of the university campus and without the university's financial resources, all intellectual property generated during the project period belongs to the company. An agreement will be negotiated among the student, the programme coordinator, the academic supervisor, and the industry prior to the start of the project so as to ascertain ownership of intellectual property. The agreement depends on the particular status and scope of each project as well as previous patent ownership.

1.5 Publication

Short Paper (for Proceeding) - Use (Short Paper template) – *6 pages- Paper can either follow the IJIC or UTM SC Proceeding. **Please consult your SV for which template to use.*

- For Paper template and examples, please visit :
  - SC Prooceeding (visit SC Proceeding web) OR
- IJIC Paper template (visit IJIC web) examples.
  - Short paper info can be found here too.

1.6 Project Calendar

Project 1 (MCSD 6215)

Week	Activity	Responsibility
2	Student submit project proposal and supervisor appointment form to coordinator	Student →program coordinator
3	Result on Project Proposal	Program coordinator →student
6	Students email to: norazlizay@utm.my • Active email: • Matric no: • Supervisor name: • Dissertation title:	Student → Program Administrator Program Coordinator will create student turn it in account.
10	Students submit **HARDCOPY** draft of Project Report to Supervisor.	Student →Supervisor
13	Draft of Project Report draft returned by Supervisor.	Student →Supervisor
	Program Administrator publish Project Timetable by email	Program Administrator → student
14	Students submit to Academic Office: • Project reports certified by Supervisor • (FOLLOW the UTM thesis report) • Log Book • Turnitin Form • Plagiarism form by chapter	Student → Academic Office
15	Project presentation	Student Supervisor & Examiners → Program Administrator

Project 2 (MCSD 6227)

Week	Activity	Responsibility
6	Students email to: norazlizay@utm.my • Active email: • Matric no: • Supervisor name: • Dissertation title:	• Student → Program Administrator *Program Coordinator will create student turn it in account.*
10	Students submit **HARDCOPY** draft of project report to Supervisor.	Student →Supervisor
13	Report Project draft returned by Supervisor.	Supervisor → Student
14	Students submit to Academic Office: • 3 copies of Project reports certified by Supervisor (**FOLLOW** the UTM thesis report) • 1 copy of Log Book ***(Supervisor)*** • 3 copies of Turnitin Form-Plagiarism form by chapter (for each chapter similarity index must not exceed 20%)-Endorsed by coordinator programs	Supervisor → Academic office
	Program Administrator publish Project Timetable	Program Administrator → Student
15	Project presentation	Student Supervisor & Examiners → Program Administrator

** Date and activities are subject to change. Any update will be informed in the current semester by the program coordinator

1.7 General Rules

1. Students need to pass the Research Methodology course before register Project 1 (MCSD1043)

2. Project proposal must be discussed and submitted to academic supervisor.

3. **PLAGIARISMS** of any works during Project 1 and Project 2 are strictly prohibited. Students are required to attach the result of Turnitin report with less than 20% similarity.

4. Students are advised to aware of the Projects Important Dates (which is given in early phase of Project 1) and planning wisely accordingly to the date given for the project implementation.

5. Final reports for Project 1 and Project 2 need to be submitted at most **TWO weeks** after the presentation for students who obtained **MINOR CORRECTION** and minimum **FOUR week** for students who obtained **MAJOR CORRECTION**.

6. Communicate with academic supervisor at least **THREE (3)** times meeting per semester so that the students will be on track for their project.

7. During presentation day, student and the academic supervisor is **COMPULSORY** to attend.

8. Students report and presentation will be evaluated by appointed examiners among UTM FC academic staff with related expertise in the respective project. The evaluation will be using standard evaluation form provided by UTM FC upon presentation.

9. If the students have a medical leave it should be informed immediately to programme coordinator.

10. All the confidential matters from industries need to be declared in a `Confidential Items Form'
11. *All reports and presentations must be treated with the strictest confidential and must be declared in 'Confidential Items Form'*