GUIDELINES

CAPSTONE PROJECT IN DATA SCIENCE I

Department of Data Science

Faculty of Computing

Sabaragamuwa University of Sri Lanka

2024

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1. Introduction

1.1. Overview

The **Capstone Project in Data Science I (DS2105)** is a compulsory course module for the Bachelor of Science Honours Degree Programme in Data Science, offered by the Department of Data Science (DDS), Faculty of Computing, Sabaragamuwa University of Sri Lanka. This course is completed as an individual project in the second semester of the first year. The capstone project is designed to allow students to engage in the investigation, installation, and configuration of data engineering tools.

Capstone project may involve an investigation of data management tools, installation, and configuration. The students will apply their knowledge on relational data model and management, NoSQL data model and management and data distribution. Moreover, the students will utilize their knowledge on data distribution, data processing techniques such as cleaning, transforming, and enriching data.

In this project, students will identify requirements for real-world problems and subsequently design and develop software applications. This project provides students with an opportunity to apply theoretical principles and practical programming skills in the development of diverse applications.

Students are advised to plan their project ideas early in the second semester of the first year. An internal supervisor will be assigned to each student, who will guide the students through the project process. Students are responsible for regularly updating the progress of the project, addressing feedback from the supervisor throughout the semester, and completing the final report by covering all the initially defined requirements and scope.

The capstone project is equivalent to 2 credits, duration for the Capstone project is 15 weeks (one semester), and is evaluated by the internal supervisors and a panel of evaluators through a presentation and the final report.

1.2. Vision

The vision of the Capstone Project in Data Science I (DS2105) is to provide the Data Science (DS) Students with a foundational experience in applying theoretical principles and programming skills on data management tools to real-world problems. This course aims to bridge the gap between theoretical knowledge and practical applications by encouraging students to software applications or desktop applications to address real-world challenges.

1.3. Mission

The mission of the Capstone Project in Data Science I (DS2105) is to equip first-year students with the essential skills and experiences needed to design and develop innovative software applications that address real-world problems effectively. Further, it aims to foster students' ability to work collaboratively in teams, simulating professional environments, and to establish a strong foundation for future academic and professional success by integrating core software development practices, problem-solving strategies, and application design principles.

2. Objectives

Objectives of the Capstone Project in Data Science I:

- Identify real-world problems relevant to various domains.
- Develop students' ability to apply knowledge and techniques learned in theoretical classes to develop software products for real-world problems.
- Gives an insight into the real working environment of an organization to the students.
- Assist students in exploring career opportunities in their fields of interest by engaging in hands-on projects.
- Strengthen students' skills in reporting, presenting, and demonstrating their project outcomes effectively.
- Contribute to the academic and professional growth of students as undergraduates at Sabaragamuwa University of Sri Lanka, while fostering a mindset of continuous learning and innovation.

3. Proposed Action Plan

Students are typically required to undertake their Capstone Project in Data Science I (DS2105) during Semester II of their first year. Before beginning the project, students must complete all prerequisite coursework at the start of Semester II. Once these prerequisites are met, students will proceed to the implementation phase of the project. They are expected to complete and submit their final project deliverables, including any required reports or presentations, by the end of the semester.

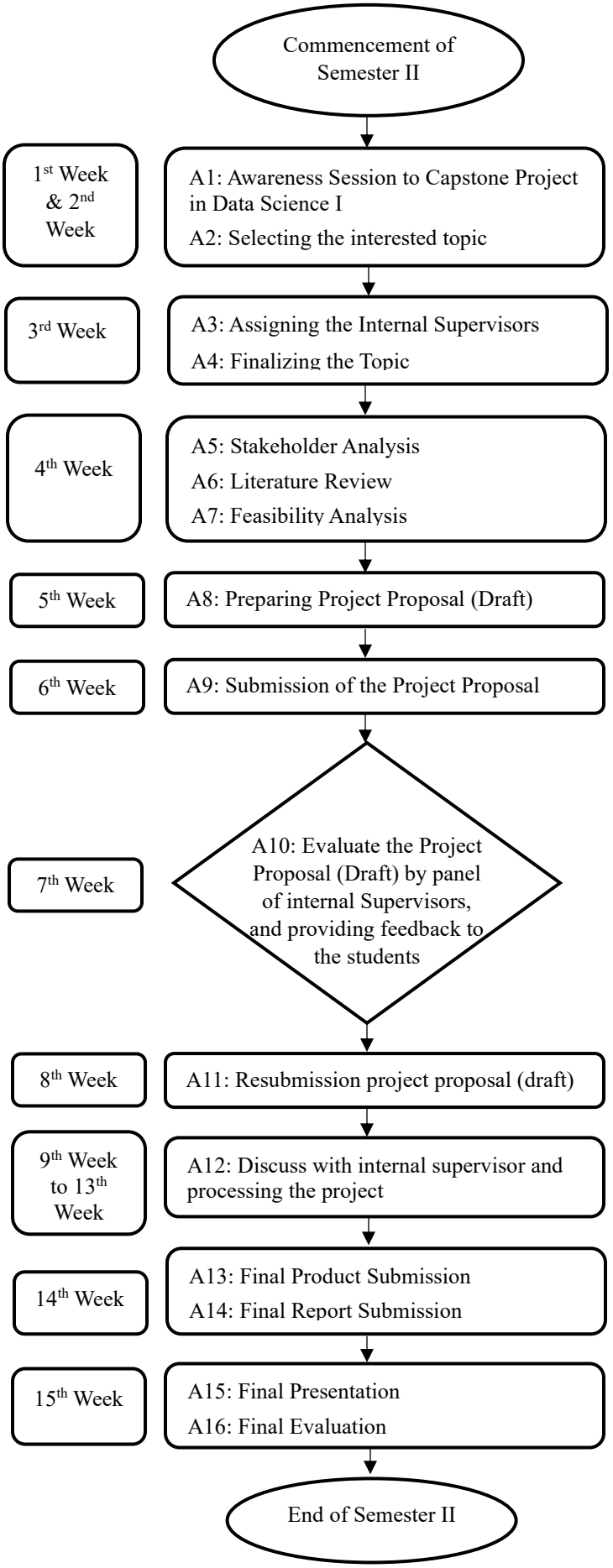

Figure 1: Proposed Action Plan

1.1 A1: Awareness Session to Capstone Project in Data Science I

An Awareness Session will be organized to inform students about the Capstone Project in Data Science I. During this session, students will be provided with detailed guidelines for the project, including expectations, timelines, and deliverables. The primary focus of the session is to ensure that students understand the importance of producing a high-quality final product as the outcome of their Capstone Project.

1.2 A2: Selecting the Interested Topic

Students are guided through the process of choosing a relevant and feasible real-world problem for their Capstone Project in Data Science I. They are encouraged to select a topic that aligns with their personal interests or current industry trends, ensuring the problem is both significant and manageable.

1.3 A3: Assigning the Internal Supervisors

The department will assign an Internal Supervisor to each student based on their chosen project topics. Students should be aware of their assigned Internal Supervisor and are required to initiate contact with them to discuss their Capstone Project. This interaction is crucial for receiving guidance, feedback, and support throughout the project. The Internal Supervisor will assist students in refining their project approach, ensuring they stay on track, and addressing any issues that may arise during the course of the project.

1.4 A4: Finalizing the Topic

Students should finalize their project topic after conducting a feasibility analysis. This analysis involves evaluating the practicality and scope of the chosen topic, ensuring that it aligns with available resources, data accessibility, and project objectives. The finalized topic should be clearly defined and feasible for completion within the project's timeframe.

1.5 A5: Stakeholder Analysis

This process is to analyses the Stakeholders for the finalized topic of the project and students will ask to analyses the stakeholder who are influencing the Capstone Project.

1.6 A6: Literature Review

This process is to check whether the availability of the existing products is for a similar area. Every product must be a novel one.

1.7 A7: Feasibility Analysis

This process is to check the possibility of completing the project during the given time period with appropriate requirements (Technologies, Budget, Time and etc.).

1.8 A8: Preparing Project Proposal (Draft)

Drafted Capstone Project proposal should be prepared in consultation with the internal supervisor. It should clearly state the objectives and environment of the proposed Capstone Project to be undertaken. The proposal should outline the problems, goals, approach, and expected outcomes, and must be formatted according to the specified guidelines.

1.9 A9: Submission of the project Proposal

Students are required to submit a comprehensive proposal document that includes the project title, introduction, objectives, scope, methodology, and a tentative project plan. Students must submit their proposals by the given deadline.

1.10 A10: Evaluate the Project Proposal (Draft) by panel of Internal Supervisors, and providing feedback to the students

The proposal will undergo an initial review process, and feedback will be provided to guide any necessary revisions. This ensures that the project's scope, objectives, and methodology are clearly defined and approved before the project begins. Every student will be given suggestions and feedback about the proposal.

1.11 A11: Resubmission Project Proposal (Draft)

Students are responsible to resubmit the project proposal by addressing all the comments and feedback from the reviewers.

1.12 A12: Discussion with Internal Supervisors and processing the Project

After incorporating the feedback from the Review Panel, students can begin the implementation phase of their project. This discussion with their Internal Supervisor is crucial for resolving any challenges encountered during implementation. The Internal Supervisor is responsible for guiding students, offering support, and providing the necessary resources to facilitate the successful completion of the project.

1.13 A13: Final Product Submission

The final product of the Capstone Project must be submitted by every student at the end of the Capstone Project semester (Beginning of 14^{th} week). This should be a completely workable product that completes all the defined scope of the project proposal.

1.14 A14: Final Report Submission

At the conclusion of the Capstone Project, all students must submit a final report. This report should be prepared in accordance with the Capstone Project Report Preparation Guidelines. The final report will document the entire project process, including problem identification, methodology, analysis, results, and conclusions, ensuring a comprehensive reflection of the work completed.

1.15 A15: Final Presentation

The presentation should provide a concise yet detailed summary of the students' overall performance during the Capstone Project. It should be presented in an engaging and logically organized manner, effectively communicating the key aspects of the project. The presentation must be submitted at the beginning of the 15^{th} week.

1.16 A16: Final Evaluation

The final evaluation will be conducted by a panel of experienced evaluators who have been involved throughout the Capstone Project in Data Science I. This consistent panel will assess the overall performance of students, considering their progress, adherence to project guidelines, and the quality of the final deliverables. The evaluation will focus on both the process and the final outcomes, ensuring a comprehensive assessment of the students' work from start to finish.

4. Instructions for the Students and Supervisors

4.1. Instructions for Students

- This is an individual project which every student should complete.
- Students have to select the interested topic of the project during the 1st two weeks of the Capstone Project.
- Students are allowed to select any interested project with trending/timely technologies.
- The Department will assign an Internal Supervisor to each student.
- If students encounter any issues, they must seek guidance from their assigned Internal Supervisor.
- Consequently, students should do a stakeholder analysis, literature review and feasibility analysis.
- Students must submit a project proposal, including project title, introduction, objectives, scope, methodology, and a tentative project plan.
- All the Project proposals will be reviewed by a panel assigned by the Department and students should address all the feedback given by the review panel students should resubmit the proposal within 7 days of the project proposal being reviewed.
- The proposal must be approved by the Department before the project can commence.
- Students must report to their internal supervisor once a week to show/update the progress of their work. If the students are not properly communicating with the internal supervisors, they have the power to take strict actions and report to the respective departments.
- Students should contact their internal supervisors at the first possible instance and waiting for the last moment will cause for late submissions and marks reductions.
- Students must submit their final project report along with the final product, and final presentation to the final evaluation.
- Students should strictly follow the Guidelines provided by the Department to prepare each and every report.
- Students are encouraged to use Version Control Tools like GitHub and Project management tools like Trello, and Microsoft Projects.
- Students are strictly advice to work for the given deadlines. If anyone does not follow the rules, the department has the power to take strict actions and reduce the considerable number of marks for each submission/milestone. Departments will not be extending the deadlines for any reason.

4.2. Instructions for Internal Supervisors

- Every Student will get one Internal Supervisor to get guidance during their Capstone Project.
- Internal supervisors may get more than one students to guide during the semester.
- Supervisors are expected to find out the solutions for their internal matters and they should directly involve evaluating the progress of the students.
- Internal Supervisors can schedule the meeting if needed and they can provide feedback on the progress of the project.
- The department will provide guidelines to prepare proposals, interim reports, final dissertations, and presentations. Internal Supervisors also have access to those resources and are expected to adhere to these guidelines during supervision.
- Internal Supervisors should participate in each and every evaluation throughout the project.
- Guidelines for Supervision
    - Please note that all guidelines for the preparation of documents and presentations are provided to students. Therefore, please advise the students that they should adhere to those guidelines.
    - Please note that those guidelines use very generic terms such as Others' work, Approach, Design, etc. and you are required to guide students to find suitable terms for these as per their own projects.
    - The internal Supervisor should be aware of the students with the project objectives, process, and evaluation.
    - Please advise students about the importance of testing or evaluation in all scientific projects. You may guide the students to organize the evaluation in terms of evaluation strategy, identification of participants, controlling the experiments, design of questionnaires, and reporting the results. Please make sure that the evaluation has been structured to measure the objectives.
    - Always encourage students to work before the deadlines. If any students are not following the rules, internal supervisors have the power to take immediate strict actions and report to the project coordinator of department heads.

5. Guidelines

5.1. Capstone Project in Data Science 1 Proposal Guidelines

The project proposal is a crucial document at the beginning of the Capstone Project in Data Science I. It serves as a roadmap, guiding students to execute their projects effectively throughout the course duration. When preparing the project proposal, students must carefully consider several key factors, including the scope of the project, the motivation behind it, and the feasibility of completing it within the given timeframe. Project proposal should be prepared in consultation with the **Internal Supervisors**. Ensure to include the pages and sequence of contents strictly should be in the following order:

- Title of the Project
- Approval of Capstone Project
- Index
- Acknowledgment
- Student Details
- Introduction & Objective of the Capstone Project
- Analysis (Feasibility Study, DFD Diagrams/ER Diagrams, and etc.
- H/W and S/W requirement
- Tables and Structure, Number of Modules, Details of Modules, Data Structure
- Proposed System (Including functional and non-functional requirements, Methodology)
- Modules Split-up and Gantt Chart References
- Cost analysis

5.1.1. Guidelines for the Proposal Formatting

- Font face - Times New Roman.
- Font size- 11pt
- Line spacing - 1.5 line space

5.1.2. Template for the Approval sheet

Approval of Capstone Project in Data Science I

1. Title of the Capstone Project:
2. Details of the Student:

Index No	Name with Initials	Email	Mobile No	Signature of Student

3. Name of the Internal Supervisor:
4. Internal Supervisor’s designation:

For office use only:

Approved/Not approved
Signature of the Internal Supervisor
Date:
Suggest if any:

5.2. Capstone Project in Data Science 1 Final Report Guidelines

The final report is the most important document for the Capstone Project in Data Science I. It should be a comprehensive document of approximately 10 pages with double spacing. Students are encouraged to use any suitable text editor to compose their project report. To ensure a high-quality final report, Capstone Project Report should strictly follow the points given below:

5.2.1. Report Formatting

The information given in this section explains the formatting of the report. Use any word processing tools to set them up.

Layout

- Use A4 size with 35mm left margin 30mm right, top, and bottom margins
- Page numbers should be included (See Tables of Content)

Fonts

- Font type: Times New Roman
- Font Size: 12pt

Alignments

- Allow 1.15mm line-spacing
- Paragraphs should be separated by one blank line
- Permitted font color - only black
- Left and right margins should be justified

Legends

- Should be emboldened and centered

Page limit (Quantity can't substitute the Quality)

- There are not any limitations/strict rules about overall page count.
- Get advice from your respective supervisor regarding the page limit

Print

- The whole report should be printed on one side
- Type: Grayscale

Structure

- Follow the instructions given in Anatomy of the Report

5.2.2. Anatomy of the Report

Title Page

Generally, the title page contains a precise title, names, and affiliations of investigators along with institutional details. Don't do fancy though you are free to follow your own set of ideas.

Declaration

Type the particular declaration given in Appendix A.

Certificate of Approval

Appendix B

Acknowledgment

Even though it is optional, gratitude towards the people who gave the real contribution and support can be praised here (typically your supervisor, head of the department, friends and colleagues, etc.).

Abstract

The abstract is the shortened form or the summary of the complete report. Give more emphasis on results, recommendations, and conclusion and it should be more concise. Apart from these major points, the purpose of the report can also be included.

This section;

-can contain 250 - 300 words

-should be written as a single paragraph using the present tense

Table of Contents

The arrangement of the complete report can be illustrated in the table of contents. Use Roman numbering except for primary chapters, for which the numerals can be used.

List of Figures

The list of figures with numbers and titles can be shown together with page numbers where the figures are located. Keep in mind that all figures and tables listed here must be referred to inside the main text.

E.g. “The use case diagram shown in Figure 1 ....”

5.2.3. List of Tables

This list of all tables can be shown together with their page numbers. The arrangement of tables should be arranged with chapters.

Chapter 1: Introduction

Through this chapter, a detailed description of the project can be given to the audience. The major points elaborated in other chapters of the report have to be merged together with a brief description. Most importantly, it should encourage the reader to read the complete report.

This section may include the following major points as subsections;

- Major goals and objectives
- Motivation
- The scope of the completed project
- The approach and assumptions while carrying out the project work
- Concise summary of major outcomes

The length of this chapter depends on the nature of the project.

Chapter 2: Background

The background section should provide the reasons why the project was initiated, which assists the audience to get complete understanding of the rest of the report. Major attention has to be given to explain the reason why the project is intending to address the problem pointed out in the report. With that a clear indication of other related works where the same problem has been tried previously.

Chapter 3: Specification and Design

A specification should describe what the software system is required to do once it is implemented. In more simple words, the specification can be referred to as “expectation” and described as “what the proposed software system does.” The design always gives the description of top-level details of the way of meeting the software requirements.

A strong recommendation is to make extensive use of;

- Algorithms
- Use case diagrams
- ER diagrams
- UML diagrams
- Sequence diagrams
- State charts

Chapter 4: Implementation

In implementation give more description at a finer level of detail by touching the coding level of your project. It is possible to describe any problems which caused difficulties during implementation with the solution you found in solving those. Try to describe critical code segments in the system, significant interfaces and other components.

Implementation may include;

- Software and hardware requirements
- Illustration of a non-standard or innovative way of implementing an algorithm and data structure
- Difficulties involving existing software
- Lack of appropriate supporting software
- Over-ambitious project aims

Chapter 5: Results and Evaluation

The primary purpose of the results and evaluation is to indicate inferences taken from your observations. Pay more attention to describing the way you demonstrated that the system works as intended.

In evaluating the results, you may include:

- The comparison of implemented results with expected outcomes
- Analyze and state the achieved accuracy of outcomes
- Analyze and state implications or limitations

Chapter 6: Future Work

Some discussions and critiques on your project in order to provide openings to future research should be included in this section. This can be provided as an opportunity for future researchers by expressing unrevealed ideas.

In this section you may include;

- Gaps of the project
- Proposal for enhancement or re-design

Chapter 7: Conclusions

The conclusion chapter should state the achievements of the project in brief. These should be derived directly from the results and evaluation. Simply it is referred as the summary of the findings, which may include;

- The importance of the Software development
- Validity of the outcomes
- Gaps and limitations of the findings

References

List all important references from which you obtained the information or ideas in preparing the project report. You may include the consulted list of all books, research articles, and technical resources. Each reference should be cited in the main text. Follow IEEE standards for reference.

Glossary

A list of special technical words or acronyms may be necessary. This is particularly true if the subject deals with a new area with a specialized vocabulary that the average reader in the discipline might not be familiar with, such as Biotechnology. This list should come after the appendices.

Appendices (if applicable)

Appendices are supplementary documents to the main text. All appendices should be arranged in order, titled and alphabetical numbering can be used.

E.g. Appendix A, Appendix B and so on

- Appendices may include;
- Pieces of bulky research work/summaries of results obtained elsewhere
- Complete or partial data as tables
- Program listing
- Detailed maps, charts and diagrams

Appendix A - Sample Declaration page
Declaration (18pt + B)

We declare that this thesis does not incorporate, without acknowledgment, any material previously submitted for a Degree or a Diploma in any University, and to the best of our knowledge and belief, it does not contain any material previously published or written by another person or ourself except where due reference is made in the text. Also, we hereby grant to Sabaragamuwa University of Sri Lanka the non- exclusive right to reproduce and distribute my thesis, in whole or in part in print, electronic or other medium. We retain the right to use this content in whole or part in future works (such as articles or books).

Index Number	Name of Student	Date	Signature of Student

Appendix B – Certificate of Approval
Certificate of Approval

We hereby declare that this thesis is from the student's own work and effort, and all other sources of information used have been acknowledged. This thesis has been submitted with our approval.

Index Number	Name of Student	Date	Signature of Student

Name of Internal Supervisor:

……

Date: Signature of Internal Supervisor

Name of Head of the Department:

……

Date: Signature of Head of the Department

6. Evaluation Procedure

To ensure the proper conduction of each project, the progress of each project should be monitored on a continuous basis; by the internal supervisor, coordinator and the evaluation panel. In order to do so, it is planned to hold three evaluations to be made by each project student in each semester. The entire evaluation will be taken by the same panel of evaluators from the beginning for each and every student.

6.1. Project Proposal Evaluation

This will be a proposal report, which a panel of internal supervisors will review. In this report, students are required to provide a detailed document outlining the main aim/objective of the project, the methodology to be employed, the tentative work plan, and any supporting materials such as diagrams or charts.

If the report does not meet the required standards, the panel will ask the students, in consultation with their internal supervisor, to revise and resubmit the proposal within a week. Alternatively, if the committee deems the project insufficient in standard or feasibility, students may be required to select a new project topic. The internal supervisor will evaluate each student based on the quality of their proposal report, following the established project rubrics. The evaluation of the report will carry a weight of 30% of the total marks for the proposal.

6.2. Final Product Demonstration to get the Internal Supervisors' recommendation & feedback for the final submission

Students must complete 100% of their final product and demonstrate it to their respective internal supervisors to get approval for the final submission. The respective internal supervisors should check whether the final product meets the given scope and will give feedback and recommendations for the final submission.

6.3. Final Product Evaluation and Presentation

This will be organized by the Project coordinator at the end of the Capstone project semester. The final evaluation will be taken by a panel that consists of internal supervisors and department representatives. This same panel will review the progress of the students from the beginning of the semester. Each student is required to make a project report showing the complete 15 weeks' progress of the project. This report should be brief and should mainly contain the detailed methodology/ algorithms adopted/ studies during the entire semester. This report should be signed by the respective internal supervisor and should be submitted to the PDC at least two days before the final presentation day during the 15th week.

The students are also required to make a final presentation and present before the final Committee. The students should demonstrate the complete working product to the panel in the final evaluation. In this presentation the panel is supposed to mark each student based on their project content, project outcome and performances, presentation made, project progress, queries answered, maintaining professionalism, and attendance and it weighs 70% (10% for all the progress journal

submissions and 60% for final evaluations) of marks (Evaluation is performed according to Project Rubrics).

CAPSTONE PROJECT IN DATA SCIENCE I PROPOSAL EVALUATION RUBRICS

LEVELS OF ACHIEVEMENTS (Total 100 marks)					
a.	**Problem Statement & Motivation** **10 Marks**	Problem statement is clear, well defined, and addresses a significant issue. Motivation is strong, demonstrating deep understanding of the problem's impact and relevance. (10)	Problem statement is clear and relevant, though it may lack some depth. Motivation is good, but the significance of the problem could be better articulated. (08)	Problem statement is somewhat unclear or lacks detail. Motivation is present but weak, with limited discussion of the problem's impact or relevance. (05)	Problem statement is unclear, poorly defined, or irrelevant. Motivation is weak or missing, with no clear explanation of the problem's significance or relevance. (02)
b.	**Objectives & Scope** **10 Marks**	Objectives are clear, specific, and measurable. The project scope is well-defined and realistic, with clear boundaries and achievable goals. (10)	Objectives are clear but may not be fully measurable or specific. The scope is defined but could benefit from more detail or clearer boundaries. (08)	Objectives are somewhat vague or broad, lacking specificity or measurability. The scope is defined but may be too broad or narrow, with unclear goals. (05)	Objectives are unclear, vague, or unrealistic. The scope is poorly defined, with unclear or unachievable goals, leading to potential project failure or misdirection. (02)
c.	**Innovation and Originality** **10 Marks**	The project is highly innovative, presenting a novel solution or approach. The proposed project contains many significantly original, innovative, or creative aspect(s) (05)	The project shows good innovation, with some novel elements or approaches. Project contains some original, innovative, or creative aspect(s). (03)	The project shows some innovation, but the concept may be derivative or lack originality. Novelty in the approach or methodology is limited. (02)	Limited information Only Some objectives of the proposed work are defined. (01)

d.	**Technical Feasibility** **10 Marks**	The project is technically feasible, with a clear, well researched plan for implementation. Required tools, technologies, and resources are well-defined and appropriate. (10)	The project is technically feasible, though some aspects may lack detail or thorough research. Tools and technologies are mostly defined and appropriate. (08)	The project is technically feasible, but with significant gaps in the plan or resources. Some tools or technologies may be inappropriate or poorly defined. (05)	The project is technically infeasible, with major gaps in the plan or required resources. Tools, technologies, and resources are unclear, inappropriate, or missing. (02)
e.	**Methodology & Approach** **15 Marks**	The methodology is well defined, detailed, and appropriate for the project. The approach is logical, with clear steps, milestones, and deliverables aligned with objectives. (15)	The methodology is clear and appropriate, though some details or steps may be underdeveloped. The approach is logical, but milestones or deliverables could be clearer. (12)	The methodology is basic, with several gaps or unclear steps. The approach may lack logical flow, and milestones or deliverables are vaguely defined. (07)	The methodology is poorly defined or inappropriate. The approach lacks logic or coherence, with unclear or missing milestones and deliverables. (05)
f.	**Expected Outcomes & Impact** **20 Marks**	Expected outcomes are clearly defined, realistic, and aligned with the project objectives. The potential impact is significant, with well-articulated benefits to stakeholders. (20)	Expected outcomes are clear and realistic but may lack full alignment with objectives. The potential impact is good, but benefits could be better articulated. (15)	Expected outcomes are defined but may be vague or unrealistic. The potential impact is limited, with benefits that are unclear or poorly articulated. (10)	Expected outcomes are unclear, unrealistic, or poorly defined. The potential impact is minimal or not well explained, with unclear benefits to stakeholders. (05)

g.	**Project Timeline & Milestones** **10 Marks**	A detailed and realistic timeline is provided, with clear milestones and deadlines. The timeline aligns well with the project scope and objectives. (10)	A timeline is provided with clear milestones, though some details or deadlines may be vague. The timeline generally aligns with the project scope and objectives. (08)	A basic timeline is provided, but with significant gaps or unrealistic deadlines. Milestones may be unclear or misaligned with project objectives. (05)	The timeline is poorly defined, unrealistic, or missing critical milestones. Deadlines may be unclear, unrealistic, or misaligned with project objectives. (02)
h.	**Documentation Quality** **15 Marks**	The proposal is exceptionally well-organized, professional, and free of grammatical errors. Formatting is consistent, with a clear and logical flow throughout the document. (15)	The proposal is well-organized and mostly free of grammatical errors. Formatting is consistent, with minor issues in flow or presentation. (12)	The proposal has some organizational issues or grammatical errors. Formatting may be inconsistent, affecting overall readability and presentation. (07)	The proposal is poorly organized, with numerous grammatical errors. Formatting is inconsistent, leading to difficulty in understanding and following the content. (05)

CAPSTONE PROJECT IN DATA SCIENCE I FINAL PRESENTATION AND DEMONSTRATIONS EVALUATION RUBRICS

LEVELS OF ACHIEVEMENTS (Total 100 marks)					
		Excellent	Good	Average	Poor
a.	**Identifying Design Requirements and implementation** **10 marks**	Describes the system's architecture with exceptional clarity and detail, including comprehensive information about main components and interactions Provides a thorough and well reasoned explanation of the technology stack and the rationale for its selection. Offers a highly detailed and insightful explanation of the implementation, including algorithms, data structures, and frameworks. (10)	Clearly describes the system's architecture, though some details may be less comprehensive or clear. Explains the technology stack used and its selection rationale, but with some minor gaps in detail. Provides a solid overview of implementation details with some depth, though may lack exhaustive detail. (07)	Provides a general description of the system's architecture, with some key details missing or unclear. Explains the technology stack but with limited depth or rationale. Offers a basic overview of implementation details with missing specifics or incomplete explanations. (05)	Provides a vague or incomplete description of the system's architecture. Lacks explanation or provides insufficient rationale for the technology stack used. Offers minimal or unclear information about implementation details. (02)
b.	**Evaluation of available technologies and selection of the appropriate technology** **10 marks**	Clearly identifies a range of possible alternative technologies to solve the problem and selects the most appropriate. (10)	Identifies some possible alternative technologies to solve the problem and choose the appropriate technology from the identified range. (07)	Has not evaluated any other technology, but explains why the selected technologies are appropriate. (05)	Has no evaluation and no idea that there can be alternative techniques to solve the problem. (02)

c.	**Creativity and Innovation** **15 marks**	Demonstrates exceptional originality and innovation in addressing the problem, offering new and creative solutions. Displays a high level of creativity in the project's design or implementation with unique approaches. (15)	Shows originality and innovation in addressing the problem, though it may not be highly distinctive. Demonstrates creativity in design or implementation but with some conventional elements. (10)	Shows some originality and innovation, but may be somewhat predictable or conventional. Displays basic creativity in design or implementation, but lacks unique or standout elements. (05)	Lacks originality and innovation, offering conventional solutions that do not address the problem uniquely. Minimal or no creativity in the project's design or implementation. Most of the components are plagiarized. (03)
d.	**Demonstration of software system /Module working and Functioning** **20 marks**	All defined objectives are achieved. Each module worked well and properly demonstrated. All modules of the project are well integrated and the system working is accurate. (20)	All defined objectives are achieved. Each module worked well and properly demonstrated. Integration of all modules not done and system working is not very satisfactory. (15)	All defined objectives are achieved. Modules are working well in isolation and properly demonstrated. Modules of projects are not properly integrated. (10)	Only some of the defined objectives are achieved. Modules are not in a proper working form that further leads to the failure of the integrated system. (05)

e.	**Quality of the Work Done** **20 Marks**	Students have a clear understanding of what has been done and has completed all the tasks. Students are fully focused on the work and always trying to give a better outcome. (20)	Student has a clear understanding of what is done but looks like outside help was obtained. Students are trying to focus on the work and to give a better outcome. (15)	Student somewhat understands what was done, but looks like that mostly outside help was obtained. Students are not fully focused on the work. But trying to give some better outcome. (10)	Students have done very little work and obtained help from others. Quality of the work is insufficient. (05)
f.	**Maintaining Professionalism and Quality of the presentation** **15 marks**	Student has performed in an excellent way with; • Clear sound • Better proficiency in language • Proper body gestures • Good tonality • Good eye contacts • Proper time management • Wearing suitable attires (15)	Student has performed well with; • Good sound • Good language • Proper body gestures • Good tonality • Good eye contacts • Proper time management • Wearing suitable attires (10)	Student has performed in an averagely with; • Less sound • Good language • Body gestures • Tonality • Eye contacts • Time management Suitable attires (05)	Student performances are not adequate with; • Poor sound • Proficiency in language • Poor body gestures • Poor tonality • Poor eye contacts • Poor time management Not wearing suitable attires (03)

g.	**Handling the Q & A** **10 marks**	Student has listened to question carefully, respond directly to the question asked and answered the question without defensiveness (10)	Student has listened to question, respond directly to the question asked and answered the question without defensiveness (06)	Students have listened to the question partially, not respond directly to the question asked and answered the question without defensiveness on average. (04)	Student has not listened to question carefully, not respond directly to the question asked and answered the question with defensiveness (02)

CAPSTONE PROJECT IN DATA SCIENCE I FINAL REPORT EVALUATION RUBRICS

LEVELS OF ACHIEVEMENTS					
		Excellent	Good	Average	Poor
a.	**Introduction & Background** **15 Marks**	The introduction provides a clear, concise overview of the project, including a well-defined problem statement and context. Background research is thorough and relevant, clearly establishing the need for the project. (15)	The introduction is clear but may lack some detail or depth. The background research is adequate but may miss some key aspects or connections to the problem. Problem statement is clearly described, but some key details are omitted. (10)	The introduction is somewhat vague or lacks clarity. Background research is present but may be superficial or only partially relevant to the problem. (05)	The introduction is unclear or poorly written, with little to no background research. The problem statement is vague or missing, making the project's purpose unclear. (03)
b.	**Project Objectives / Scope /Motivation** **15 Marks**	The objectives are clearly defined, specific, and measurable. The scope is well-defined and appropriate, with clear boundaries and alignment with the project's goals. The motivation for pursuing the project and its relevance are clearly and persuasively established by relating the project to related work.	The objectives are clear but may lack full specificity or measurability. The scope is defined but may be slightly too broad or narrow in relation to the project's goals. The motivation for pursuing the project is somewhat clear, but no support is provided. (10)	The objectives are somewhat vague or overly broad. The scope is unclear or not fully aligned with the project's goals, leading to potential confusion. The motivation of the project is not clear or described. (05)	The objectives are unclear, vague, or unrealistic. The scope is poorly defined, with significant misalignment to the project's goals, leading to project misdirection. (02)

		(15)			
c.	**Design & Methodology** **30 Marks**	The report provides a detailed, logical, and well-organized description of the design and methodology. The approach is appropriate for achieving the project's objectives, with clear justification for design choices. (30)	The design and methodology are well-described but may lack some detail or depth. The approach is generally appropriate, though some aspects could be better justified. (20)	The design and methodology are described but lack clarity or thoroughness. The approach may be somewhat inappropriate or poorly justified for the project's objectives. (10)	The design and methodology are poorly described or missing. The approach is inappropriate or unjustified, leading to potential failure in achieving the project's objectives. (05)
d.	**Implementation, Results, Conclusion, and Discussion** **20 Marks**	The implementation is thoroughly documented, with clear explanations of the steps taken. Results are well-presented, with appropriate use of tables, graphs, and analysis. Outcomes are clearly linked to the objectives. Project work is well summarized and concluded.	The implementation is well documented, but some details may be unclear or missing. Results are presented adequately, but analysis may be lacking in depth. The project work summary and conclusion are not very appropriate. Future extensions in the project are specified. (15)	The implementation is documented, but with significant gaps or unclear explanations. Results are presented, but may be poorly organized or lack thorough analysis. The project work summary and conclusion are not very appropriate. Future extensions in the project are not specified. (10)	The implementation is poorly documented or incomplete. Results are unclear, poorly presented, or missing. Analysis is minimal or non-existent, failing to link outcomes to objectives. Project work is not summarized and concluded. Future extensions in the project are not specified.

		Future extensions in the project are well specified. (20)			(05)
e.	**References & Citations** **10 Marks**	The report includes a wide range of high-quality references that are relevant, up-to-date, and properly cited. The citations follow a consistent and appropriate style, adding credibility to the report. (10)	The report includes several good references, though some may be slightly outdated or less relevant. Citations are mostly correct, with minor inconsistencies in style. (07)	The report includes a few references, but they may be of questionable quality or relevance. Citations are inconsistent or improperly formatted. (05)	The report includes minimal or no references, or the references used are of poor quality or irrelevant. Citations are missing, incorrect, or inconsistent in style. (02)
f.	**Report Formatting and Quality of Writing** **10 Marks**	Reports are formatted exactly as mentioned in the guidelines. Complete explanation of the key concepts and strong description of the technical requirements of the project Outstanding, comprehensive and clear report. (10)	Reports are formatted as mentioned in the guidelines. Complete explanation of the key concepts but in-sufficient description of the technical requirements of the project Effective report using academic language. (07)	Reports are formatted as mentioned in the guidelines at a some certain level Incomplete explanation of the key concepts and in sufficient description of the technical requirements of the project. Acceptable report structure, no missing	Reports are poorly formatted. Report is unbalanced or unclear, or it is difficult to follow ideas. Report is unreadable as an English report Inappropriate explanation of the key concepts and poor description of the technical requirements of the project.

				parts, clarity of language (05)	Major sections are missing. (02)