uOttawa

L'Université canadienne
Canada's university

Faculté de Génie - Faculty of Engineering

BMG5111/ELG6131 Data Science for Engineers winter 2025.

Project Phases, Deliverables and Learning Objectives;

PROJECT GOALS AND LEARNING OBJECTIVES

By the end of the course, and through successful work on the project, students will

- Complete a project based on the design, development, implementation and utilization of engineering systems.
- Learn to articulate the requirements and technical specifications for systems to be realized through engineering development process lifestyle.
- Understand the role of stakeholders and end-users for creating a new product, method, and evaluation approaches.
- Gain experience with a research project in the engineering fields.
- Reinforce knowledge from other engineering courses through practice in an action-oriented setting.
- Identify the inconsistencies and develop an awareness of the evolution of the development of engineering systems both from hardware and/or software perspectives.
- Develop critical thinking and design thinking skills for applying scientific knowledge in evaluating scientific literature.
- Develop the skills needed for the teamwork and planning the deliverables.

PROJECT PHASES AND DELIVERABLES

1- Project Proposal and Team Formation: Problem definition, possible solutions design and approaches, applicability, value to the users; due date **January 15th**, 2025. Proposal template available on the Brightspace.

2- **Initial & Detailed Design and Literature Review**: Conceptual design and architectural view of the system, high-level description on the system, functional and non-functional requirements and specifications, System decomposition, subsystems/components design; interaction and interrelation

between the subsystems, trade-off studies and evaluation of alternatives; architectural development of engineering, Besides, think about the different data that needs to be acquired, analyzed or discussed, architecture of the data flow, the expected results - due Friday **January 24th , 2025. No submission**

3**- System Implementation Methodology, Project Midterm Presentation MVP**: Systematically structured approach to implement the prototype models, implementing the designed system, the efficient use of the tools, technologies, Minimum Viable Prototype MVP -☺ Preferably, the lightweight prototype is ready – due **Feb. 24th, 2025**. (20%). PPT Presentation only (each student 5 minutes, no report.)

4- **Final Presentation**: Includes Solution Design and Implementation, Results, Discussion and Conclusions, Complete architecture of the project developed, prototype of the system, interactions of the subsystems and components and the model to manage the testing, verification and critical analysis, Datasets, Data plan, Testing strategy and test cases, etc., Live Demo….. (each student 2 minutes), final presentation, due **March 31st, 2025** (10%)

6- **Final Report**: It should include the major and typical sections of a technical report: Introduction, Background, Solution Design and Implementation, Results, Discussion of the Results, Conclusions and Future work…… etc. (final Report, due **April 19th, 2025** (30%) **(Final Report must be in IEEE paper format)**

***Important Note:** Final report must be in MS Word doc.; all presentations must be in PPT format; PDF format is **NOT** accepted for the all the deliverables.

*Presentation time allowed for each team might be reduced based on the number of teams in the class.

Project information & work breakdown

1) The project's team of 2 students.

2) Be consistent with the description of the project proposal and objectives in all project's documents and deliverables. At the beginning details may be superfluous or missing, you must determine what is essential for your submission. Deliverables would include:

a. Initial Design

b. Detailed Design & literature review

c. System Implementation Methodology

d. Project Midterm Presentations

e. Proof of Concept (Minimum Viable Prototype MVP): **(midterm presentation deliverable)**

i. Be creative, this is open to interpretation

ii. Be reasonable about the level of effort

f. Validation and Verification of the system functionalities (set a test strategy, test cases, and test plan…)

g. Final presentation

h. Final report: General format for the report is the IEEE format.

3) Effort. Team members will spend equal amounts of effort on the project.

4) Time period. Please carefully note the deadlines given above. Plan and spread the work so that you have sufficient time to finish the deliverables on time. There is considerable amount of work for each deliverable, so start early and do not wait until the last few days!

5) All team members must present more or less equally. Presentations and could be other deliverable marks is given to each individual, not to the whole group (more presentation instructions will be provided later).

6) In this project you may IMPLEMENT at least a proof-of-concept (ideally MVP Minimum Viable Prototype) for the midterm presentation, and complete solution in the final presentation. For a working system that will also be acceptable to the users (the professor, and other people in the industry), you need a detailed idea of users' preferences. Prepare a strategy of how you are going to understand what the users really want. Explain your strategy and the requirements you actually came up with. Also, make sure you and your customers agree on the environment the system is going to be run on. If any members of the team are unfamiliar with this type of product, it is imperative that you ground your knowledge in how this type of system works in the real world – more specifically, research it!

7) The first demo must be nearly a proof-of-concept (MVP for the midterm presentation) then better in the final presentation. You need to show it on your own equipment (laptop, smartphone, for example), and live demo. The goal here is to convince the users that this system (hardware/software, or both) is a real need and would improve the quality of the engineered systems.