



University  
of Windsor

School of Computer Science  
<https://cs.uwindsor.ca>

## Master of Applied Computing

COMP-8117

Advanced Software Engineering Topics

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Office Hours : Monday & Tuesday (1.00pm – 4.00pm EST)

### Project Outlines

During this project, you are to proposed a medium-size application in team of 6-8 students by implementing professional software engineering techniques and principles. As you will develop the project in parallel of the lecture, we are not expecting that you follow perfectly the existing methodology. We will evaluate :

- Your ability to think and apply a software engineering approach (define a lifecycle, make this lifecycle evolve, follow your own plans...)
- Your ability to make a high quality project
- Your ability to react to unexpected events
- Your ability to discuss with people who have few or no knowledge in Computer Science
- Your ability to communication with your team, your project director and your customer
- Your ability to analyze a project and to adapt it when it's required.

Especially, the mark will reflect both your methodology and the end product.

### Project Scenario

The department of Multimedia development would like to invest the opportunities offered by metaverses and omniverses. They mandat you to create a team, propose and develop an innovative project around these two words. As a team, you're required to develop a game using the technologies of your choice. You'll have to find an idea, pitch it in front a customer and convince him to invest in your project, then start the development.

### Minimal Project Requirements

1. The School is ready to spend around **3 millions of CAD** per project.

2. The School requires an innovative idea around metaverses and omniverses. Especially, your game must include components allowing interactions with the reality.
3. You're required, during the two first weeks, to create a team, find an idea, conduct a market study and pitch your project by meeting your customer. The final validation is provided by the customer. You can ask for as many meeting as you need. **Pitch your idea and get a validation from the customer is MANDATORY.**
4. There is no restriction about the used technology. However, you have to justify your technology proposal by a serious study explaining why this technology is suitable, what are the advantages and the drawbacks.
5. Combined project with other teams is possible (for example, two projects providing two kind of services but completing each other).
6. Example of application :
  - Classic video games with AR components
  - Alternate Reality Game (ARG) = Pokemon GO, Ingress...
  - Classic video game with GPS use
  - ....

#### Project Description

The 10-week project involves a team of 6-8 students, working together using an iterative project development lifecycle to design, develop, test and produce a medium size software project.

The choice of the methodology is left to the discretion of the teams. Teams may work on different aspects of the product. Students are encouraged to present their own ideas for software products (the only requirement is that the product fulfills initial client needs).

Iteration length must be set at the beginning of the project. Each iteration gives rise to delivered intermediate artifacts.

A project manager and a customer will be assigned to each project. The team can request a meeting with one or both of them when they want by following the procedure defined in the quality plan.

Minimal iteration length : 1 week.

Suggested iteration length : 2 weeks.

#### Mandatory Milestones and Deadline

Project planning must include at least 3 intermediate milestones corresponding to 3 deliveries (Dates will be communicated by the Project Director), + 1 deadline corresponding to the final release + 1 pitch meeting in the two first week (minimum) :

**The project proposal must be submitted on January 29.** Early discussions with project director and customer are highly recommended.

For these milestones, the students must present to the customer and the project manager the current state of the project and future works.

**Note : These external milestones are mandatory and a meeting with the customer and project director will be organized. Teams can add to their planning internal milestones if they think it's necessary (if you plan also internal milestones, mention if an artifact will be delivered to the project manager/customer, and if a meeting is necessary).**

*Note : February 19 to February 27 is reading week. No work on the project is expected.*

### Project Proposal – Required Document

Each team must submit the project directory and customer a project proposal. This proposal should be less than 20 pages, and must contain :

- An analysis of the needs : this analysis must explain the context of the development, the identified needs (expressed by the customer and by the final users of the project), and justified with a market study. The analysis must also introduce the ecosystem, and explain why your proposal is an answer to the needs.
- A market study : This market must details and justify why the proposed project is suitable and answers an existing need. The students will also provide a study of existing application, explain why these applications don't answer the identified need, and compare their proposal with these application (what kind of new features, the advantages of the project, the drawbacks). Your project proposal must mention who (faculties, experts..) you contacted to get your idea and must compile some elements of your exchange and discussion. The market study must be supported by surveys, statistics from the literature...
- A list of main features and main elements (Explain the kind of application, fonctionnalités, technical constraints, languages, framework, target users). A description of main functional and non-functionals requirements are expected with scenarios explaining the features and requirements. **Note : at this step, we don't expect specifications, this section should remain brief.**
- A prototype or a mockup (Video, Picture, Draw...)
- A description of the technology/ies to use (justify it). **Note : Knowledge of a technology by the members may be one factor, but it cannot be the ONLY ONE or the MAIN ONE.**
- A cost analysis describing the estimated development cost and the estimated operational cost from the technical point of view only (cost of one engineer per year = 100 000 CAD). Make sure the price is lesser than the budget. Check also the licenses to make sure that you mention the right approx. price.



- A provisional project planning of the development including the 3 mandatory milestones. In this planning, the final deadline, the students will mention the number of iterations (with the planned start date and end date for each iteration), and the objectives (main features) for these iteration. For example :

*Iteration 1 : May 31 – June 5 ; Implementation of the AR engine, User managements ;*

*Iteration 2 : June 7 – June 11 ; Development of the communication framework*

...

Moreover, the students are required to submit an initial version of a quality assurance plan with basics information. This plan will be completed and corrected later during the project (the goal is to give you an idea of what is a QAP, not to teach you how to write a QAP as it's not a part of the software engineer job). Especially, the QAP must define :

- A general part :
  - The lifecycle : explain the lifecycle used in the project, the different tasks and activities associated to this lifecycle, how it is organized, how it is managed. You **MUST** describe all the procedures from an operational point of view (i.e. explaining what the developers will do concretely day-to-day). For example, saying and explaining SCRUM with the definition given in wikipedia is not enough. If a new member read this part, they should understand what to do.
  - The procedures (regulation, review, testing, communication, deployment). Example : procedures which will be followed by the team to contact the customer, or by the customer to contact the team, procedures to send an artifact to the customer/project director, procedure to archive code and assets, intercommunication between members, procedures for quality checking and quality management
  - The tools for regulation, review, testing, communication, deployment, development... List of documents which will be written with their purpose.
  - Set of standards : Coding standards, document standards, document templates, code template, languages used to communicate, taxonomy and nomenclature, naming conventions...
  - The list of developers in the team, with their background and their expected role.
  - Mention the level of flexibility of your proposed methodology and SDLC. Especially, if the members of the team can change role, how a task can change in an iteration... **Make sure that you follow the principles of software engineering when you define this level of flexibility.**
- A specific part :
  - Metrics and Tasks for the Quality Management

- Structure and role of the quality team
- Assessments, Responsibilities...

Please refer to the example of QAP for this part.

**REMINDER : At the step of project proposal, we are not expecting a complete QAP. This QAP will be completed after the lecture about quality.**

The students can also provide a brief risk analysis (not mandatory at the step of project proposal).

The use of a template containing :

- A frontpage
- A header
- A footer

Is highly recommended (see the example of template provided with this document).

### Final Report

The final release is a technical report containing (use this as a checklist) :

- All the produced artifacts (Intermediate artifacts ; Product backlog, Sprint backlog, etc.) ;  
The Sprint Backlog MUST contains :
  - o The Provisional planning of each iteration
  - o The Effective planning of each iteration
  - o These planning should contains : the list of tasks and activities, for each task, the provisional/effective start date of the task, provisional/effective end date of the task, the delta, the provisional assignee, the real assignee, the state of the task, the name of the produced artifact (if an artifact has been produced or updated)
  - o An analysis of each iteration
- Documentation :
  - o Initial and effective project planning (Gantt Diagrams) ; The effective project planning is similar to the provisional project planning but gives the true number of iterations and the real dates ;
  - o Requirement analysis (SRS)
  - o Software design & architecture,
  - o Software Quality Assurance Plan
  - o Testing Plan
  - o Risk Plan
  - o Source Code
  - o Code Documentation (see Doxygen/Javadoc/other tools) ;
  - o A user manual
- Final Release (Deployed or Packaged executable) ;

- *An individual report explaining the role of the member in the team, and any individual/personnal comments that the instructors should for the evaluation.*

Submission and deployment modalities will be specified during the term.

#### Group Presentation

Teams will present their project and work during the last weeks of the term. Presentations will last 20 minutes followed by 10 minutes of questions. Group presentation is **mandatory**. Students are encouraged to attend presentations from other teams.

#### Other requirements & advices

- Teams are expected to demonstrate that their proposed project is *innovative* through a brief market research & study.
- Teams must choose appropriate technologies according to their proposed project. This choice must be justified and documented.
- Teams must use a version control system with proper continuous integration system, software testing and verification methods deployed; Git is **mandatory**.
- Teams must use **JIRA** to follow up their project. Especially, the project managers will check JIRA to make sure that the reported backlog correspond to the elements provided in JIRA.
- You're highly encouraged to discuss with your mentor, customer and project director. There is no specific template explaining the content of the documents as the content depends on each project (i.e. you mention what you think is important for the quality of your project and to facilitate the deveopment). However, we highly encourage you to check the IEEE/ISO standards (provided on Blackboard) if you want to have an example of what these documents can contain.

At any stage of the development, teams can require a meeting with the project director/client (instructor or GA/TA) if needed. Teams are highly encouraged to request meetings at any moment (through MS Teams).