

## Project Deliverable E: **Project Schedule and Cost**

### GNG 1103 – Engineering Design

Faculty of Engineering – University of Ottawa

#### **Objective:**

Develop project tasks with a schedule view to ensure that your team can complete all three project prototypes from now until the end of the semester and provide an estimation of the costs and the components that will be required for your project. Devise a test plan for your first prototype.

#### **Instructions:**

1. First, you need to include a clear and detailed design drawing that summarizes your chosen concept, having refined your ideas into a single idea based on your work in deliverable D. All parts should be included in the detailed design, including fasteners, adhesives, wires, power supplies, libraries or APIs, depending on your project.
2. Teams must then outline a plan and a schedule for prototyping and testing their solution to the client's needs, by the end of the semester. For each iterative step, your effort to improve your solution should be obvious. Your plan should include:
  1. A list of all the tasks which need to be completed, an estimated duration for each task, as well as who is responsible for each task.
  2. A list of the significant project risks and your associated contingency plans to mitigate the critical risks that are *reasonably* likely.
3. To spend your budget, you must have the cost of your materials and components approved by your TA. A product/project cost spreadsheet greatly simplifies this approval, and you need to include links to specific products in this spreadsheet or Bill of Materials (BOM). This should include an estimate of the cost for all components and materials (even if they are 0\$) which you will need for the different prototyping deliverables described below. Use your detailed design to make sure no items are missing from the BOM.
4. A list of equipment (software or hardware) needed to build each prototype should also be included. It can contain temporary materials that are only needed for initial prototyping but are not part of the final design (a breadboard for example).

5. Teams will outline a prototyping test plan based on the template provided in “Lecture 11 – Prototyping Test Plan” to prepare to build the first prototype in the next deliverable.
  1. Typical objectives include: communicating and getting feedback for ideas, verifying feasibility, analysing critical subsystems or system integration or reducing risk and uncertainty.
  2. You must also define a stopping criterion which will allow you to end the test once you are satisfied that you have achieved your testing objectives.
  3. Be very clear about what you are trying to measure and define an acceptable fidelity based on the objectives of your prototype. See [https://wiki.makerepo.com/wiki/Design\\_for\\_manufacturing](https://wiki.makerepo.com/wiki/Design_for_manufacturing).

Three prototyping deliverables will be due from now until the end of the semester (see due dates in BrightSpace). The first prototype will be a basic proof of concept and should be made using materials and components that cost very little (e.g. things found around the house, scraps, etc.). A simple analysis of critical components or systems should also be included, based on your current knowledge of engineering science or other material. If the project is completely software-based, make sure that you include the cost of any special tools or software services that you will need for a functional prototype. Ideally, free software tools should be used only. The second prototype should be of a (or maybe *the* most) critical subsystem, to ensure that your design will work. An analytical, numerical or experimental model should also be included. Finally, the third prototype should be a fully functional version of your solution (i.e. a comprehensive prototype). Many successful groups do *more* than three prototypes, based on their specific project risks, but at least three are required.

For the project, each team will be allocated \$100 or \$50 (depending on the project). You can take the opportunity to concentrate your purchases on one subsystem and collaborate with other teams to share resources. You will purchase materials and components yourselves and you will bring your TA the original receipts for a reimbursement. It is easier if only one person on your team makes all the purchases, but you must provide the receipts. See [https://wiki.makerepo.com/wiki/Purchasing\\_Guide](https://wiki.makerepo.com/wiki/Purchasing_Guide).

### **Task Plan Update:**

1. Update your Trello task board to include any changes in estimated task duration, missing tasks, task responsibilities, or details, based on your better understanding of the project or based on feedback that you have received from your PM/TA.
2. Include more detailed sub-tasks for the tasks that will need to be completed over the next few weeks.
  - Important note: It should be possible for ONE person to complete each identified task or sub-task in the allotted time. The allotted time should also be *reasonable*, based on the task owner's availability. Everyone should be doing their fair share of the work.
3. Verify and update the task start dates and end dates for each task, based on your project progress.
4. Ensure that you have taken into account each team member's *actual* availability over the next two weeks, as well as significant events, such as particularly high course loads, exams or travel, which might be going to limit actual project work progress.
5. For *each* person in your group, it should be possible to determine:
  - What was completed last week (i.e. "**Completed**" tasks),
  - What will be done next (i.e. "**In Progress**" tasks)
  - If tasks are going to be put "**On Hold**" or "**Cancelled**" altogether
6. Any and all group "Issues" should be discussed and dealt with, ideally with the assistance of your Project Manager (PM). This should happen during **each** of your lab sessions or can happen earlier, using your defined communication methods. As already explained, it is essential to keep your PM/TA "*in the loop*" throughout the term. It is usually *not* a good idea to ignore conflicts between team members. Instead, you should deal with them in a constructive way.

### **Submission:**

Each team (***only one person from each team***) must submit a PDF copy of this deliverable by uploading the file as an attachment into BrightSpace.

### **Due Date:**

See BrightSpace.