

Digital Fabrication Final Project

Objective:

1. Demonstrate the digital fabrication skills learnt in the production of a project.
2. Present and defend the ideas/technologies used in the construction

Task

In this final project you will demonstrate the skills and techniques that you have learnt in the module. This is an individual project.

The project **must** have the following components:

1. Documentation - Idea, Construction, How-do, Instruction manual
2. CADD and/or Digital graphic components (vector/raster)
3. 2D cutting and engraving
4. 3D printed part
5. Embedded control using a microcontroller with
 - input(s)
 - output(s)

You can select your own project, however, it must meet the above requirements. You can select your project from

- one of the suggestions below
- taken from the Internet (Instructables, thingiverse etc), or
- of your own design

However, all design drawings (CAD, graphics) must be done by you. If you have selected to use a design from the Internet, you need to

- attribute the original design to the author
- reproduce all design drawings
- make changes to the original design as published
- make changes to the code used for the embedded controller to suit your purpose.

We would suggest the following steps before starting on your project

- do a search on the internet for similar ideas
- do a paper sketch of the project to help in later design, of what you intend to fabricate
- list down the items/tasks that you have to perform
- run the design idea by your lecturer to finalise the scope of what you need to do.
- plan the time allocation for each of the sections.

When you select and finalise your project, please take note of

- what you intend your project to do, what are its limitations
- who your project is intended for (the users)
- who has done your project before and why it is different

Before you start fabricating your project, you should consider writing out a Bill-Of-Materials (BOM). The BOM shows the components needed for the project. You are allowed to use other components/modules for the project. please consult your lecturer regarding availability.

For example, you might require a Real-time clock module for the Arduino to keep track of the time. Your lecturer may need to order the item in for you and it usually takes 2-3 weeks before the module is delivered. The BOM will show what you require and whether it is in stock. It helps you plan the development of the project. Please don't ask for "fantastic" modules e.g. GPS or Gas-sensors, these are expensive and we most probably do not have them in stock, however, you are free to acquire them at your own expense.

Submission

The submission of the final project will include (located on your github folder)

1. The documentation of the project, housed in github together with your module journey. The documentation must contain the following sections:
 - A preliminary project sketch
 - the project design (where it came from, who has done what before, what changes you have made)
 - a detailed "how-to" in the construction of the project
 - original design files and code.
 - photos, images of your project journey
 - BOM (Bill of materials)
 - what was completed, what was successful, what needs more work
 - the user manual
2. A presentation of the project, which includes
 - A formal presentation
 - A demonstration of the project
 - A single page "cover sheet" of the project
 - saved as _presentation.png
 - resolution of 1920x1080
 - describes the project, creator, features
 - A one-minute video of the project

3. The completed project

The submission date of your project (online) is **Wednesday, 12noon, 12th August 2020**. All late submissions will be penalised.

The project presentations will be held from Mon 17th August to Friday 21st August 2020. You will be informed of the schedule at a later date.

Project plan

We would like to suggest the following project plan towards the completion of your project.

Target Date	Duration	Tasks to be completed
Wed 15 July	4 hr	Selection of project, internet searches, project scope
	2 hr	Project sketch, bill of materials
Fri 17 July	4 hr	Clear idea, requirements, scope through your lecturer, finalise intensions
Wed 22 July	8 hr	CAD designs, 2D layouts, 3D designs, preliminary embedded design
Wed 29 July	8 hr	Laser cut, 3D printed, prototype mock up
	4 hr	Embedded design, I/O considerations, testing
Wed 05 Aug	12 hr	Finishing touches, testing
Wed 12 Aug	12 hr	Submission of project, presentation preparation

Note that there is no time(s) allocated for the documentation. You **MUST** document as you go, otherwise you will not be able to complete the tasks as well as write the documentation at the same time.

Project Suggestions

The following are some project suggestions. The titles and explanations are very broad-scoped, you will need to do some research and write down what you think can be done, considering the time allocation and limits of 2D, 3D and knowledge of embedded microcontrollers and programming.

1. Mood lamp, a lamp which changes color based on environment, light or if someone walks near
2. Information display which displays environment readings e.g. temperature, humidity, time
3. Automated tea maker able to make the correct tea brew with a tea bag
4. Automatic watch winder to simulate hand-wearing or just to wind it up completely.
5. You have to wash your hands for at least 20 seconds - a system to remind you, when you are at the sink.
6. Contactless Hand sanitizer dispenser, just place your hand under the nozzle.
7. USB controlled volume adjustment for your laptop
8. Multi-tone doorbell/intruder alert to your private spaces
9. Moving art feature which changes its display when it has an audience
10. Laser Engraved clocks using light
11. Time lapse photo controller
12. Most Useless Machine Ever Project

The above project list, is by far, not conclusive.

You may choose other ideas, however, please do consult your lecturers so that we can keep you in the scope of the project to complete within 4 weeks.

EP1000 Teaching Team