CHEMICAL ENGINEERING: labs & project

Prototyping option: Master Spring Semester 2025

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1

The Master level Lab in Chemical Engineering is aimed for the student's **acquisition of professional competence** by:

i) **Building a prototype** of a device that involves **chemical processes**.

ii) Developing your own **analytical experimentation** and learn how to do **treatment and interpretation** of experimental data.

iii) Mastering **written communication**: Writing memos and reports to present the experimental results obtained.

iv) Developing **oral communication skills** by presenting and defending the results /conclusions with an oral presentation.

v) Being able to **work as part of a team**.

The particularity of this prototyping option is that it will train your **independence**, **creativity** and **self–organization**.

2

Deliverables and grading

- **Presentation of the project plan** (detailing the tasks, deliverables and supplies you will need, max 2 page plan presented in 10 min): 10% of the grade
- **Progress meeting 1** (Final plan with 3D drawing, 10 min presentation): 10% of the grade
- **Progress meeting 2** (Around assembly, 10 min presentation): 10% of the grade
- **1 final report** (detailing the final product and verification that it works, max 15 pages): 50% of the grade*
- **1 oral presentation** (on the product, and demonstration of how it works max 15 min): 20% of the grade*

*** Both of these grades will include a judgement of how well the product performed.**

3

Deliverables and grading

- **Presentation of the project plan** (detailing the tasks, deliverables and supplies you will need, max 2 page plan presented in 10 min): 10% of the grade

Your experimental plan should contain the following (**maximum 2 page, everything included**):

1. A brief introduction of your product (ca 100 words)
2. Deliverables at the end of the semester (a description of both the product and exactly how it will be demonstrated)*
3. A detailed plan of what you will do week-by-week to achieve these deliverables. This should include intermediate deliverables.
4. A precise shopping list of what you will need (some things may need to be ordered before this first meeting).

*What the device will do and how you will demonstrate that it does this. Be quantitative!

Deliverable: a precisely defined tangible or intangible good or service produced as a result of the project (e.g. “a fully accurate 3D plan of the device”, “a pump capable of delivering 10 ml/min of water at 10 bar”, etc…)

4

Deliverables and grading

- **Progress meeting 1 at 6 weeks** (Final plan with 3D drawing, 10 min presentation): 10% of the grade

This is to keep you on schedule. You should be able to show precisely what the device will look like with a first detailed 3D blueprint. You will also have to report on your intermediate deliverables (from the project plan) and have to detail whether or not you are "on schedule" and, if not, how to adapt.

- **Progress meeting 2 at 10 weeks** (Around assembly, 10 min presentation): 10% of the grade

Again, this is to keep you on schedule. You should be within the assembly phase of the device and have a clear plan for testing. You will also have to report on your intermediate deliverables (from the project plan) and have to detail whether or not you are "on schedule" and, if not, how to adapt.

5

Deliverables and grading

- **1 final report** (detailing the final product and verification that it works, max 15 pages): 50% of the grade*

The final report should detail how the device is built and works and detail how it was tested to verify that it works.

Abstract

1. Background and goals for the prototype
2. Description of the prototype build, assembly and functioning
3. Testing objectives
4. Testing materials and methods
5. Testing results and discussion
6. Conclusions

Maximum 15 pages including figures but not including references (no annex documents).

6

Timeline

- **Project plan:** Due at the end of week 1 (Friday the 28th at 17h, send to the assistant). Please reach out to schedule the meeting during the following week.
- **Progress meeting 1** (Final plan with 3D drawing, 10 min presentation): Please reach out to schedule the meeting during week 6 (Week of March 24th).
- **Progress meeting 2** (Around assembly, 10 min presentation): Please reach out to schedule the meeting during week 10 (Week of April 28th).
- **1 final report:** Due the last week of classes (Tuesday May 27th at 17h):
- **1 oral presentation**: They will be scheduled on Wednesday May 28th.

7

Available resources

- Different 3D-printers
- Computers with 3D drawing software (Autodesk inventor)
- The Skill (Fred can coordinate a training)
- Mechanical workshop (fully equipped with one technician that can manufacture some pieces for you since you are not allowed to use the equipment yourselves)
- Basic engineering consumables (pipes, screw, connectors, …)
- A little workshop with tools (hammers, screwdrivers, wrenches…)
- Everything you can order (reasonable price **and** delivery time)

→ Don't feel blocked. You can always come to Elisabetta or Fred to discuss potential approaches.

8