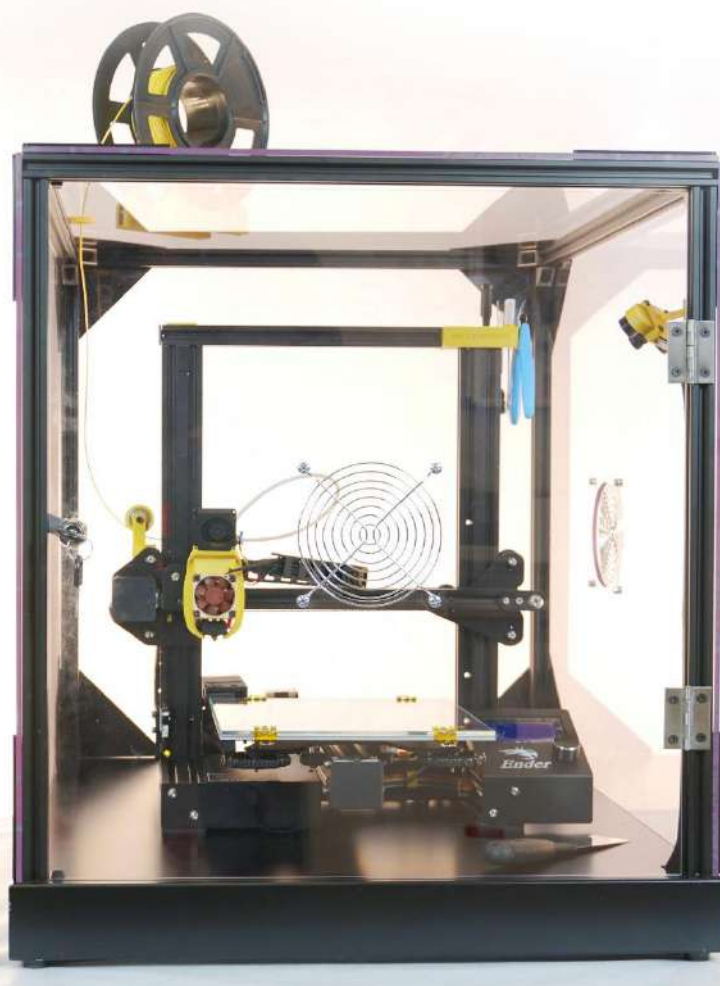




# FABRICATION LABORATORY

## DL FABLAB



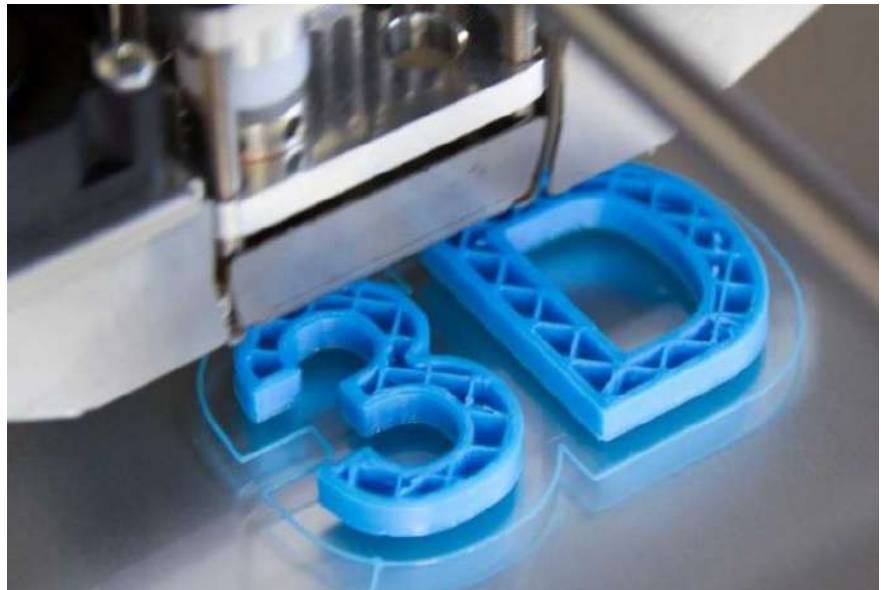
## INTRODUCTION TO THE LABORATORY

Several technologies have transformed our world throughout history including the steam engine, the light bulb, the microchip, and the World Wide Web. The 3D printer is one of the most recent revolutionary technologies, that has changed the way we learn, do research and create prototypes, producing a physical object from scratch.

De Lorenzo proposes the FABLAB, a fundamental laboratory to help the student get into the future, taking the first steps into the world of 3D modeling.

The laboratory, which consists of a high-performance 3D printer and a comprehensive didactic manual, aims to guide the student through an unprecedented complete experience, starting from the mental conception of an object, according to specific needs, until its physical production.

The complete process proposed by Lorenzo follows a 4-step cycle: designing, modeling, 3D printing, and application.



With detailed documentation accompanied by practical videos, the student will learn the basics of 3D modeling, the mechanics and resistance of the models, and will also master the preparation of printing files to create objects indispensable in areas such as prototyping, architecture, automotive and all those fields of application in which the collaboration of more partners was previously required.

## DIDACTIC EXPERIENCE

De Lorenzo offers the best possible educational experience. The system allows not only the use of the 3D printer but also the creation of models based on particular needs.

The didactic material proposed by De Lorenzo consist of a comprehensive manual that covers the concepts of 3D modeling and a series of explanatory videos for a clearer presentation of the basic concepts.

The topics included in the teaching material are listed below:

### 1. INTRODUCTION

- Unpacking
- Preliminary checks
- Precautions

### 2. SET-UP

- Regulation of the sliding blocks (video)
- Filament insertion (video)
- Leveling the print bed (video)
- Preparation of the print bed

### 3. PRINTING AN OBJECT

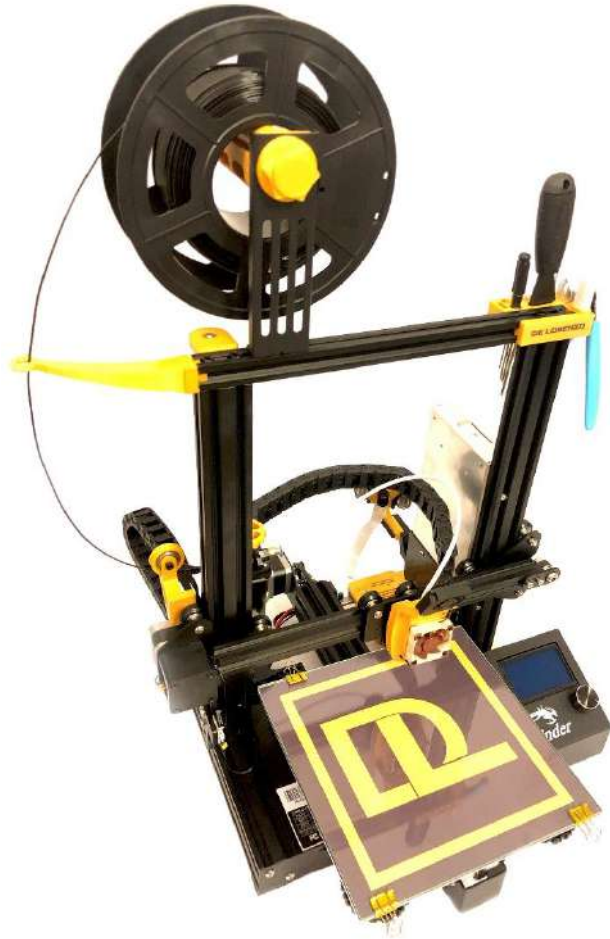
- Imagination and creation of an object
- Preparation of a simple model in Sketchup (video)
  - Using the rulers
  - From 2-D to 3-D
  - Designing screw holes
  - Smoothing the edges of an object
  - Importance of measurements and tolerances
  - Cleaning-up the object before exporting
- Importing and setting-up in the slicer
  - Establishing printing speed and resolution
  - Filling up and outer thickness
  - Model orientation for printing optimization

- Preparation of a more complex model with joints in Sketchup (video)
  - Evaluating friction and elasticity
  - Variation of tolerances between the printed and coupled objects
  - Mechanical factors of the objects
  - Preparing the object to be exported
  - Importing and setting-up in the slicer Cura
  - Placing multiple objects on the print bed
  - Identifying the most appropriate print profile
  - Generation of the supports
  - Resistance of the object based on print orientation
- Uploading and copying the file for printing
- Preparation of the printing plane
- Precautions for more efficient printing

### 4. MAINTENANCE

- Checking the sliding blocks
- Checking the print bed
- Filament replacement (video)
- Cleaning and replacing the nozzle (video)
- PTFE tube replacement
- Silicone cover replacement
- Fan replacement
- Printing of the spare parts

## DESCRIPTION OF THE 3D PRINTER



### Creality Ender 3 PRO 3D printer

The 3D printer proposed by De Lorenzo is sturdy and can withstand time, the exceptional super-tempered and heated glass guarantees flawless prints and their easy removal. The professional quality of its frame extrusion ensures perfect positioning of the print nozzle and a very stable structure. The exclusive add-ons allow a better print quality, avoid annoying inconveniences that other printers have and allow to monitor and control the printer even remotely by having a video streaming of the piece being printed.

#### Key features:



#### Reel support

Thanks to the support mounted on ball bearings, the reel rotates without any friction, avoiding sub-extrusion events.

### Cable holder chain

Entanglement and wear due to improper cable rotation are avoided with these 3 cable holder chains, also obtaining a cleaner design.



### Tempered glass surface

The very high quality accident-proof tempered glass makes it possible to print models with a perfect adhesion but also easy to remove.

### Cooling device

The double channel EPR fang, with the aid of a professional fan, guarantees maximum filament cooling for perfect adhesion of the deposited layers.



### Remote control

With the integration of the latest generation, it is possible to connect remotely to watch the printing through an IR webcam, monitor temperature, progress and time-lapse videos of previous printings.

## Technical features:

Frame: made of precise and high quality aluminum extrusion

Printing technology: FDM (Fused Deposition Moulding)

Print size: 220 \* 220 \* 250mm

Print speed:  $\leq 180$ mm / s, normal 30-60mm / s

Precision:  $\pm 0.1$  mm

Layer thickness: 0.1mm-0.4mm

Nozzle diameter: standard 0.4 mm, supports 0,2,0,3 mm, etc.

Nozzle number: 1

Print bed temperature  $\leq 110$  °C

Print mode: online or offline SD card

File format: STL, obj, amf

Filament: PLA, ABS, Wood, TPU, shaded color, carbon fiber, etc.

Filament diameter: 1.75 mm

Software Slicer: Cura