

OVERVIEW-The Basic Steps for CNC Milling and 3D Printing

Step1-Prepare your CNC or 3D Print file.

Step 2-Schedule an appointment for a consultation with a CNC/3D print technician.

Step 3-Meet with a Lab technician to review your file.

Step 4-Make arrangements for materials.

Step 5-Pick up completed parts.

Register for access to the CNC/3D Print Consultation Software.

STEP 1: PREPARE YOUR CNC OR 3D PRINT FILE

CNC FILES

- ❖ Download the pre-configured CNC Rhino template available at <file:///juno/Public/DigitalFabrication/CNC-Template-Tutorials/> or in the Downloads section of this website.
- ❖ Import your geometry and then assign components of your design to the appropriate layers for different CNC operations (e.g., place your topo surfaces on the “Topo Surface” layer).
- ❖ Please use the provided template layers as the only layers in your file. Do not add any other layers.
- ❖ The black bounding box represents the maximum material size that the machine can accommodate.
- ❖ Measure your material and create a new bounding box for the actual existing size of **your** material within the “Stock” layer.
- ❖ Scale and place your geometry within the “**Stock**” bounding box you just created.
- ❖ Save this file and submit it to the digital fabrication staff.
- ❖ Further instruction on available CNC processes can be found in the “CNC Tutorial” document.
- ❖ If you still have questions, please email either Toren Falck at falckt@design.upenn.edu or Dennis Pierattini at dennis2@design.upenn.edu.

3D PRINT FILES

- ❖ Download the preconfigured 3D Print templates available at <file:///uno/Public/DigitalFabrication/3D-Printing-Templates-Tutorials/> or in the Downloads section of this website.
- ❖ Import your geometry into the template.
- ❖ The black bounding box represents the maximum build envelope/bed size for each 3D printer. You may print multiple objects within this box.
- ❖ Save this file and submit it to the digital fabrication staff.
- ❖ Further instruction on available 3D Print processes can be found in the “3D Printing Tutorial” document.
- ❖ If you still have questions, please email either Toren Falck at falckt@design.upenn.edu or Dennis Pierattini at dennis2@design.upenn.edu.

STEP 2: SCHEDULE A CONSULTATION APPOINTMENT

- ❖ Log in to the CNC_3D Print scheduling calendar at <http://penncnc3d.calendarhost.com/> and choose either “CNC_3D Consultation 1” or “CNC_3D Consultation 2” from the upper right corner.
- ❖ Select a convenient day and time to meet in person with a FabLab staff technician to review your file.
- ❖ Please make only one hour-long appointment at a time.
- ❖ If all available timeslots are booked, you may come to the Lab with your file as a walk-in and wait to be helped.

NOTE:

If you have not already registered on the CNC_3D Print scheduling software, please see the “Register For Software Access” document below.

STEP 3: FILE REVIEW MEETING

- ❖ Please arrive on time. If you are more than five minutes late, your appointment may be reassigned to a walk-in student. Please be patient and understand that if you are late we may have to reschedule your appointment.
- ❖ Please arrive with your completed file (and your materials if you are CNC Milling). You cannot be added to the CNC queue without your material. The Lab staff can help with final material preparation after your appointment.
- ❖ During your appointment your file will be checked in Rhino and then processed in MasterCAM to verify operations.
- ❖ If your file is successfully verified and you have submitted materials if CNC Milling, your file will be placed in a first-come first-served queue. The staff technician can give you a rough estimated completion time at this point.
- ❖ If there are problems with the file, you will be advised on any issues that need to be resolved and asked to make another appointment for file review.

STEP 4: MAKE ARRANGEMENTS FOR MATERIALS

- ❖ EPS foam (white expanded polystyrene foam) for CNC milling, in 23" x 47" sheets or 47" x 47" sheets in 4" thicknesses, is available in limited quantities for cash sale directly from the Lab during your consultation.

- ❖ All 3D Print materials are supplied by the Lab and will be billed directly through your Penn Bursar's account.
- ❖ For milling any other permissible CNC materials (high density foam, plywood, or solid wood), please see "Materials Resources" below, or discuss options with a staff technician.

CNC MATERIALS RESOURCES

CNC Materials

Deliverable to:

Meyerson Hall, Room G29

210 S. 34th St. Philadelphia PA. 19104

Expanded Polystyrene Sheets (EPS)

(Low Density, white Polystyrene):

https://www.uline.com/BL_874/Polystyrene-Sheets

Website Keywords: polystyrene sheets

High Density Urethane Foam (HDU)

(Higher density & quality, yellow / off-white Urethane):

-For larger bulk orders, higher quality (15lb density recommended)

<https://harborsales.net/Home/ProductList.aspx?ProductTypeId=168&FilterType=SignFoam+4>

Website Keywords: sign foam

-For smaller orders, faster delivery (6lb or 10lb density recommended):

<https://www.mcmaster.com/prototyping-foam/>

Website Keywords: prototyping foam

Plywoods & Natural Solid Woods:

John Junius Taylor Woodworking

Please email inquiries regarding plywood in sizes: $\frac{1}{4}$ ", $\frac{1}{2}$ " and $\frac{3}{4}$ " as well as various domestic natural solid woods to:

3813pearl@gmail.com

STEP 5: PICK UP COMPLETED PARTS

- ❖ You will receive an email from the staff technician when your job is completed and ready for pickup.

REGISTER FOR SCHEDULING SOFTWARE ACCESS

1-Go to the CNC_3D Printing Scheduling Calendar at <http://penncnc3d.calendarhost.com/>, click on "Login" at the right of the page, click on "I am a new user", and then fill out the "Add User" form.

- ❖ At "User ID" enter your PennKey. Your PennKey is the username at the beginning of your Penn email address. For example, Mary Smith, whose email address is smithm@design.upenn.edu, would enter "smithm". Bill Jones, whose email address is jonesb@sas.upenn.edu, would enter "jonesb".

- ❖ At “Password” enter a password that is strong but easy to remember. DO NOT use your Pennkey password. This website is NOT secured by the university.
- ❖ Enter your name as it appears on your PennID, then enter your most frequently checked email address, then your phone number.
- ❖ Click the “Submit” button.

2-To complete your registration, email a request for CNC and 3D Printing access to **cnc3dacc@design.upenn.edu**.

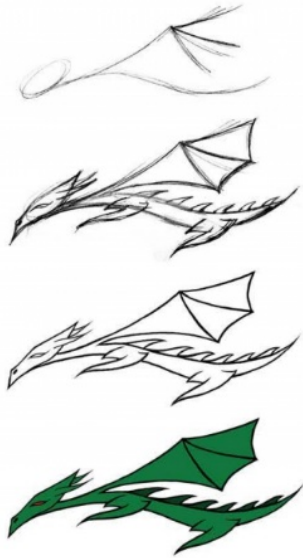
- ❖ **You MUST send this request from your Penn email address.** Requests sent from any other email address will not work. Please include your full name and your PennKey name. Do not include ANY passwords. For example, format the email as follows:

“I am requesting access to the PennDesign Online CNC/3D Schedule. I have already completed the online registration. My full name is Mary Smith and my PennKey is smithm.”

- ❖ You will receive a confirmation email from **cnc3dacc@design.upenn.edu** that your registration is complete.
- ❖ Requests for access to the scheduling software will be processed as quickly as possible, Monday through Friday, during normal business hours. Please note that NO requests will be processed during the weekends or evenings.

Design File

use this at your desk



Fabrication File

bring this to the Fab Lab



- No unnecessary info
- Remove your design process work
- Use the laser/CNC file templates
- Use the template layers only
- Delete all other layers