

## 3D Printer Policy and File Prep Guide

There are numerous types and sizes of 3D printers available at the CoACM Digital Fabrication Lab, and all printers require files that are properly setup and optimized by the user prior to submission. All students and faculty must familiarize themselves with the 3D printer policy and plan their designs and projects around the 3D printers' equipment constraints.

### 3D Printer Policy:

Failure to comply with lab and equipment safety policies may result in removal of lab privileges.

- Only CoACM class-related projects are permitted to be fabricated on the 3D printers
- Only Digital Fabrication staff are authorized to handle 3D printer machine doors and consoles
- No open food or drink is permitted in the lab or near the equipment
- Users are responsible for picking up their 3D prints, within 2 workdays, upon completion
- 3D print file submissions must be properly optimized

### 3D Printing Time Factor:

While classified as “rapid-prototyping” machines, the 3D printing process can take a considerable amount of time based on numerous factors, including the size and complexity of the object. Users should take this into account when considering the 3D printers for their project.

### 3D Printer File Setup:

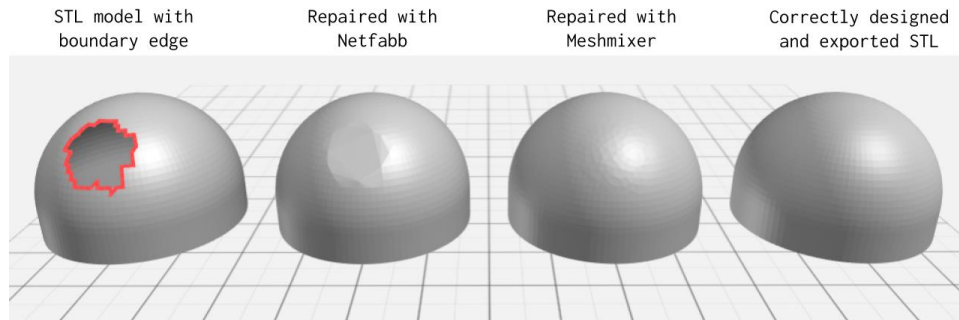
3D printing works best for models that are planned in advanced and designed with the machine's constraints in mind. Please double check all models prior to submission by re-opening the exported file. Staff cannot fix submitted files for users.

1. 3D model must be exported as a .STL file
2. Isolate the model before export
3. Only one individual object per file
  - a. Create separate STL files for each disconnected object
4. Large file sizes may crash printer and will be rejected
5. Broken and thin meshes may distort final model and will be rejected
6. Model must be pre-scaled (in inches or millimeters) to fit within 3D printer build plates
7. Utilize a mesh-repair function or software to check the mesh's fabrication viability

For more information how to submit your exported files for printing, please read the “3D Printer Submission Guide” PDF available on the Digital Fabrication Lab webpage.

### Fixing 3D Print File Errors:

Models must be setup correctly for proper printing. While auto-repair functions and software may fix the object's errors, the quality of the repair will vary. Modeling the object correctly in the native software in the first place will provide the best quality results.



*While repair functions helped fill the hole in the mesh automatically, correctly designing the object from the start provides the highest quality model for 3D printing, image provided by hubs.com*

Objects must be modeled as solid; the most common issue encountered in the lab involves models that are not correctly modeled as 3D solid objects, or as “watertight” meshes.



The two objects on the left are printable because they are modeled as complete, solid forms. The object on the right is only comprised of open and unclosed surfaces, image provided by sculpteo.com

For more examples of common 3D printing file issues, please review the article at the following link: <https://www.3dprint-uk.co.uk/the-basic-rules-for-stl-files/>

It is recommended that all users save their STL files separately from their native software's project file(s), as going back and revising the original model is easier than editing the STL file. Please contact Digital Fabrication Lab staff with any additional questions regarding 3D printing model setup.