Digital Fabrication Studio Protocols //

STUDIOS FOR ART & DESIGN RESEARCH
I. Schedule of Operations

Daily Schedule/

The Spring 2014 semester hours of operation are as follow:

- **Monday**: 8am - 8pm
- **Tuesday**: 8am - 9pm
- **Wednesday**: 8am - 8pm
- **Thursday**: 8am - 8pm
- **Friday**: 8am - 5pm
- **Saturday**: closed
- **Sunday**: 11am - 4pm

Annual Schedule/

The Studios for Art & Design Research are open throughout the year. However, they close for the following:

- Winter and Summer Break as outlined in The Ohio State University Academic Calendar
- All University holidays and some events (including class trainings and lectures)

Website/

Please visit [www.u.osu.edu/studiosforartanddesign](http://www.u.osu.edu/studiosforartanddesign) for the most up to date information on policies, schedules, and other information about the facilities.
II. Access and Use

The Digital Fabrication Studio is accessible throughout the year to all Ohio State University students who are currently enrolled in Art and Design coursework. All projects that are run in the Studio must be for expressly academic purposes. This includes coursework, academic research, or university sponsored programs.

Absolutely no professional projects are permitted

A. Students

Access protocol for students

The be able to access the digital equipment located in the Studios for Art & Design Research students must attend a Digital Fabrication Safety and Use Orientation. Many of these orientations will take place in these specific gateway courses:

Art 2400 - Visual Studies: Three-Dimensional
Art 2500 - Visual Studies: Digital Image Manipulation
Art 3101 - 3D Modeling Sculpture
Design 3101 - Introduction to Industrial Design I
Design 3102 - Introduction to Interior Design I

Other Safety and Use Orientations will be scheduled at the beginning of each semester for students not enrolled in these gateway courses or for students who would like to review the equipment policies.
There are two levels of training:

Level I - Basic Training - Laser Cutter and 3D Printers
Level II - Advanced Training - CNC

Level I must be completed before Level II

Once your Safety and Use Orientation is complete, you will be allowed to schedule time on the equipment for which you have been trained.

The Digital Fabrication Studio will consist of a training that covers the following topics:

- safety (general and per machine)
- material guides (per machine)
- file setup (per machine)
- access and reservations
- costs and resources

Any student who at any point displays an inability to use the Digital Fabrication Studio appropriate will be suspended from access and required to retake the orientation. Simply asking questions or requesting clarification on the operation of the machine does not constitute an inability to operate the equipment safely. Students who display carelessness when operating the equipment will be suspended from access.

Any student who willfully breaks the Digital Fabrication Studio policies will be expelled from access. This includes being disrespectful to SADR staff and employees. The duration of the expulsion will be determined by the SADR manager depending on the severity of the infraction.
Use Protocol for Students

Students reserve time of the DFS machines by checking the online schedule here:

www.tinyurl.com/studioscalendar

and sending an email to Nathaniel Hartman (hartman.264@osu.edu), Assistant Manager of the Studios, requesting a machine and time slot.

Students who demonstrate an ability to operate the machine independently will be given access to the calendar and allowed to schedule time without emailing for an appointment. Any abuse of this privilege will result in revoking your access.

Students who exceed their reserved time will not be allowed to finish their job(s). SADR staff and employees will monitor and enforce this policy.

Machine logs must be maintained for all machines. All questions and incidents must be noted in the machine log and tied to a specific moment of use and user.

When using the machine, students must sign in and out of the machine log.
III. Equipment Overview

Laser Cutter/

Students must provide their own materials for use in the laser cutter (see allowable materials on pg. 12)

Undergraduate Students may make a minimum 30 minute reservation per day and a maximum 2 hour reservation, but not exceeding 2 hours per week, on the laser cutter.

Graduate Students may make a minimum 30 minute reservation per day and a maximum 2 hour reservation, but not exceeding 3 hours per week, on the laser cutter.

Students are responsible for proper file setup and overall operation of the laser cutter. We currently print directly from Adobe Illustrator CS5. Acceptable files include .ai, .dxf, and pdf, but all files must be opened and formatted in Illustrator.

Students are required to be present and attentive to the laser cutter throughout the execution of the job. A laser cutting job is never to be left unattended.

Lab technicians are available to assist. Students with questions regarding laser cutting should direct them to the on-duty SADR technician.

3D Printers/

All materials for the Type A Machines 3D printers are provided by the SADR (see costs on pg. **)

Prior to making a reservation, students must ensure that their .stl is printable using current FDM printers, has the proper wall thickness and units, and is appropriately scaled.
Students must be present during the entire print. Please be prepared to operate and start the print and notify the SADR Assistant Manager if your print will take longer than your reservation time. If there is a problem during your print and you are not present, the SADR staff will stop the print. You are responsible for purchasing all used material, even if it is an uncompleted print, unless it is determined by the SADR manager to be machine error.

Lab technicians are available to assist. Students with questions regarding 3D printing should direct them to the on-duty SADR technician.

CNC Mill/

Students must provide their own materials for use in the CNC mill (see allowable materials on pg. 12)

All students wishing to use the CNC mill must schedule a consultation before purchasing or preparing stock. Students must come to the consultation prepared with a file or model in the correct format: 2D - .ai, .dxf, .pdf; 3D - .stl.

At the consultation, the SADR manager or assistant manager will determine whether or not the project is ready to proceed to milling. If not, the student must schedule a review of the new files. If the files are ready, the Manager or Assistant Manager will work with the student to determine a milling time slot.

Milling projects are time intensive. Students should expect a minimum duration of at least two weeks between the first consultation and the job completion for a simple project.

The Studios for Art & Design Research provides all of the bits used in the CNC mill (see CNC bit on pg. ** for size and cutting length details).
Only certified SADR staff will operate the CNC mill.

**For all machines, equipment, rules, regulations, and policies - when in doubt, ask questions**
IV. General Safety Guidelines

1. **Never** operate the machine unattended. If you are running a file on the laser cutter you are required to be present for the entire engrave/cut.

   If you need to leave your file will be stopped.

2. Make sure the exhaust and air assist are on and functioning. Please find an SADR staff member if you notice that these are not on.

3. Make sure the laser is properly focused and aligned. If anything looks wrong during the cut or your material is warping and running into the laser tube, press the red pause button.

4. Locate the emergency stop button on the lower right hand side of the machine. If anything goes wrong beyond material warping, press the emergency stop button in.

CNC Safety Guidelines:

1. Wear protective gear including eye protection, dust mask, and ear protection. Avoid loose-fitting clothing or dangling jewelry.

2. Keep eyes, hands, hair, and clothing away from the Shopbot and router when it is operating. Tie long hair back. Do not use hands to hold down parts that may come loose as they are cut out.

3. Unplug or shutdown power to the router when changing bits.
4. Listen for changes in sound that may indicate a problem while running the tool. ALWAYS be near enough to the Remote Stop Switch or Space Bar on the computer keyboard to be able to stop the gantries should a problem arise.

5. Use a bit appropriate to the task

6. Avoid unsafe hold down practices that can shatter a bit or allow parts to move during cutting. Use the vacuum table during ALL cuts and reliefs.
//Approved Materials

Epilog Laser:

**Materials that can be Cut and Etched:**

Wood (up to 1/4” thick) - solid and certain plywoods (baltic birch)
Wood Veneer
Masonite (up to 1/4” thick)
Acrylic (up to 1/4” thick)
Paper
Genuine Leather
Mylar
Matte Board (up to 1/8” thick)
Cardboard (up to 1/8” thick)
Fabric (100% cotton or wool less than 1/4” thick)
Cork
Rubber (less than 1/4” thick)

**Materials that can only be Etched:**

Glass
Ceramic
Coated Metals
Tile
Marble
Anodized Aluminum

**Materials that cannot be used:**

Polycarbonate
Vinyl
Casting Resins
Foamcore
Polypropylene

Shopbot CNC:

**Extruded Polystyrene (Blue Foam)**
High Density Modeling Foam
Plywood
Hardwood
Formaldehyde free MDF
Polycarbonate or Acrylic
Local Material Suppliers -

Panel Center  http://www.panelcenter.com/
Woodwerks  https://www.woodwerks.com/
American Plastic Distributors
Perma-Flex Mold Company  http://www.perma-flex.com/
Freeman Supply (Avon, OH)  http://www.freemansupply.com/
McMaster-Carr (Cleveland)  http://www.mcmaster.com/
Lowe’s
Home Depot

Online Material Suppliers -

Inventables  https://www.inventables.com/
Interstate Plastics  http://www.interstateplastics.com/

Digital Fabrication Resources -

Epilog Laser  http://www.epiloglaser.com/
Shopbot CNC  http://www.shopbottools.com/msupport/resourcelist.htm
Type A Machines  http://www.typeamachines.com/
Makerbot  http://www.makerbot.com/
Makezine  http://makezine.com/
Ponoko  https://www.ponoko.com/
Shapeways  http://www.shapeways.com/
Sparkfun  https://www.sparkfun.com/