

**UNLV School of Architecture  
Digital Fabrication Lab**

Policies and Procedures

**COVID-19 Amendments**

*Effective August 24th, 2020*

**COVID-19 Amendments to the Digital Fabrication Lab Policies and Procedures**  
Effective August 24th, 2020

*The purpose of these amendments is to establish and clarify procedures to maintain safety for Students, Faculty, and Staff in the Digital Fabrication Lab during the COVID-19 pandemic. This plan will outline cleaning and disinfecting procedures, organizational changes, and amended procedures for using equipment. These amendments will remain in effect until further notice.*

*All UNLV COVID-19 university guidelines must be followed. The policies and procedures outlined within this document will supplement the COVID-19 university guidelines posted at <https://www.unlv.edu/coronavirus>. Until further notice, any policy or procedure outlined herein will take precedence over the Digital Fabrication Lab's standard policies and procedures.*

*Students and Faculty are advised to follow **all** CDC recommendations and guidelines.*

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## Part 1: Cleaning and Disinfecting Procedures

### A. Cleaning and Disinfecting:

- **Every day the Digital Fabrication Lab facilities are scheduled to be open, the following equipment controls are to be cleaned and disinfected:**
  - *CNC router*: main shutoff switch at control interface, buttons below screen on control interface, keyboard, mouse, vacuum zone control valves, and collet wrench.
  - *Air Compressor*: control panel buttons, compressed air valve to CNC router, compressed air valve to air hose, and air hose hand held valve.
  - *Vacuum Pumps*: N/A
  - *Clean Station*: lid handle and control panel buttons.
  - *Computers*: keyboard and mouse.
  - *CNC plasma cutter*: all switches on plasma cutter unit, controller switch, computer switch, and computer screen.
  - *Laser cutter*: power switch, control panel buttons, exhaust fan switches, air compressor switch, air compressor hose and quick connect fitting, handle to laser bed enclosure, vacuum switch/handle, and vacuum hose.
  - *Stratasys 3D printer*: control panel buttons, build chamber door handle, and power switch.
  - *Desktop 3D printers*: control panel buttons and power switches.
  - *POS*: touch screen and buttons.
  - *Dust Collector*: start and stop buttons.

**Note: DO NOT disinfect internal components of equipment or parts that are not required to be touched during normal operation. Disinfecting sensitive components may cause irreversible damage.**

- **Every day the Digital Fabrication Lab facilities are scheduled to be open, the following workstations are to be cleaned and disinfected:**
  - ARC 161: tables and chairs for desktop 3D printers.
  - ARC 169: computer station and chairs.
  - ARC 175: computer station and chairs.
- **Every day the Digital Fabrication Lab facilities are scheduled to be open, the following high touch facility surfaces are to be cleaned and disinfected:**
  - Door handles, light switches, and sink faucets

### B. Disinfecting Throughout the Day:

- **Equipment operators must disinfect equipment controls before and after each use.**
  - *This redundancy will ensure equipment is safe for the next operator.*
- **Users (students and faculty) will assist with general workstation disinfecting.**
  - *Disinfecting supplies will be provided adjacent to all workstations.*
  - *Users must sanitize tables and chairs before and after each use.*

- **Users (students and faculty) will assist with PPE sanitation.**
  - *If students and faculty are using provided plasma cutting shades, they must sanitize these before and after use.*

C. Acceptable Disinfectant Products

- **Lab machinery and tools:**
  - *Preferred: clorox or lysol wipes*
  - *Secondary: CaviWipes1 or Sani-Cloth AF3 Germicidal Disposable Wipes*
  - *Tertiary: EcoLab Peroxide Multi Surface Cleaner and Disinfectant*
- **Touchscreens on equipment:**
  - *70% isopropyl alcohol (NOT ethanol alcohol)*

D. Location of Hand Sanitizer and Disinfecting Products

- **(1) bottle or dispenser of hand sanitizer is available in the following locations:**
  - ARC 161, ARC 168A, ARC 169, and ARC 175
- **(1) canister of wipes or spray bottle (and paper towels if applicable) is available in the following locations:**
  - ARC 161, ARC 168A, ARC 169, and ARC 175
- **(1) canister/resealable packet or box of alcohol swabs available in the following locations:**
  - ARC 168A
- **(3) boxes [2 L, 1 M] of nitrile disposable gloves available in the following locations:**
  - ARC 175

## Part 2: Organizational Changes

### A. Virtual Appointments

- **Webex will be utilized for the following:**
  - Project Consultations
  - Software Consultations
  - Toolpath Programming (CNC Router & CNC Plasma Cutter)
  - 3D Print File Checks

### B. In-person Appointments

- **In-person appointments will be required to use the following equipment:**
  - CNC Router
  - CNC Plasma Cutter
  - Desktop 3D Printers
  - Laser Cutter

### C. Social Distancing

- **Social distancing will be required when two or more people are in the same room. If social distancing can't be maintained due to room size, only one person may be in that room at a time.**
  - *Maintain a 6' minimum social distance*
  - *8'+ is highly recommended*

### D. Attendance Caps

- **Attendance caps will be as follows:**
  - *Desktop 3D printers - ARC 161:* 1 student
  - *CNC Plasma Cutter - ARC 168A:* 2 students
  - *Laser Cutter/ Industrial 3D Printer - ARC 169:* 1 student
  - *CNC Router - ARC 175:* 2 students

### E. Personal Hygiene

- **Students and Faculty are asked to wash their hands or use hand sanitizer prior to using Digital Fabrication Lab equipment.**

### F. Clear Safety glasses

- **Students and Faculty are required to provide their own clear safety glasses for health and safety reasons.**

### G. Masks

- **Students and Faculty are required to provide their own masks and wear them at all times.**

- ***Disposable masks will be available for Students and Faculty who are working on projects that expose them to sawdust since cloth face coverings may not be appropriate to use when sanding or routing.***

H. Hearing Protection

- ***Disposable ear plugs will be provided in lieu of earmuffs.***

### Part 3: Amended Procedures for Using Equipment

#### A. Laser Cutter

Laser Cutting will now occur through a **hybrid** system that combines laser cutting appointments and the laser queue. Appointments will be required for health and safety reasons, but students should prepare jobs as if they were submitting to the laser queue. Students must arrive at their appointment time to drop off their material, USB drive, and laser cutting form. Jobs will be run during the appointment time.

Please Note: Per social distancing requirements, students will be asked to wait in the corridor while their project is cut.

#### **Process:**

##### **Scheduling an Appointment:**

1. Schedule an appointment online.
2. Appointments **MUST** be scheduled a minimum of **(30) minutes** before the appointment time.
3. The maximum appointment time is **1hr** per individual student and **2.5hrs** for student groups.
4. Students are asked to make a thoughtful estimate of how long their project will take to cut prior to scheduling an appointment.

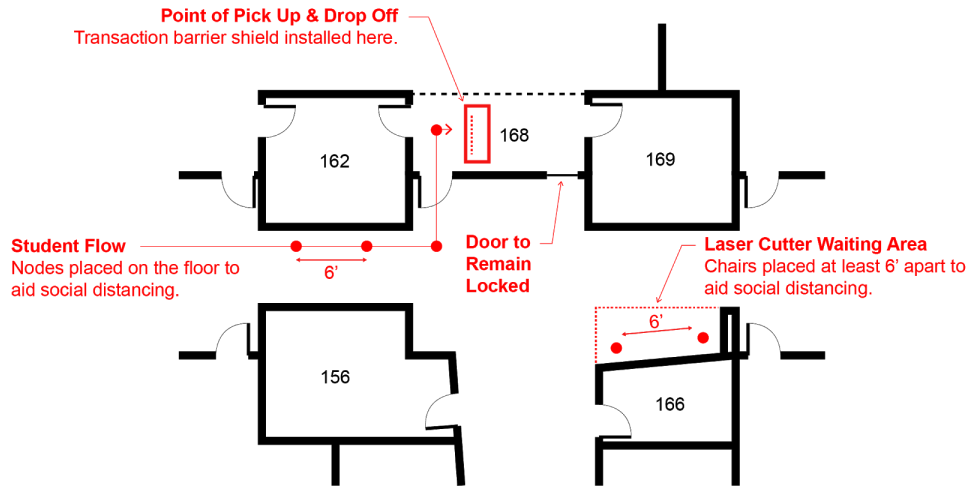
**All appointments will be scheduled for a minimum of 30 minutes. Students will be charged for the FULL appointment time scheduled.**

##### **Prior to an Appointment:**

1. Ensure materials are 18" x 32". We recommend cutting material to 17-7/8" x 31-7/8".
2. Ensure materials are in conformance with the acceptable and prohibited materials list.
3. Use the Rhino laser cut template to set up the file. This template is available online.
4. Have Rhino file(s) saved on a USB drive.
5. Download, print, and complete the laser cutting form.

##### **During the Appointment:**

1. Arrive 5 mins prior to your appointment.
2. Bring material(s), USB drive, and laser cutting form.
3. Drop off the above items to the student employee and plan to wait outside in the corridor. The student employee may need to ask questions during the job.
4. Ensure there are sufficient funds on your RebelCard to cover your scheduled appointment time. Your RebelCard will be charged at the end of the appointment.
5. Reference the diagram below for how social distancing will be maintained during the process:



## B. CNC Router

### **Process:**

#### **At the Conception of a Project:**

1. Visit website to determine machine limitations, tools, acceptable materials, etc
2. Review the RhinoCAM PDF guide online to gain an understanding of what geometry is required, and how that geometry is arranged in Rhino for the plugin to operate correctly.
3. Discuss the project with lab staff to determine feasibility and possible solutions.

#### **Preparing a Rhino File(s) for Toolpathing:**

1. Have all necessary geometry required for the toolpath process cleanly modeled in Rhino.
2. Save geometry in a new Rhino file(s).

#### **Scheduling an Appointment for Project Review and Toolpath Programming:**

1. Schedule an appointment online.
2. Appointments **MUST** be scheduled a minimum of **(2) hours** before the appointment time.
3. The appointment will occur via Webex with Kyle Kithas to review your project and program toolpaths using RhinoCam. Programming toolpaths using RhinoCam will be done via Webex screen sharing.
4. All parameters of the project will be verified for conformance with lab policies and safety protocols. Minor adjustments and edits may be performed during the appointment. **If major revisions are needed, students will need to schedule another appointment after revisions are completed.**
5. Once toolpaths are created, an appointment can be scheduled to run the job. The appointment times are based on the RhinoCAM time estimate multiplied by a factor of three.



### **CNC Appointment:**

1. Meet outside ARC 175 (5) minutes prior to your appointment to run the job.
2. Bring your RebelCard and material stock. Ensure there are sufficient funds prior to your appointment.
3. The material stock will be measured and adjustments will be made to the file as needed.
4. Students are required to monitor the job and to clean up. Your RebelCard will be charged at the end of the appointment.

### C. CNC Plasma Cutter

#### **Process:**

#### **At the Conception of a Project:**

1. Visit website to determine machine limitations, tools, acceptable materials, etc
2. Review the Torchmate CAD CAM PDF guide online to gain an understanding of what geometry is required, and how that geometry is arranged in Rhino for Torchmate CAD CAM to operate correctly.
3. Discuss the project with lab staff to determine feasibility and possible solutions.

#### **Preparing 2D geometry for Toolpathing:**

1. Have all necessary geometry required for the toolpath process cleanly modeled in Rhino.
2. All geometry must be closed planer curves. Export geometry from Rhino as .dxf and save as either "2004 Polylines" or "2007 Polylines"
3. Save .dxf file(s).

#### **Scheduling an Appointment for Project Review and Toolpath Programming:**

1. Schedule an appointment online.
2. Appointments **MUST** be scheduled a minimum of **(2) hours** before the appointment time.
3. The appointment will occur via Webex with Kyle Kithas to review your project and program toolpaths using Torchmate CAD CAM. Programming toolpaths using Torchmate CAD CAM will be done via Webex screen sharing.
4. All parameters of the project will be verified for conformance with lab policies and safety protocols. Minor adjustments and edits may be performed during the appointment. **If major revisions are needed, students will need to schedule another appointment after revisions are completed.**

### **CNC Appointment:**

1. Meet outside ARC 175 (5) minutes prior to your appointment to run the job.
2. Bring your RebelCard and material stock. Ensure there are sufficient funds prior to your appointment.
3. The material stock will be measured and adjustments will be made to the file as needed.
4. Students are required to monitor the job and to clean up. Your RebelCard will be charged at the end of the appointment.

## D. Stratasys 3D Printer

### Process:

#### Prior to an Appointment:

1. Have all necessary geometry cleanly modeled in Rhino.
2. Export geometry as an .stl or .stp files.
3. Sav .stl or .stp file(s) **AND** original Rhino file(s).

*Tip: Download GrabCAD Print and check your model prior to your appointment. GrabCAD Print is free and offers some model repair features. Although repair is possible in this software, we always recommend producing clean geometry in the author software.*

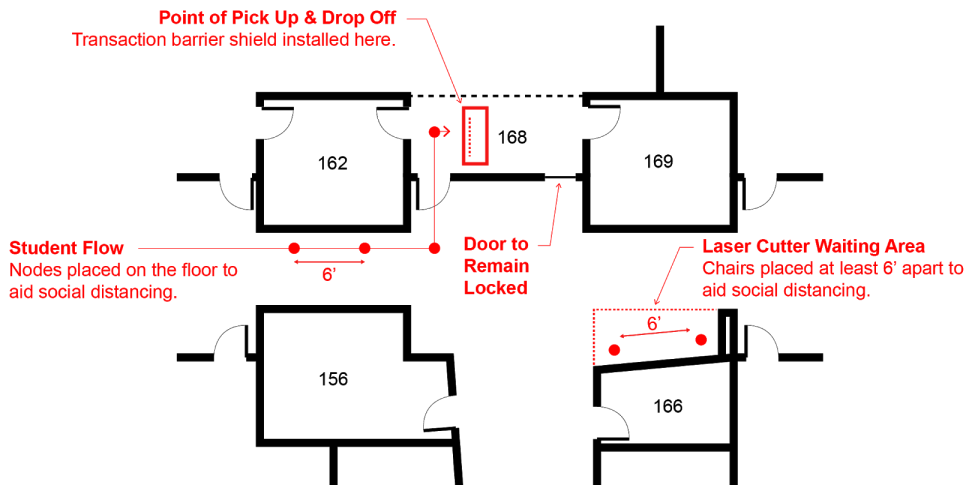
*Additionally, GrabCAD Print allows support, infill, and layer height settings to be adjusted – each having an impact on time and cost. Students are encouraged to play with different settings to arrive at a time and cost they are comfortable with.*

#### Scheduling an Appointment:

1. Schedule an appointment online.
2. Appointments **MUST** be scheduled a minimum of **(2) hours** before the appointment time.
3. The appointment will occur via Webex with Kyle Kithas to review the file and determine the exact price before releasing the job to the printer.

#### Picking Up a Job:

1. At the completion of the print, an email will be sent to the student. Completed jobs will be available for pickup at ARC 168 **during posted pick up times**.
2. Reference the diagram below for how social distancing will be maintained during the pick up process:



## E. Desktop 3D Printers

### ***Process:***

#### **Prior to an Appointment:**

1. Obtain the correct filament for the desktop 3D printers. Filament specs are located on the Digital Fabrication Lab website.
2. Download the corresponding slicing software online to prepare models for printing.
3. Save gcode files on a SD card. SD cards are available in ARC 161.

#### **Scheduling an Appointment:**

1. Schedule an appointment online.
2. Appointments **MUST** be scheduled a minimum of **(2) hours** before the appointment time.
3. Meet outside ARC 175 (5) minutes prior to your appointment.

**Part 4:** Amended Procedures for Safety Training

A. Safety Training

In response to COVID-19, safety training will be delivered via online video accompanied by an online safety quiz and Assumption of Risk/Release of Liability form.

## Part 5: Amended Hours of Operation and Scheduling

### A. Hours

The Digital Fabrication Lab will have amended hours of operation from August 24, 2020 to December 11, 2020 as follows:

	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday	Sunday
	Student Employee	Kyle (Remote Work)	Student Employee	Kyle	Student Employee	Kyle	Student Employee	Kyle (Remote Work)	Student Employee	Kyle		
8 am	Clean/Disinfect		Clean/Disinfect		Clean/Disinfect		Clean/Disinfect		Clean/Disinfect			
9 am	Laser Cutting 3D Print Pick Up		Laser Cutting 3D Print Pick Up		Laser Cutting 3D Print Pick Up		Laser Cutting 3D Print Pick Up		Laser Cutting 3D Print Pick Up			
10 am		Admin		Clean/Disinfect		Clean/Disinfect		Admin	Laser Cutting 3D Print Pick Up	Clean/Disinfect		
11 am	Project & Software Consultations CNC Router & CNC Plasma File Checks			CNC Router & CNC Plasma File Checks + CNC Router & CNC Plasma Jobs Desktop 3D Printer Availability		CNC Router & CNC Plasma File Checks + CNC Router & CNC Plasma Jobs Desktop 3D Printer Availability		Project & Software Consultations CNC Router & CNC Plasma File Checks		CNC Router & CNC Plasma File Checks + CNC Router & CNC Plasma Jobs Desktop 3D Printer Availability		
12 pm												
1 pm												
2 pm												
3 pm												
4 pm												
5 pm												
6 pm				Monitor Wood/ Metal Shops		Monitor Wood/ Metal Shops				Monitor Wood/ Metal Shops		

### B. Scheduled Closings

The Digital Fabrication Lab is scheduled to be closed on the following days:

- 9/7/20 (Labor Day)
- 10/30/20 (Nevada Day)
- 11/11/20 (Veterans Day)
- 11/26/20 - 11/27/20 (Thanksgiving)

### C. Unscheduled Closings

During the semester there may be unscheduled closings. The Digital Fabrication Lab will follow all COVID-19 university guidelines posted at <https://www.unlv.edu/coronavirus>.

If the Digital fabrication Lab is notified that a student who recently visited the lab or lab staff member has tested positive for COVID-19 the following steps will be taken:

1. All services will be suspended and the lab will be closed
2. The Director of the School of Architecture will be notified

The Digital Fabrication Lab will reopen once it receives permission from the Director of the School of Architecture to do so.

D. Additional time allotments due to increased cleaning and disinfecting

- ***It is anticipated that cleaning and disinfecting will take approximately 10 minutes to 15 minutes to complete.***
- ***Additional time during CNC router and CNC plasma cutter appointments will need to be allotted for disinfecting during the day.***

E. Standard appointment blocks

- ***Laser Cutting***
  - 30 mins. Students will be charged for a minimum appointment time of \$5.
- ***CNC Router Programing***
  - 1 hour 30 mins (No Charge)
- ***CNC Router Job***
  - TBD based on project time and specifics
- ***CNC Plasma Cutter Programing***
  - 1 hour 30 mins (No Charge)
- ***CNC Plasma Cutter Job***
  - TBD based on project time and specifics
- ***3D Print File Check***
  - 1 hour 30 mins (No Charge)