[DFL] is located in room 103, Blue Barracks (Building 0721 on campus maps)

1. Sign up sheets, for the laser cutter, will be posted ON THE 4TH FLOOR every Tuesday.
- when signing up make sure to print your name and email address.

2. First-come-first-serve signup for a 15 min time block not to exceed 3 consecutive blocks per person per day.

3. Students may sign-up for a total of 6 nonconsecutive time slots [1 hour 30 minutes] per week.

4. The **GUIDE** and AutoCAD **TEMPLATE** are available here:
http://www.siu.edu/~arc_id/DFL.htm

5. You will need to bring your own material,
size not to exceed 12"x24" recommended size 11-7/8" x 23-7/8"

6. Laser Cutter jobs that take longer than the allotted time will be paused by the Lab Assistant, but not before the next scheduled student arrives with his or her job. Students should consult with the Lab Assistant about formatting job to conform to the 15 min time block.

7. The FIRST missed time slot will result in a warning. After the SECOND missed time slot the student will lose sign up privileges.

8. If lab schedule is maxed services can be attained through **SALUKI CENTRAL**
http://www.salukicentral.com/index.php?target=pages&page_id=1

9. **LAB FEE**
Laser cutting - 0.5$ per minute.

Milling or Routing - 10$ setup fee, a drill bit and clamps.

Payments for the laser cutter will be processed after the job has finished. If funding is not available on your **debit dawg** the job outcome will be held until payment is made. Failure to make a payment within a 48 hours block will result in lost of Fab lab privileges.

10. Scheduling for the CNC will be available by request only.

11. Any updates to the Rules and Operation will be posted outside of Room 103.

LAB ASSISTANTS

The role of the Lab Assistants is to promote the proper and safe use of the equipment and to operate the machines during the posted Schedule. It is NOT the responsibility of the Lab Assistants to "fix" problematic files.
The Lab Assistant will notify the student if he or she needs to modify their submitted CAD file.

Students should consult the file preparation section in the guide prior to asking for help.

Lab Assistants have authority in the Lab at all times concerning scheduling and operation of any equipment.

This semester Lab Assistants are:
Scott Wenz swenz@siu.edu / Jason Pierce pierce1@siu.edu / Jake McCann jakem@siu.edu

LASER CUTTER MATERIALS

Mat Board, Cardboard, Wood, Plywood, Acrylic, Styrene and Mylar may be cut on the Laser Cutter.
Cutting (as opposed to engraving) capacity varies with materials.
Consult with Lab Assistants about cutting thickness limits and materials NOT listed in this document.

NO CUTTING of PVC or POLYCARBONATE or UNCOATED METALS is permitted

Some specially treated metals such as anodized aluminum and painted brass may be ETCHED.

CLEAN-UP & MAINTENANCE

All student/ users are expected to clean-up materials after using the lab.
This includes but is not limited to: disposing (inside a trash can) of any drop from laser cutting.
Please limit storage of raw materials in the lab. If you do have material there, label it clearly and store it neatly and out of the way.
The Lab Assistants will be responsible for regular maintenance of the devices and associated computer equipment.

STORAGE

The CAD/CAM Lab is not a storeroom for student projects.
While we understand there is a scarcity of secure space in which to store your projects, for the sake of the safety and functionality of the lab, student projects should not remain in the lab for longer than 24 hours. You're also asked not to use the adjacent studio space to do work. We are aware of this issue and working towards providing additional workspace in the DFL area.

The Lab hours of operation are in accordance to student worker allotment by the School of Architecture and it is recommended that you check periodically for changes to the schedule posted on the 4th floor.

SIUC-SOA_Digital Fabrication Lab: LASER CUTTER GUIDE

from AutoCAD

Use the file: *Laser Cutter Template_SIU-SOA_DFL.dwg*

HOW SHOULD I DRAW IT?

It's pretty routine CAD. Draw your project to full-size scale (we'll scale it down in the layout). The laser cutter is fully capable of cutting all vector data, including hatch patterns and text. In that regard, it isn't much different from setting up a regular plot. (*Allow a margin of 1/8" around all sides.*)

WHERE SHOULD I DRAW IT?

In model space, simply place your full-size geometry in the labeled box that corresponds to the size you'd like your model to be. It will then be correctly positioned in the appropriate layout, labeled by the following nomenclature:

- 1-16 → 1/16" = 1'-0"
- 1-1 → 1" = 1'-0"
- HALF → Half size → 6" = 1'-0"

WHAT LAYERS SHOULD I USE?

Cutting	LZR-Cut-1	Magenta
	LZR-Cut-2	Cyan
Scoring	LZR-Score-1	Red
	LZR-Score-2	Green
	LZR-Score-3	Yellow
	LZR-Score-4	Blue

In the rare case that additional types of cuts are needed, they may be placed on the subsequent cutting and scoring layers (e.g.- LZR-Score-2).

Tips for efficient cut times:

- To be as efficient as possible, it is important to think not in terms of *lines*, but in terms of *paths*. For instance, if you were to draw a tic-tac-toe game on a sheet of paper, you wouldn't draw nine individual squares, stacked 3x3, but rather two horizontal line and 2 vertical lines. The laser cutter works much the same way, and cutting times can be greatly reduced by setting up your pieces with long, continuous lines.
- Avoid "double-lines" at all costs. Copying and pasting shapes can quickly generate a lot of redundant geometry. When two lines are over-lapping, the laser cutter interprets this as two separate cuts over the same location, which can lead to scorched edges.
- If you are using text to label your pieces, straight-line based fonts such as ISOCTUER or ***OCR A Extended*** are suggested. The laser cutter actually reads curved lines as hundreds of tiny straight lines. Reducing them in throw-away text reduces cut times.[1]

SIUC-SOA_Digital Fabrication Lab: LASER CUTTER GUIDE

from Corel Draw

HOW DO I SET UP A FILE FOR CORELDRAW?

In order to print through Corel Draw, your geometry will need to be saved as a Windows Metafile from whatever program you use to draw it in (if not drawn in Corel Draw). The steps from AutoCAD to CorelDraw are as follows:

1) Follow the above guidelines for creating full-scale geometry in AutoCAD.
2) Draw 1 rectangle to represent the 24"x12" print margins of the laser cutter, and (*if necessary*) 1 rectangle to represent the size of your material using the following equation:

$$\frac{\text{Length of Line (}\textit{in inches}\text{) in the model scale (}\textit{e.g.- 24" length limit for laser cutter}\text{)}}{\text{Scale Unit that represents 1'-0" in the model}} \times 1'\text{-}0'' = \text{Length of Line in full-scale drawing in CAD.}$$

   Thus, a full-scale drawing would need a printer-margin box of 192'x96'

3) After placing your geometry on the representative sheets, export <u>each sheet individually</u> (*including margin boxes*) as a Windows Metafile:

   FILE → Export… → Files of Type: Metafile (*.wmf) → Select geometry to export (*as prompted by the command line*).

<u>WHY</u> WOULD I SET UP A FILE FOR CORELDRAW?

Obviously, if the origin of your geometry is AutoCAD, and you can print from AutoCAD, why use CorelDraw at all? There are several reasons:

1) Corel Draw is a much more intuitive if you are planning on using raster engraving with bitmap files and different line-widths.
2) It is simpler to divide your file into separate cuts, if things need to happen in a certain order.
3) For some, Corel Draw is simply easier to work with. Check with the person helping you use the laser cutter to see if they prefer a *.wmf* or *.dwg*

M-300 Laser Cutter FAQ's

Which materials can be cut? Which materials are faster to cut?

- ***Acrylic/Plexiglass*** *(slow) – A popular material but also the slowest to cut, resulting in less efficient machine times. Use this material judiciously and carefully plan your cuts.*
- ***Acetate/Mylar*** *(fast) – Cuts beautifully with a delicate touch.*
- ***Chipboard*** *(moderate)*
- ***Corrugated Cardboard*** *(moderate) – Surprisingly clean results can be achieved with this material.*
- ***Corian*** *(moderate) – Commonly used on countertops, it also cuts to nice effects.*
- ***Foamcore*** *(moderate) – Technically it can be cut, though the results are pretty rough. The heat required to cut the laminate surfaces is also enough to melt the foam center, resulting in a concave edge.*
- ***Paper*** *(fast) – Museum Board, Architectural Task Board, etc. all cut beautifully. Be aware that due to the high absorption value, black museum board takes almost as long as plexiglass.*
- ***Wood*** *(moderate) – Balsa, Bass, Plywood. We suggest a thickness of 1/8", and certainly no more than 1/4". The tradeoff is the thicker the material, the more "burned" the edges will be. Be aware that extremely small pieces of Balsa Wood are prone to being sucked away by the exhaust system due to their light weight.*

What if I want to use a material that isn't listed by the DFL?

Students are encouraged to do their own research and find interesting materials that are laser-cutter friendly. Just show us a print-out of the webpage verifying that the material is okay, and we'll give it a shot.

Which materials can NOT be cut?

- ***PVC****- Highly corrosive to the machine, and gives off a toxic chlorinated gas when cut.*
- ***Lexan****- Can be purchased at most hardware stores. Be careful when selecting your plexiglass that you don't accidentally purchase this. Not only is it more expensive, but it will not cut as it is designed to be resistant to certain radiation, including that used by the laser cutter.*
- ***Glass*** *– The laser tends to just pass right through.*
- ***Metals*** *– Our laser cutter does not cut MOST metals. Certain metals are available online that may be etched.*
- ***Reflective Materials*** *– The laser cutter is a system of lenses and mirrors. Placing a mirror on the cutting bed sends the laser back in on itself and may damage the machine.*

What's with the multiple cut and score layers in the CAD template?

CUTS – "LZR-Cut-1" will always cut before "LZR-Cut-2". This can be very useful when cutting many small pieces out of a larger piece. It is good practice to cut smaller pieces nested inside of larger pieces first, to reduce the chances of material movement and reduced cut quality.