LASER CUTTER POLICIES
READ CAREFULLY BEFORE STARTING

COME PREPARED
Students should come to their laser cutting session ready to cut. The laser work station is not a place to make extensive changes to your files before cutting.

KEEP WATCH AT ALL TIMES
Students MUST be actively watching the laser cutter at ALL times, due to the fact the material may catch on FIRE! Any laser cutter found running without being watched will be stopped immediately.

FIRES
Small flames are to be expected. However if your material catches fire and remains on fire immediately open the top lid and stop the laser cutter using the main power switch, and notify a Lab Aide immediately.

WAIT BEFORE OPENING
After your cut/engraving is complete, keep the lid of the laser cutter closed for 10 seconds to allow smoke or vapors to be vented– you do not want to breath them in!

CLEAN UP BEFORE LEAVING
Be considerate of other students and clean up your workstation when you are finished. Do not leave materials of ANY kind in or around the laser cutter or floor, and make sure the bed of the laser cutter is free of debris. Please place all recyclable materials in the recycling bins provided.
# MATERIALS

Students will be denied access to the laser cutters if a banned material is brought to cut. Cutting banned material can also result in a suspension of lab privileges!

## APPROVED
- Natural Wood
  - Basswood
  - Balsa Wood
  - Avoid oily/resinous woods
- Birch Plywood
  - Hobby shop version recommended
- Paper/Cardstock
  - Matboard
  - Butter Board
  - Cardboard
  - Chipboard
- Extruded Polystyrene (Styrene)
- Acrylic
- Mylar

## BANNED
- Any painted material
- PVC (Poly Vinyl Chloride)
- Any Poly or Copoly plastic
- MDF
- Particle Board
- Masonite
- Polycarbonate
- Fiberglass
- Any kind of foam including foamcore boards
- Plastics
  - ABS, HDPE, PLA, etc
- Thick commercial plywood
VECTOR OR RASTER?

READ CAREFULLY BEFORE STARTING

VECTOR

LASER FOLLOWS LINE PATHS

USED FOR:
- CUTTING & ETCHING

PROS:
- SPEEDY
- CAN BE USED TO CUT THROUGH MATERIAL OR TO ENGRAVE

CONS:
- UNABLE TO CREATE SOLID FILL ENGRAVINGS

RASTER

LASER MAKES A SERIES OF HORIZONTAL SCAN LINES

USED FOR:
- ETCHING ONLY

PROS:
- CAN BE USED TO ENGRAVE AN ENTIRE SOLID FILLED IMAGE

CONS:
- VERY SLOW, ETCHES ONE PIXEL AT A TIME
- UNABLE TO CUT MATERIAL
# Programs

The laser software is compatible with the following design programs and extensions:

## Adobe

<table>
<thead>
<tr>
<th>Program</th>
<th>Format</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illustrator CS6</td>
<td>.ai</td>
<td>Cut/Etch Lines &amp; Etch Images</td>
</tr>
<tr>
<td>Photoshop CS6</td>
<td>.psd</td>
<td>Etch Images</td>
</tr>
</tbody>
</table>

## Autodesk

<table>
<thead>
<tr>
<th>Program</th>
<th>Format</th>
<th>Feature</th>
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</thead>
<tbody>
<tr>
<td>AutoCAD 2015</td>
<td>.dwg</td>
<td>Cut/Etch Vector Lines</td>
</tr>
</tbody>
</table>

## CorelDraw

<table>
<thead>
<tr>
<th>Program</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CorelDRAW X7</td>
<td>.cdr</td>
<td>Etch Images</td>
</tr>
</tbody>
</table>
VENTILATION

YOU CANNOT RUN A LASER CUTTER WITHOUT VENTILATION- IT CAUSES POISONOUS GAS & SMOKE INHALATION AS WELL AS FIRES!

1. TO TURN ON THE VENTILATION SYSTEM FIND THE SWITCH (LOCATED ON A PILLAR NEXT TO IGOR) AND PRESS THE STRAT BUTTON

2. OPEN THE VENTS (2 OF THEM) THAT SUPPLY YOUR MACHINE
   ALWAYS MAKE SURE THE VENTS ARE OPEN ALL THE WAY.
   VENTS ARE LABELED WITH THE NAME OF THE LASER CUTTER THEY SERVE

NOTE: YOUR LASER CUTTER WILL NOT TURN ON UNLESS THE VENTS ARE OPEN AND THE VENTILATION SYSTEM IS ON.
FOCUSBING THE LASER

THE LASER CUTTER MUST BE FOCUSED FOR THE THICKNESS OF YOUR MATERIAL IN ORDER TO FUNCTION CORRECTLY!

1. PLACE YOUR MATERIAL IN THE TOP LEFT CORNER OF THE BED.

2. WITH THE LID OPEN PRESS THE “z” BUTTON ON THE LASER CUTTER.

3. THE LASER CARRIAGE WILL MOVE OVER TO THE LEFT.

4. REMOVE THE FOCUSING TOOL FOUND INSIDE THE MACHINE, ON THE LEFT SIDE OF THE BED.
FOCUSING THE LASER

5. PLACE THE FOCUSING TOOL UNDERNEATH (ON THE FRONT– NEVER ON THE SIDE) THE LASER CARRIAGE.

6. USE THE ARROWS ON THE LEFT TO MOVE THE BED UP OR DOWN UNTIL THE LASER CARRIAGE SITS PERFECTLY IN THE TOOL’S NICHE MARK.

7. PROPERLY PLACE THE FOCUS TOOL BACK IN ITS STORAGE SLOT AND PRESS THE “z” BUTTON AGAIN.

YOUR LASER IS NOW FOCUSED.

YOU MUST RE-FOCUS THE LASER EVERYTIME YOU CHANGE MATERIALS OR MATERIAL THICKNESS.
PREVIEWING THE PRINT

IN ORDER TO GET A PREVIEW OF EXACTLY WHAT THE LASER CUTTER IS GOING TO DO FOLLOW THESE STEPS:

1. SEND YOUR FILE OVER TO THE LASER CUTTER
2. OPEN THE LID
3. PRESS THE GREEN BUTTON ON THE LASER CUTTER (WITH THE LID OPEN)

THE LASER CUTTER WILL THEN PROCEED AS IT WOULD NORMALLY JUST WITHOUT ACTUALLY CUTTING/ENGRAVING ANYTHING.

4. ONCE YOU ARE SATISFIED THAT EVERYTHING IS GOING TO PRINT CORRECTLY PRESS THE “PAUSE” BUTTON ON THE LASER CUTTER.
   THE LASER CUTTER WILL FINISH THE LINE BEFORE GOING BACK TO ITS START POSITION (THIS MAY TAKE SOME TIME IF YOU HAVE LONG SOLID LINES)
   DO NOT CLOSE THE LID UNTIL THE CARRIAGE IS BACK AT ITS START POSITION AS IT WILL START CUTTING THE SECOND THE LID IS CLOSED
COMMON ERROR 1

THE LASER CUTTER SCREEN GIVES YOU A 0.00 READING ON THE SCREEN INSTEAD OF YOUR SETTINGS.

ILLUSTRATOR:
- YOUR LINES DO NOT HAVE THE CORRECT LINEWEIGHT (0.001), COLOR (BLACK), OR TRANSPARENCY (100%)

AUTOCAD:
- YOUR LINES ARE NOT ON THE CORRECT LAYER WITH THE “BY LAYER” SETTINGS APPLIED.
- THE LAYER WHICH THEY ARE ON DOES NOT HAVE THE CORRECT LINEWEIGHT (0.00).
- MAKE SURE THE SETTINGS (PEN COLOR) YOU HAVE APPLIED ARE FOR THE COLOR THAT MATCHES YOUR LAYER/LINES.
COMMON ERROR 2

THE LASER CUTTER IS CUTTING VERTICALLY ACROSS A SMALL PORTION OF THE MATERIAL INSTEAD OF HORIZONTALLY ACROSS THE ENTIRE BED. (I.E. THE DIRECTION OF YOUR PRINT IS WRONG)

THE ORIENTATION OF YOUR FILE NEEDS TO BE CHANGED.

-IF YOU HAVE NOT DONE SO BEFORE CORRECT THE ORIENTATION ACCORDING TO THE “USER-DEFINED PORTRAIT/LANDSCAPE” SETTING

  I.E. USER-DEFINED PORTRAIT = PORTRAIT ORIENTATION

-IF USING THE SAME ORIENTATION AS THE “USER-DEFINED” VERSION DOES NOT WORK THEN CHANGE TO THE OTHER ORIENTATION OPTION IN THE ORIENTATION SECTION OF YOUR PRINT SETUP, AND RE-SEND YOU FILE.
DOCUMENT SETUP

PAGE SIZE: CREATE AN ARTBOARD WITH THE SAME DIMENSIONS AS THE LASER CUTTER
32”X18”

LINE WEIGHTS: SET THE LINE WEIGHTS FOR EVERYTHING TO 0.001

OPACITY: SET THE OPACITY FOR EVERYTHING TO 100%

LINE/ETCH COLORS: THE ONLY COLOR THAT CAN BE USED IS BLACK (BOTH ETCH & CUT)

MARGINS: MARGINS ARE 1/8” - TAKE THIS INTO ACCOUNT

CREATE LAYERS: IF YOUR IMAGE NEEDS TO BE CUT ON CERTAIN LINES AND ETCHED ON OTHERS THEN YOU WILL NEED TO PREPARE YOUR FILES WITH SEPARATE LAYERS FOR CUT AND ETCH.

EX. HIDE THE CUT LAYER AND SEND THE FILE TO THE LASER CUTTER TO ETCH THE VISIBLE LAYER. THEN HIDE THE ETCH LAYER & MAKE THE CUT LAYER VISIBLE, SEND THE FILE TO THE LASER CUTTER TO CUT THE VISIBLE LAYER. (DO NOT MOVE YOUR MATERIAL.)
Black

0.001 pt line weight

100% opacity

Separate layers for cut & etch

NOTE: THIS EXAMPLE SHOWS THE PRINT IN COLOR ONLY TO EXPLAIN THE CUT/ETCH LAYERS— IN PRACTICE ALL THESE LINES/OBJECTS MUST BE IN BLACK
PRINT SETUP

BEFORE YOU PRINT:
- HIDE ANY LAYERS THAT REQUIRE DIFFERENT LASER CUTTER SETTINGS (EX. CUT vs ETCH)

1. FILE → PRINT
2. SELECT PRINTER → IGOR
3. SETUP
4. PREFERENCES
5. **SET PEN MODE**

   **CLICK ON LITTLE BOX**

   **VECT** - VECTOR (CUT/ETCH)

   **RAST** - RASTER (ETCH ONLY)

   RAST/VECT - **DO NOT USE!**

   USE ONLY **BLACK**

   SET ALL OTHER COLORS TO **SKIP**

6. **ADJUST SETTINGS ACCORDING TO MATERIAL**

   SETTINGS FOUND ON COVER OF MANUAL

7. **SET**

8. **OK**
9. USER-DEFINED PORTRAIT

4. PLACEMENT
ALWAYS TOP LEFT CORNER

11. PRINT

12. MAKE SURE LASER CUTTER SCREEN SHOWS YOUR FILE NAME AND SETTINGS
IF IT IS NOT SHOWING PRESS “NEXT FILE”
IF IS STILL ISN’T SENDING IT OVER ALERT A LAB AIDE

13. PRESS THE GREEN BUTTON ON THE LASER CUTTER TO START.

REMEMBER TO FOCUS THE LASER BEFORE STARTING YOUR PRINT!
Adobe PHOTOSHOP
DOCUMENT SETUP

USE MULTIPLE LAYERS FOR SETTING CHANGES

- ONLY KEEP ONE LAYER VISIBLE AT A TIME—ADJUST THE SETTINGS FOR THAT ONE LAYER AND SEND IT TO THE LASER CUTTER. REPEAT THESE STEPS FOR THE OTHER LAYERS.
BEFORE YOU PRINT:

- HIDE ANY LAYERS THAT REQUIRE DIFFERENT LASER CUTTER SETTINGS (EX. CUT VS ETCH)

1. FILE → PRINT
2. SELECT PRINTER → IGOR
3. PRINT SETTINGS
4. SET PEN MODE
BLACK IS THE ONLY OPTION

5. ADJUST SETTINGS ACCORDING TO MATERIAL
SETTINGS FOUND ON COVER OF MANUAL

6. SET

7. OK
8. ADJUST IMAGE LOCATION
Move the image to where the material is placed on the laser cutter bed.

9. PRINT

10. MAKE SURE LASER CUTTER SCREEN SHOWS YOUR FILE NAME AND SETTINGS
If it is not showing press “NEXT FILE”
If it still isn’t sending it over alert a lab aide

11. PRESS THE GREEN BUTTON ON THE LASER CUTTER TO START.

REMEMBER TO FOCUS THE LASER BEFORE STARTING YOUR PRINT!
**DOCUMENT SETUP**

<table>
<thead>
<tr>
<th>SET UNITS:</th>
<th>SET YOUR UNITS TO ARCHITECTURAL (INCHES/FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXPLODE:</td>
<td>EXPLODE ALL BLOCKS, THE LASER CUTTER WILL NOT RECOGNIZE THEM</td>
</tr>
<tr>
<td>CREATE LAYERS:</td>
<td>CREATE A CUT AND AN ETCH LAYER (IF ALSO ETCHING- 2 LAYERS) PLACE ALL LINES TO BE CUT ON THE CUT LAYER &amp; ALL LINES TO BE ETCHED ON THE ETCH LAYER</td>
</tr>
<tr>
<td>ADJUST LAYER PROPERTIES &amp; LINEWEIGHTS:</td>
<td>WITHIN LAYER PROPERTIES SET THE LINE WEIGHT TO 0.00mm ALL LAYERS BEING USED MUST BE SET TO 0.00mm &amp; Continuous ANY BASIC COLORS CAN BE USED BUT ALL LINE PROPERTIES MUST BE &quot;BY LAYER&quot;</td>
</tr>
<tr>
<td>MARGINS:</td>
<td>MARGINS ARE 1/8&quot;- TAKE THIS INTO ACCOUNT</td>
</tr>
<tr>
<td>USE A PAPERSPACE LAYOUT:</td>
<td>TO ACCESS CLICK ON THE &quot;LAYOUT&quot; TAB AT THE BOTTOM OF THE WINDOW</td>
</tr>
</tbody>
</table>
BEFORE YOU PRINT:

- MAKE SURE ALL LINES ARE ON THE CORRECT LAYERS AND THAT ALL THEIR PROPERTIES ARE “BY LAYER”

1. RIGHT CLICK ON “LAYOUT 1” (OR ANY OTHER LAYOUT YOU WISH TO USE)

2. SELECT → PAGE SETUP MANAGER

3. SELECT THE LAYOUT YOU ARE EDITING FROM THE LIST

4. MODIFY
5. Select Printer

IGOR

6. Select the Default Paper Size

7. Properties
8. CUSTOM PROPERTIES

9. SET PEN MODE
   CLICK ON LITTLE BOXES
   **VECT** - VECTOR (CUT/ETCH)
   **RAST** - RASTER (ETCH ONLY)
   **RAST/VECT** - DO NOT USE!
   SET ONLY THE COLORS YOU ARE USING
   SET ALL OTHER COLORS TO SKIP

10. ADJUST SETTINGS ACCORDING TO MATERIAL
    SETTINGS FOUND ON COVER OF MANUAL

11. SET
    DO THIS FOR EACH COLOR YOU ARE CHANGING

12. OK

**NOTE:** BY DOING YOUR CUT/ETCH SETTINGS IN “PAGE SETUP” YOU SAVE TIME BECAUSE THEY WILL NOT NEED TO BE RE-SET EVERYTIME YOU SEND A PRINT (ONLY APPLIES IF YOU PLAN ON USING THE SAME SETTINGS FOR MULTIPLE CUTS)
13. PLOT AREA SHOULD BE "LAYOUT"

14. MAKE SURE THE OFFSETS ARE SET TO 0.0

15. MAKE SURE THE SCALE IS 1:1

16. SELECT ORIENTATION

17. OK

NOTE: THE PAPER SIZE HAS CHANGED TO 32"x 32"
VIEWPORT SETUP

You should now see a 32”x32” sheet with a small viewport.

You must now create a viewport that is the same size as the laser cutter bed: 32”x18”.

1. Create a new layer for the viewport → Layer Properties

2. Call the layer “VPORT” and make it a “no print” layer. Making it a bright color also helps.
PLACE YOUR VIEWPORT ONTO THE NEW "VPORT" LAYER
ALSO MOVE IT TO THE TOP LEFT CORNER & EXTEND IT BEYOND THE PAGE MARGINS.

3. CREATE A 18" GUIDELINE ON THE SIDE OF YOUR SHEET

4. ALIGN YOUR VIEWPORT TO THE 18" LINE

5. DELETE THE GUIDELINES
6. TO ACTIVATE & MOVE AROUND WITHIN YOUR VIEWPORT DOUBLE CLICK INSIDE IT (YOU CAN ALSO HOLD DOWN THE MOUSE WHEEL TO PAN)

7. WHEN THE VIEWPORT IS ACTIVATED YOU CAN SET THE VIEWPORT SCALE (THE SCALE OF EVERYTHING INSIDE OF IT).
   A LIST OF SCALE OPTIONS WILL POP UP

8. WHEN EVERYTHING INSIDE THE VIEWPORT IS POSITIONED & Scaled CORRECTLY JUST DOUBLE CLICK OUTSIDE OF IT TO DEACTIVATE IT

IF YOU HAVE MULTIPLE DIFFERING PRINTS, JUST RE-DO THE LAST 3 STEPS TO SETUP EACH ONE—THIS SAVES A LOT OF TIME SINCE EVERYTHING INCLUDING YOUR CUT/ETCH SETTINGS ARE ALREADY DONE. ALTERNATIVELY YOU CAN SETUP A LAYOUT FOR EACH PRINT BUT EACH LAYOUT WILL NEED TO BE SETUP FROM SCRATCH.
1. SELECT THE LARGE AUTOCAD “A”

2. HOVER OVER PRINT

3. SELECT PLOT

4. RE-CHECK YOUR SCALE MUST BE 1:1

5. OK
6. MAKE SURE LASER CUTTER SCREEN SHOWS YOUR FILE NAME AND SETTINGS
   IF IT IS NOT SHOWING PRESS “NEXT FILE”
   IF IT IS STILL ISN’T SENDING IT OVER ALERT A LAB AIDE

7. PRESS THE GREEN BUTTON ON THE LASER CUTTER TO START.

REMEMBER TO FOCUS THE LASER BEFORE STARTING YOUR PRINT!