ARTS102 – 3D Media Studies
DEVANN GARDNER
Spring 2024

Light Craft – Using Laser Cut Designs in 3D

Project Brief

The objective of this project is to introduce students to technological resources and translate their thinking from a 2D plane into a 3D sculpture. Students will explore planar construction, the construction of geometric shapes, scale relationships and the organization of elements of form in space. Students will develop craftsmanship, construction techniques and how to utilize Adobe Illustrator, and Vcut software in inventive ways. Students will be able to demonstrate the process of ideation, sketching and working out ideas and creating the final work.

In this project, students will explore form, scale, light, and space among other principles through construction of a hanging or sitting lamp design. Students will produce a prototype of their design in cardboard or paper to test joinery and structure. Students will gain an understanding of their chosen form in space and gain the ability to design their lamp in Illustrator and have it cut with the CreatorSpace's laser cutter. Followed by adhering the pieces together either with glue or joinery and have the sculpture hang or sit and house a light that will cast shadows as their final experimental phase of the work.

Students will professionally document their work and process and reflect upon their ideas and how they connect visually to the final work in their production of a project statement.

Assignment

For this project, you will design a hanging mobile or freestanding sculpture that will house a light and cast corresponding shadows into the installation space. Think about simple shapes, repetition, pattern and symmetry when designing. The challenges will occur during the creation process as this design will be multiple pieces that must fit together with refined craftsmanship and stand or hang on its own.

First draft up a few simple thumbnails of interesting shapes, patterns, etc and remember to think about the negative space in and around your pieces as these will let light through or cast shadows. You can do as many small-scale tests with paper as you wish to help your understanding with translating your 2D sketch into 3D space, but you must make ONE cardstock maquette of your final chosen design before moving on to the final wood cut.

Once your final design is successful, you will draw your design in Adobe Illustrator following the instructions and transfer/open your file in Vcut – the laser cutter software in the CreatorSpace. Proceed with the Wood Cut Instructions to cut your design from the Birch wood in the laser cutter machine. Adhere your pieces together, insert bulb, refine, and document. Submit with artist statement.

Materials

- **Cardstock**
- **X-acto knives**
- **Scissors**
- **Adobe Illustrator**
- **Laser Cutter**
- **Baltic Birch 1/8" thick wood panel – cut down**

Each student will be supplied with a set number of materials which should suffice for the project.. Even though we have these items in studio, students should have these as part of their general student artist tool kit:

- **Pencils, pens, scissors**
- **Ruler**
- **Xacto Knives, Blades**
- **Masking Tape**
- **Paper/Sketchbook**
- **Erasers**

If students require additional resources, they will need to purchase those items. Or contact instructor for alternative options. ***If you wish to use Cast Acrylic for this project – I recommend translucent. No larger than 18" x 32" in size and 1/8" thick from canalplastics.com - ORDER EARLY***

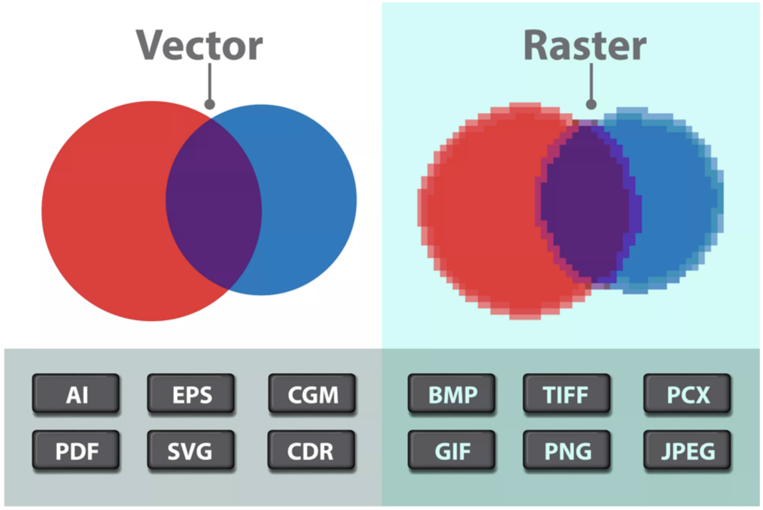
Part 1 – In your sketchbook
1. **Research / Brainstorm:** Find at least 5 artists working with light,shadow, lasercut, mobile or translucent art that intrigue you. Include images of their work, with their names, in your Sketchbook.
2. Create at least 5 thumbnail sketches for 5 different design sculptures – shapes, pattern, repetition, symmetry are key here.

Part 2 – In the studio
1. After discussing with professor and/or peers, create a cardstock maquette of one of your design to test its joineries, find any edits needed or modify your design. We will share these refined ideas in class.
2. Once your idea is successful, you will need to book time with the laser cutter in the CreatorSpace by signing up, You must use class time wisely, but you will need additional time, so don't forget to book.

3. Create. Follow instructions below: *Illustrator Instructions* & *Wood Cut Instructions* being mindful of craftsmanship and willingness to problem-solving arising issues.
4. Photograph your finished sculpture and upload your images to your Blackboard – minimum 5 jpg images of documentation and 300 word artist statement combined as a single pdf – *LastName_LaserCut.pdf*

Part 3 – Artist Statement 300 words
1. Discuss your work in terms of the components of an artwork.
Design – What is your design? Does it translate will in 3D? How does it change in this form?
Form – How is your piece shaped or made?
Context – What would a viewer need to know to better understand your work? How are the shadows appearing in the installation of the work? What is the viewer's experience?
2. How was your project successful?
3. How could your project be improved?

Illustrator Info



VECTORS: When set to RGB Red, / Stroke .001
The laser will cut all the way through the material

RASTERS: Anything NOT set to RGB red / Stroke .001
The laser will ETCH into the surface of the material
Your work should focus on cutting through the material – Vectors!!!

How to use the pen tool in Illustrator:

- Open illustrator (use your school email login to access Adobe)
- Create a new file (18" wide by 12" tall) – this will match the size of your wood panel
- Practice drawing a box by clicking the pen tool. Be sure to close the shape!
- Practice drawing another geometric shape.
- Learn how to move the shapes so that they overlap.
- Learn how to use the pathfinder tools to join the shapes.
- Learn how to edit individual nodes.
- Now learn how to make curves. Practice adjusting the "handlebars" to adjust the curves.
- Learn how to add or subtract nodes.

Illustrator Instructions

1. Open a new file 18"w x 12"h

2. Place image of your sketch drawing and scale it to size of work space(s). (hold shift key while clicking and dragging corner of scale box)

3. Add new layer and lock image layer.

4. Select the pen tool (P). Adjust stroke thickness to be visible to you. And begin tracing your sketch with the pen tool.

    a. Zoom in to follow lines and use the curvature tool or handles to curve your lines.

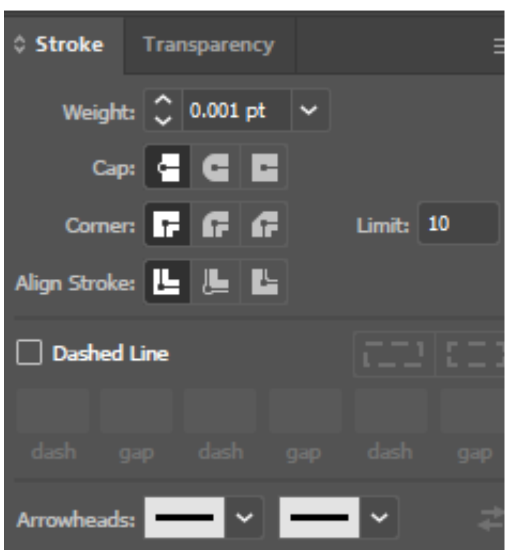
    b. If you have a patterned design or repeating shapes – you can trace one object then select it, duplicate (ctrl/cmd + C & ctrl/cmd + V) and scale it up or down by holding shift to maintain proportions.

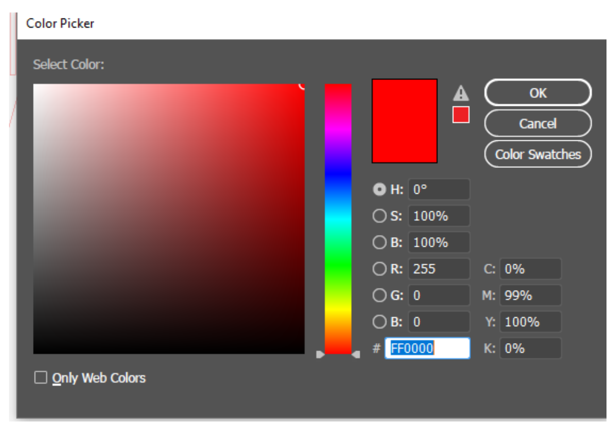
5. Once finished tracing – toggle back and forth on layer visibility to check for any missing lines.

6. Hide sketch layer. Select all (cmd/crtl + A) or double click your stroke

    a. adjust Stroke thickness – under properties – to .001

    b. adjust color RGB – R: 255 G: 0 B: 0





7. Save .ai file to external hard drive and google drive.

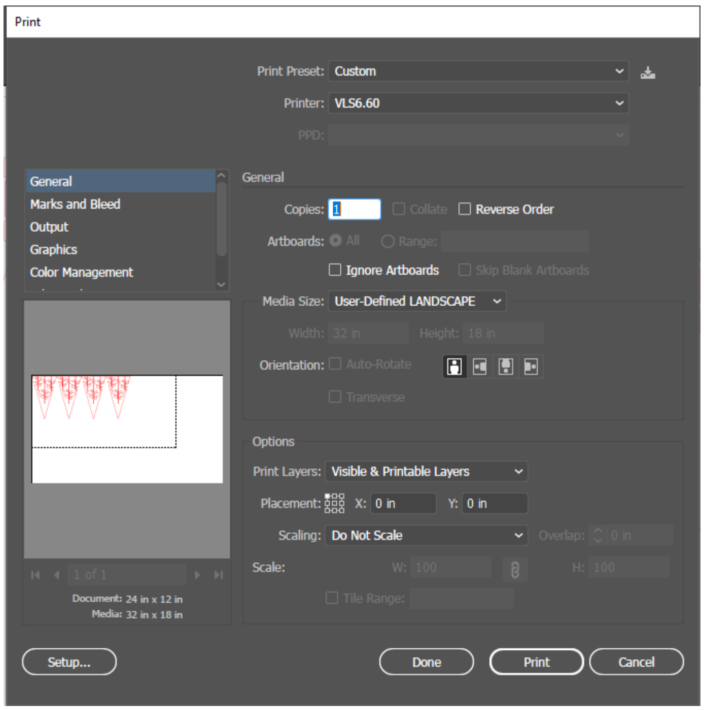
VCut Instructions

Bring a bag/container to carry your pieces out with at end.

1. Open you file on the Laser Cutter Computer. Google Drive file transfers may alter your file so be sure to double check your line weights and stroke colors!!

2. Once everything is double checked and ready - Click “File / Print” and the print menu will open up.

3. In the Print Menu:



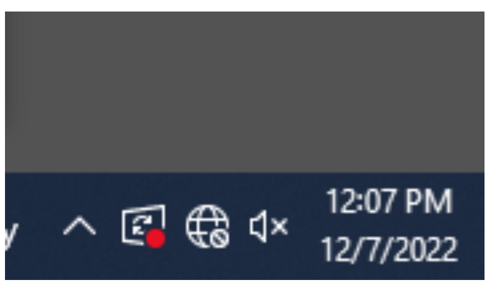
← Right here, make sure that VLS6.60 is selected.

← Select “User-Defined Landscape”

← Under “placement”, click the top left block and then make sure X is set to 0 and Y is set to 0.

Then click “Print”.

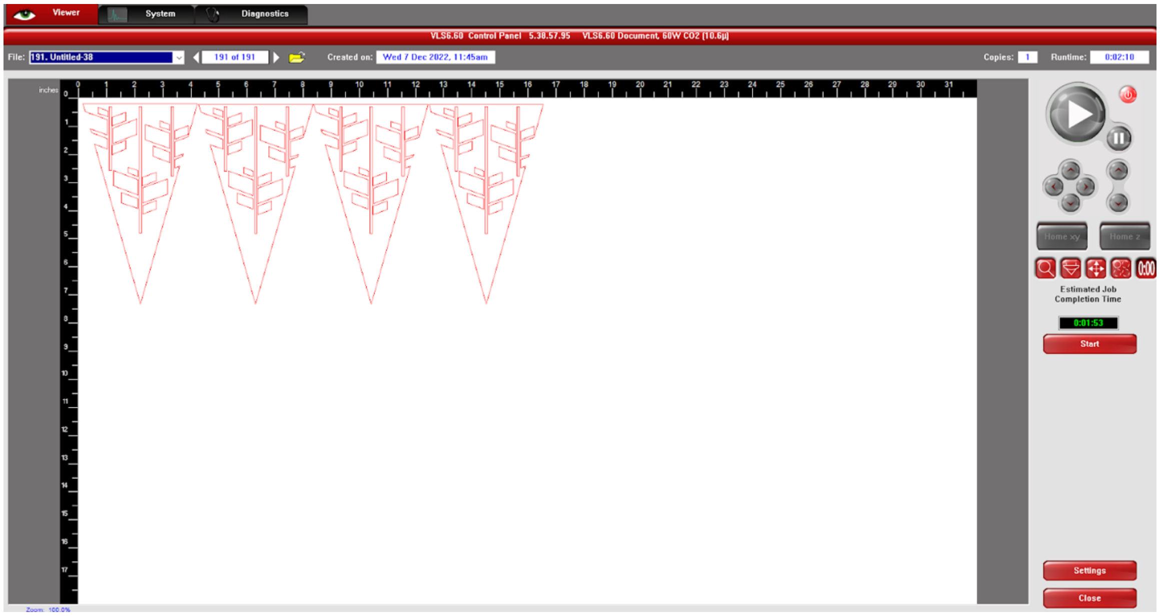
1. In the bottom right corner of your screen, click the little up arrow to bring up the hidden icons. Select the little red box with the white diamond to bring up the laser cutter.



↑ Click this arrow

Then click the red box.

Now you have a screen that looks like this: Your illustrator design should open in this software. If not successful – recheck all stroke weight and color and print settings and try again.

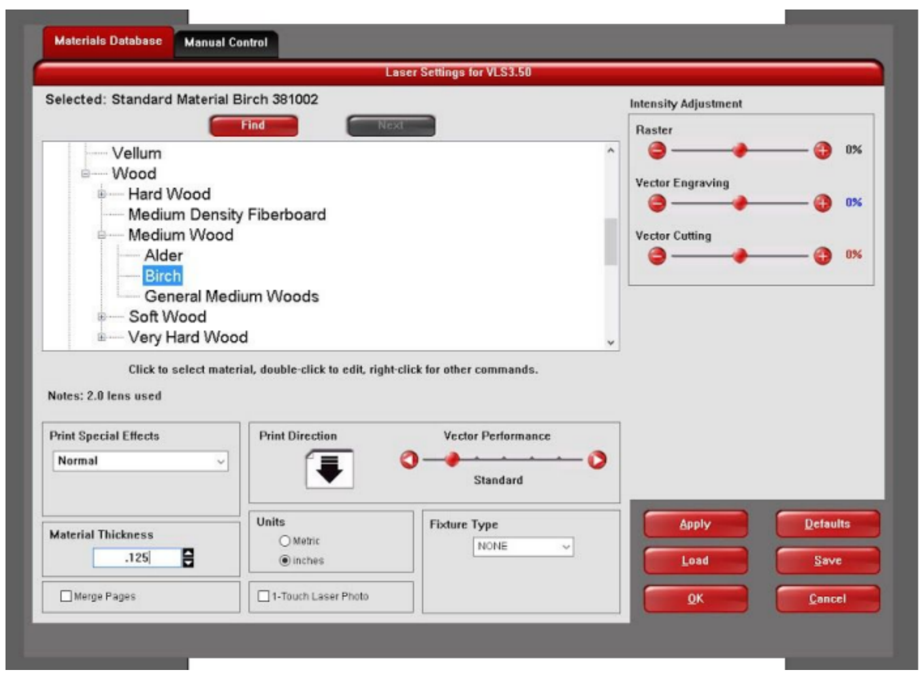


On the bottom right, click the red "Settings" button. Then choose the "Materials Database" tab.

In here, you will select your material. For this class, it is under Natural / Wood / Medium Wood / Birch.

*if you want to experiment with Cast Acrylic, talk to me to adjust setting appropriately.

Here, where it says, "Material Thickness", you will use calipers to measure your material and enter the thickness. (For us, it is approx .19) YOU MUST USE THE CALIPERS.



Then, click "Apply" and then "Okay".

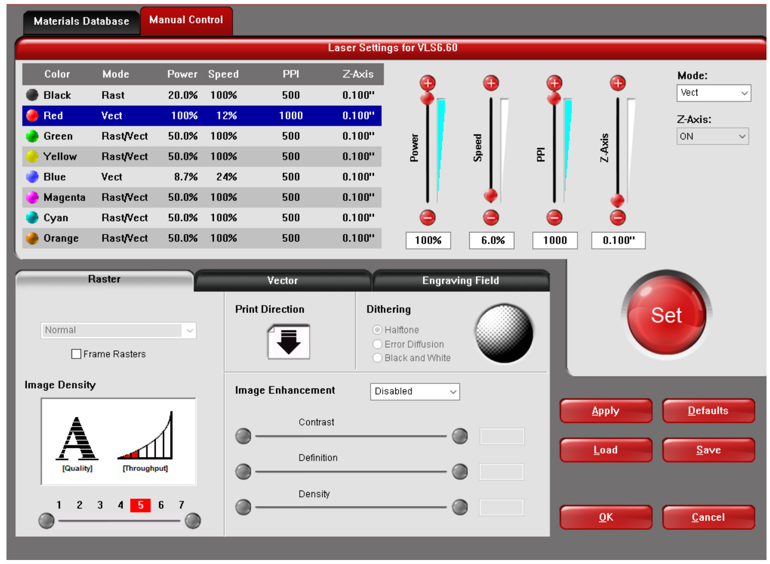
Then, go back to the Settings menu. This time, click the "Manual Control" tab.

Here, you will click to highlight the "red" row. Then, change the settings to:

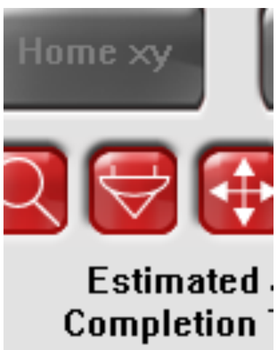
Power: 100%
Speed: 8%
PPI: 300

Then click "Set" then click "Apply" and then click "OK"

Now you need to turn on the machine, using the power button in the top right corner.
If you find that your piece isn't cutting well, stop you cut and return to this step – check the laser logbook and find a material and thickness similar to yours that someone else logged and see if their settings work for you



Then you need to ZERO THE Z AXIS. Click the icon that looks like this:



This will allow you to move the laser carriage. Use the mouse to click somewhere on top of your design on the screen. You will see a little blue crosshairs symbol. Place it on top of your design and click to move the laser to that position.

You can also select the "Estimated Time Completion" button to see how long your cut will take. Unsolicited Advice: It should NOT take over an hour if your design, cut and settings match the project requirements. If it is, welp, check again or ask me for help.

Get Ready To Attach the Laser Beams to the Heads of The Sharks!!!

Open up the laser lid and take out the z-axis measuring tool. Place the flat black plastic end down on top of your material. The little groove in the white shaft should rest just underneath the right corner of the laser carrier. If it's too high or too low, use the up and down arrows on the front of the machine to raise or lower the print bed until it fits perfectly.
NOW TURN ON THE AIR FILTER! Press the red button on top of the BOFA air filter, to the left of the laser. THIS IS EXTREMELY IMPORTANT!!!

Finally, push the green play button on the laser cutter software to run your print.

When your print is finished, don't open the door for at least 30 seconds. It'll be real smelly and smoky – let the air filter clear it out for a minute before you poison yourself. (poison is bit dramatic – but you get the point).
Be sure to log your print settings on the Laser cutter log! If you have time in the space NOW– jigsaw your design together to make sure everything matches up and LATER - sand, wood fill, paint, glue and install light.