Appendix 1: Invention Studio Checklist V1.0

Georgia Tech Invention Studio
ULI Basic Skills Test
Version 1.0 (April 2014)

Name: _____
Date:_____
GT Email: _____

Before you start the test:
1. Read this wiki article: http://inventionstudio.gatech.edu/wiki/ULI_Recruitment_and_Training
2. Find a ULI to check you off.
3. Perform the test tasks!

Hints:
-You can take each test separately.
-If you fail a section you will have to wait 24 hours to retake it.

3D Printer Test *Required: Standard .stl file.*	ULI Name: _____ ULI Signature: _____

1. Obtain the standard .STL file from the ULI training wiki article.
2. Use the slicing software that corresponds to the printer you want to use to slice the file and put it on an SD card. Use a raft and support material.
3. Print out the part.

Wood Room Test *Required: 2x4 board scrap.*	ULI Name: _____ ULI Signature: _____

1. Go into the wood shop.
2. Take a 2x4 board or another similar piece of scrap board and use the miter saw to cut off a 6” section.
3. Use the band saw to cut it in half.
4. Drill two holes in each piece. Use the drill press for one piece. Use the hand drill for the other.

Name: _____
Date:_____
GT Email: _____

Waterjet Test *Required: Standard .dxf file.*	ULI Name: _____ ULI Signature: _____

1. Take the standard .DXF file from the wiki.
2. Import it into OMAX Layout.
3. Prepare the file for cutting. Use tabs and nesting to make two copies of the default part.
4. Export to OMAX Make. Set proper material settings.
5. Cut out the part.

Laser Cutter Test *Required: Standard .dxf file.*	ULI Name: _____ ULI Signature: _____

1. Use the standard .DXF file from the wiki.
2. Open the file using Inkscape, EngraveLab, or AutoCAD.
3. Edit the file for laser cutting.
4. Send the file to JobControl.
4. Cut out the part using proper settings for the material you're using.

Appendix 2: First Aid Kit Usage from Nov 1, 2015 - Oct 31st, 2016

Room	# Minor Injuries
Waterjet/Laser Cutters	29
Woodroom	29
Electonics and Metal	36
3D printers	45

Waterjet Room	
Date	**Item**
11/11/2015	Gauze
11/12/2015	Bandage
11/19/2015	Bandage
1/16/2016	Bandage
2/18/2016	Bandage
3/4/2016	Bandage
3/9/2016	Bandage
3/12/2016	Bandage
3/14/2016	Bandage
3/15/2016	Bandage/Antiseptic wipe
3/20/2016	Bandage
3/23/2016	Bandage
3/25/2016	Bandage
3/31/2016	Bandage
4/7/2016	Bandage
4/7/2016	Bandage/Antiseptic wipe
4/7/2016	Bandage
4/12/2016	Bandage/Antiseptic wipe
4/17/2016	Bandage
4/21/2016	Bandage
4/21/2016	Bandage
4/21/2016	Bandage
4/23/2016	Bandage
5/6/2016	Bandage
6/9/2016	Bandage
7/26/2016	Bandage
7/27/2016	Bandage/Antiseptic wipe
9/16/2016	Bandage/Antiseptic wipe
9/22/2016	Bandage

Woodroom	
Date	**Item**
11/4/2015	Bandage
11/7/2015	Bandage
11/9/2015	Bandage
11/17/2015	Bandage
2/4/2016	Bandage
2/12/2016	Bandage/Antiseptic wipe
2/16/2016	Bandage/Antiseptic wipe
2/16/2016	Bandage
3/18/2016	Bandage
3/26/2016	Bandage/Antiseptic wipe
3/26/2016	Bandage/Gauze
3/28/2016	Bandage/Antiseptic wipe
3/30/2016	Bandage
3/30/2016	Bandage/Antiseptic wipe
3/31/2016	Bandage/Antiseptic wipe
4/2/2016	Bandage/Antiseptic wipe
4/3/2016	Antiseptic wipe
4/21/2016	Bandage
4/27/2016	Antiseptic wipe
6/9/2016	Bandage
8/31/2016	Bandage
9/25/2016	Bandage
9/28/2016	Bandage
10/19/2016	Bandage
10/19/2016	Bandage
10/20/2016	Bandage
10/24/2016	Bandage
10/25/2016	Bandage
10/28/2016	Bandage/Tape

Electrolounge/Metal Room	
Date	**Item**
11/1/2015	Bandage
11/1/2015	Bandage
11/3/2015	Bandage/Antiseptic wipe
11/12/2015	Bandage
11/17/2015	Bandage
11/17/2015	Bandage/Antiseptic wipe
11/23/2015	Bandage
11/23/2015	Antiseptic wipe
11/27/2015	Bandage/Antiseptic wipe
12/5/2015	Bandage
1/20/2016	Bandage
1/28/2016	Bandage/Antiseptic wipe
2/10/2016	Bandage
2/11/2016	Bandage
2/15/2016	Bandage/Antiseptic wipe
2/25/2016	Bandage
3/1/2016	Bandage
3/8/2016	Bandage/Gauze
3/19/2016	Bandage/Antiseptic wipe
3/29/2016	Bandage
4/7/2016	Bandage
4/10/2016	Bandage
4/13/2016	Bandage
4/21/2016	Bandage
4/22/2016	Bandage
4/23/2016	Bandage
8/31/2016	Bandage
9/7/2016	Bandage
9/8/2016	Bandage
9/9/2016	Bandage/Antiseptic wipe
9/9/2016	Bandage/Antiseptic wipe
9/20/2016	Bandage
9/23/2016	Bandage
10/4/2016	Bandage/Antiseptic wipe
10/6/2016	Bandage
10/10/2016	Bandage

3D Print Room	
Date	**Item**
11/7/2015	Bandage
11/24/2015	Bandage/Antiseptic wipe
1/29/2016	Bandage
1/29/2016	Bandage
1/29/2016	Bandage
2/8/2016	Bandage
2/17/2016	Bandage
2/18/2016	Bandage
2/25/2016	Bandage
2/26/2016	Bandage/Gauze
2/26/2016	Bandage/Antiseptic wipe
2/29/2016	Bandage
3/5/2016	Bandage
3/7/2016	Bandage
3/9/2016	Bandage
3/12/2016	Bandage
3/17/2016	Bandage
3/20/2016	Gauze/Antiseptic wipe
3/29/2016	Bandage
3/30/2016	Bandage
4/6/2016	Bandage
4/16/2016	Gauze/Tape
4/18/2016	Bandage
4/18/2016	Bandage
4/30/2016	Bandage
5/1/2016	Bandage
6/13/2016	Bandage
8/4/2016	Bandage
8/31/2016	Gauze/Antiseptic wipe
9/13/2016	Bandage
9/16/2016	Bandage
9/20/2016	Bandage
9/20/2016	Bandage
9/21/2016	Bandage
9/29/2016	Bandage
9/30/2016	Bandage
10/17/2016	Bandage
10/19/2016	Bandage
10/26/2016	Bandage
10/26/2016	Bandage
11/19/2016	Bandage
11/25/2016	Bandage
11/28/2016	Bandage
11/28/2016	Bandage/Antiseptic wipe
11/29/2016	Bandage

Appendix 3: September 2019 Checklist

Georgia Tech Invention Studio
ISPI Basic Skills Checklist
Version 4.5 (September 2019)

Name:_____
GT Email:_____
GTID #:_____
SCC Team :_____
(If Applicable)

Disclaimer: The completion of this checklist does not guarantee that you will be hired as an Invention Studio Prototyping Instructor.

Please note: If you are accepted as an ISPI or SCC team access holder, your information may be disclosed to other parties for the purpose of requesting access.

So you are interested in becoming a new Prototyping Instructor? Great! Complete this checklist and you might just become one! Here at the Invention Studio, we are looking for candidates that are eager to help others and share what the space has to offer. Candidates must be willing to volunteer three hours a week to help guide as well as make sure users are using safe practices.

Before you start the test:

1. Read this webpage: https://inventionstudio.gatech.edu/become-a-pi/
2. Ask an ISPI to train you on the equipment.
    a. Experiment! Make things! Woo!
3. Perform the test tasks!

Testing

- Observe all necessary safety precautions.
- We will supply all testing material and files.
- You can complete each section individually, but some sections must be completed in sequence.
- You have to wait 24 hours after getting trained or retrained to attempt that section.
- If you fail a section don't worry! The PI will provide retraining. Return after 24 hrs to reattempt the section.
- You **MUST** take your parts home after you get signed off. Keep them forever or give them to your roommate, they'll love them.

Clean up after yourself. **DO NOT LEAVE A MESS.**

Name:_____

Wood

Note: This test will collaborate with other rooms to make a trophy. See sample piece for clarification.

1. From drawer D3 retrieve a 13" long 2x4 and a 14" x 14" sheet of plywood. Note, these are rough dimensions and subject to error.
2. Using the jointer, joint two sides of the 2x4 so that you end up with two sides flat and perpendicular to each other. i.e. you will joint one narrow side and one wider side of the 2x4.
3. Using the planer, plane down the wider side of the 2x4, opposite of the side you jointed, to 1 ¼" thickness. Keep in mind there is more than one wrong orientation to send the board through the planer. The result of this step is to have the two wider sides parallel to each other, and a finalized thickness.
4. Using the table saw, perform a rip cut so that you end up with 3" wide board. You should now have a squared and dimensioned board of 1 ¼" x 3" x 13"
5. Use the miter saw, cut an 8" long piece from your board.
6. Using the table saw again, cut a 10" x 7" piece of plywood from your 14"x14" sheet stock.
7. Use the bandsaw to cut a 3 ¼" x 5" plate from an offcut of the previous step.
8. Use the drill press and a 3/32" drill bit to drill two holes in the 3 ¼" x 5" plate at coordinates (1 ¾",1 ⅝") and (3 ¼",1 ⅝").
9. Use the mounted sanders to round the corners of the plywood plate.
10. Use the orbital sander, working your way up to 320 grit, to smooth your 8" board.
11. Use the air hose to clean off dust from parts.
12. Vacuum and clean the area you worked in.
13. Show a PI the following parts to be signed off.
    a. 10"x 7" plywood sheet
    b. 3 ¼ "x 5" plate with holes and sanded
    c. 1 ¼ " x 3" x 8" planed and sanded board
    d. A clean workspace

Name:_____

Laser

Note: Before you start the Laser Test you MUST complete the Wood Room Test.

Part 1:

1. Show the PI on duty how to turn on and off the laser and how to focus the lens.
2. Using Inkscape, import the file IS_laserchecklist_GT.png which is located on the desktop.
3. Trace the image and remove everything except a single GT (hint, the node tool is your friend).
4. Resize the GT so that the overall dimensions are 9” x 5.75”.
5. Move the GT so the bottom left corner is at the origin.
6. Remove the fill and set a red stroke for the GT.
7. Place 0.15” diameter circles at (5”,1.5”) and (5”,3”) to be cut out.
8. Using the 10"x7" plywood from the Woodroom section, cut out the GT and holes.

Part 2:

1. Import the 3”x2” rectangular guide, “Guide.dxf.” Show the PI on duty the correect manual scale factor, and remove all the Solidworks text.
2. Inside put your name, Major, Class of 20xx.
3. Engrave the text AND guide halfway up the 2x4 from the wood section (hint: convert the guide to a path).
    a. Make sure you leave enough room so the GT mounted won’t cover your name.
4. Show a PI the following parts to be signed off.
    a. GT cutout
    b. Engraved 2x4

Paint Booth

Note: Before you start the Paint Booth checklist assemble the parts from the Laser and Wood Room tests.

In Wood Room:

1. Countersink the holes in the GT and base plate.
2. Use hand tools to attach the GT to 2x4 using #6 x1” wood screws.
    a. The top left corner of the T should be flush with the top left corner of the 2x4.
3. Use hand tools to attach the base plate to the 2x4.

a. There should be a 1” border around the 2x4.

In Paint Booth:

1. Demonstrate how to properly turn on and off the vents and lights.
2. Demonstrate how to properly put on a respirator.
3. Apply a clear coat to your part.
4. Let it dry.
5. Show a PI completed part to be signed off.

Electronics

1. Find and set aside an LED, 1K ohm resistor, two spools of wire, a spool of solder, and a protoboard.
2. Turn the soldering iron on and wait for it to reach its optimal temperature.
3. Tin the iron using a dab of solder and either a wet sponge or the steel wool.
4. Strip a small amount of wire from the two spools and solder it to the protoboard.
    a. Strip one piece of wire on both sides so one exposed end goes into the board and the other can be clipped to by an alligator clip.
    b. Repeat process with the different piece of wire, leaving space between the wires.
    c. Mark one as positive and the other as negative.
5. Place the resistor on the board and solder the resistor.
    a. Make sure to place the resistor close enough to the wires soldered in step 4.
    b. Make a solder joint between the one of the wires soldered in step 4 and each of the resistor leads.
6. Paying attention to polarity, solder the LED to the board.
    a. Create a solder joint between the resistor and the positive end of the LED (negative end will have a shorter lead or flat side).
7. Solder the negative wire from step 4 to the remaining lead of the LED.
8. Tin and turn off the iron.
9. Wash your hands!
10. Connect the circuit to a 3.0V power supply on the bench and demonstrate the lit LED to a PI.
11. Desolder all parts from your board and clean up. Return the protoboard, the rest can be discarded.

12. Show the cleared protoboard to a PI to be signed off

Waterjet

1. Demonstrate waterjet startup and shutdown procedure.
2. Demonstrate how to home the machine and clear pump faults.
3. Demonstrate usage of ballast tank and explain how to rectify situation when water level cannot be lowered sufficiently.
4. Open the IS_waterjetchecklist.dxf on the waterjet computer, the DXF file should be in inches.
5. Prepare the file for cutting. Use tabs for both parts. Make sure the parts are positioned to minimize waste area.
6. Export to OMAX Make and set proper material settings.
7. Secure the material in the waterjet using an appropriate method for the sheet you are cutting.

Note: The material you are cutting is fairly thin, so be careful on how you clamp it so it doesn't bow or shift during cutting. If this happens, your cut was not successful.

8. Set path start and zero the z-axis appropriately. The z-axis zero point should be the highest spot on the cut area. Make sure that your cut doesn't go off the edge or collide with any weights or clamps. Also, reduce the amount of material wasted by locating your piece near previous cuts.
9. Cut out the part. When finished, record your information and the pump hours in the log.
10. Keep both parts. They will be used to complete the metal room checklist.
11. Show the finished parts to a PI to get checked off.

Metal

Note: You MUST complete the waterjet test and keep parts before you can begin Metal Test

1. Use shears to remove the extra flange on one side of the large plate. After you do this, all four sides will be the same height.
2. Remove tabs and deburr the edges using a belt sander.
3. Place the smaller GT plate on the center of the larger plate. Use a center punch to mark the locations of the two holes in the GT plate on the larger plate.
4. Use the drill press and an appropriately-sized drill bit to create holes for a ⅛” diameter rivet (provided). Drill these holes where you marked them.

5. Countersink the holes.
6. Using the sheet metal brake, bend the large plate into a box. Make sure you bend the box so that the countersinks are on the outside of the box.
7. Use two rivets to fasten the GT plate to the inside of the box. Use the countersunk ⅛” rivets that are provided. If there are none available, regular ⅛” rivets are acceptable.
8. Show the finished box to a PI to be checked off.
9. Have a PI compare your copy to the example copies.

3D Printing

1. Show a PI the location of the advanced printers and briefly describe their advantages and disadvantages over the fleet printers (Formlabs Form 2 / Fusion 3 / Markforged).
2. Describe how a user can have a part printed on the professional printers.
3. Demonstrate changing filament on an Ultimaker 2+ or an Ultimaker 3.
4. Do a manual bed level on an Ultimaker 2+.
5. Do an automatic bed level on an Ultimaker 3.
6. Describe what file type is required
7. Open the provided testing files and explain to the PI on duty which parts require support.
8. Open and orient Ditto STL file.
9. Scale the Ditto to 25%.
10. Explain the significance of the infill setting and state the range of recommended settings. Adjust the Ditto’s infill to 0%.
11. Explain the significance of wall thickness.
12. Demonstrate how to upload the prepared g-code file to 3D Printer OS.
13. Explain why and when to put glue onto glass plate.
14. Demonstrate how to start and abort a print and explain when it is necessary to abort.
15. Print the prepared part and demonstrate how to properly remove a part.
16. Show the printed Ditto to a PI for check-off.

Craftland

Note: This test is independent from all other tests. Do at your own leisure.

Name:_____

Vinyl Cutter

1. From the Drawer HC9, retrieve two colors of vinyl and the vinyl cutter mat.
2. Using Silhouette Studio, import the file IS_CraftlandChecklist.png which is located on the desktop.
3. Trace the image by using the “Area Trace” function to create a vector file.
4. Separate the paths and recombine them into two distinct layers that include (1) the outline of the overall shape and (2) everything else.
5. Delete the image.
6. Resize the grouped paths to have a width of 5”.
7. Show a PI your prepared file.
8. Cut out both colors of the design.
9. Use transfer tape to layer the top path over the bottom path.
10. Show a PI your sticker.

Sewing

1. Locate a fat quarter of solid-colored fabric, a fat quarter of patterned fabric, and the box of Poly-fill.
2. Iron the fat quarters to remove any wrinkles in the fabric.
3. Using Tailor’s Chalk and a ruler, mark off a 6”x6” (15.25 cm x15.25 cm) square of each of your two fabrics.
4. Use the pinking shears to cut the two 6”x6” (15.25 cm x15.25 cm) squares out.
5. Pin the squares together with the “right sides” of the fabric facing each other.
6. Mark a ¼” (.6 cm) seam allowance around the edges of the fabric.
7. Demonstrate the proper way to thread the sewing machine to a PI.
8. Demonstrate the proper way to wind a bobbin to a PI. (If there are no empty bobbins available, explain the process.)
9. Use a straight stitch to hem the pillow along the seam allowance, leaving about a 2” gap at the end. (Remember to start and stop with a reverse/locking stitch. You must pivot at the corners.)
10. Trim the corners using fabric scissors.
11. Flip the pillow inside out through the gap.

12. Stuff the pillow with Poly-fill.
13. Use a ladder stitch to close the 2” gap.
14. Show the pillow to a PI.

SAFETY

1. Point out to a PI where the fire extinguisher, first aid kit, and emergency exit is in the Hub and the Metal Shop.
2. Describe to a PI where the fire extinguisher and the first aid kit is in the Wood Room.
3. Explain the importance and use of Risk Level Signs for tools in terms of safety.

Name:_____

GT Email:_____
GTID #:_____
SCC Team (If Applicable):_____

Section		ISPI Initials	Date	Notes
Wood	Trained			
	Retrained			
	Completed			
Laser	Trained			
	Retrained			
	Completed			
Paint Booth	Trained			
	Retrained			
	Completed			
Soldering	Trained			
	Retrained			
	Completed			
Waterjet	Trained			
	Retrained			
	Completed			
Metal	Trained			
	Retrained			
	Completed			
3D Printing	Trained			
	Retrained			
	Completed			
Craftland	Trained			
	Retrained			
	Completed			

Name:_____

Safety	Trained			
	Retrained			
	Completed			

Appendix 4: 3D Printer Apprentice Checklist

3D Printer Apprentice Checklist (as of 08/20/2016)
You must complete all mandatory requirements for each printer

Apprentice Name:_____

Masterpiece requirement

Each apprentice must complete a “masterpiece” to be fully considered for a master's position. The “masterpiece” must be of sufficient complexity as to showcase the benefits of 3D printing technology. For any composition to be seriously considered an adequate “masterpiece” the work is required to exemplify, at bare minimum, a singular advanced additive manufacturing characteristic from the subsequent index:

1. Made of more than one material
2. Kinetic or interactive
3. Obvious focus on practicality, usability, or personalization
4. Integrated electro-mechanical design
5. A downright stupendous work of art that makes our jaws drop due to the impossibility of how it actually printed

Mandatory checklists

UP! Mini/ Afinia Printer

- ❏ Unload and reload filament
- ❏ Full understanding of print settings & print procedure
- ❏ Calibrate the build platform
- ❏ Diagnose common print errors
    - ❏ “Clacking” print head
    - ❏ Not extruding filament
    - ❏ Jittering axis
    - ❏ Printer emits long, unending beep
    - ❏ Filament looks “squished” on the build platform
    - ❏ Filament peeling from platform
    - ❏ Filament printing in “thin-air”
- ❏ Disassemble printer head
- ❏ De-clog nozzle
- ❏ Clean gearhead

UP! Box Printer

- ❏ List major differences between UP! Box and UP! Mini

Makerbot Replicator Z18 Printer

- ❏ Unload and reload filament
- ❏ Full understanding of print settings & print procedure
- ❏ Calibrate the build platform
- ❏ Diagnose common print errors
    - ❏ Smart extruder errors
    - ❏ Not extruding filament
    - ❏ Filament peeling from platform
- ❏ Disassemble printer head
- ❏ De-clog nozzle
- ❏ Know rules for printing large parts

Hyrel Printer

- ❏ Unload and reload filament
- ❏ Swap printheads
- ❏ Level print bed
- ❏ Calibrate Z Height
- ❏ Create your own slic3r settings for ninjaflex
- ❏ Prepare bed for printing
- ❏ Diagnose common print errors and live repair if applicable
    - ❏ Not Extruding
    - ❏ Over Extrusion
    - ❏ Peeling from the layer or the bed
    - ❏ Starts building off the plate
    - ❏ Extruding in air

Formlab 1+ Printer

- ❏ Prepare Formlab for printing
- ❏ Print something to exclusive to SLA
    - ❏ Full understanding of optimal part positioning and support structures
- ❏ Post Print Clean-Up

Faro Arm Scanner

- ❏ Startup the Faro arm
    - ❏ Attach Laser Probe to the arm
    - ❏ Connect required cords
    - ❏ Startup the correct software
    - ❏ Ready the program to take a scan
- ❏ Calibrate the faro arm
    - ❏ Calibrate the touch probe
    - ❏ Calibrate the laser probe
- ❏ Demonstrate knowledge of the settings
    - ❏ What is scan rate
    - ❏ What is scan density
    - ❏ What are the proper setting to not fill holes
- ❏ Scan a “complex” object
    - ❏ Scan requires at least two separate scans to get all of the sides of the object
- ❏ Cleanup the file
    - ❏ Combine your multiple scans to create on part
    - ❏ Fill all the holes in the part so that it is a printable file
- ❏ Export your file in an appropriate format
- ❏ Shutdown the Faro arm
    - ❏ Properly pack up components
    - ❏ Turn off everything that needs to be turned off

MCOR Iris Printer

- ❏ Know how to load an .stl file
    - ❏ Know orientation tricks for optimal color reproduction vs model durability
- ❏ Full understanding of print settings & print procedure
    - ❏ Knife/Cutter calibration
    - ❏ Glue Wheel checks & cleaning
    - ❏ How to properly attach the base paper layer to the print bed
- ❏ Diagnose common print errors
    - ❏ Error 28
    - ❏ Error 29
    - ❏ Inkjet problems
    - ❏ How to get Mcor Support to respond promptly (Jeff trick)
- ❏ Know how to reload paper
- ❏ Know how to refill glue
- ❏ Know when the glue line is clogged
- ❏ Know how to purge the glue system

BIBO Printer

- ❏ Explain CURA software options/navigation
    - ❏ How you do move the head/platform using CURA?
    - ❏ How do you save material settings in CURA?
- ❏ How do you move the head/platform using the touch screen?
- ❏ How would you fix a melty goopy mess on top of a print?
- ❏ Unload/reload 2 different types of filament
- ❏ 3D print a vase (single layer wall thickness, spiral formation)
    - ❏ Prepare the platform for proper adhesion

3D Printer Basic Knowledge

- ❏ What are the 6 types of 3D printing techniques?
- ❏ When should stereolithography be used?
- ❏ What are limiting factors for 3D printing?
- ❏ What is the difference between ABS and PLA plastics?
- ❏ When should you direct someone to use the professional 3D printers? (i.e. Stratasys, Objet Eden etc.)
- ❏ What is bridging?

Optional Checklist

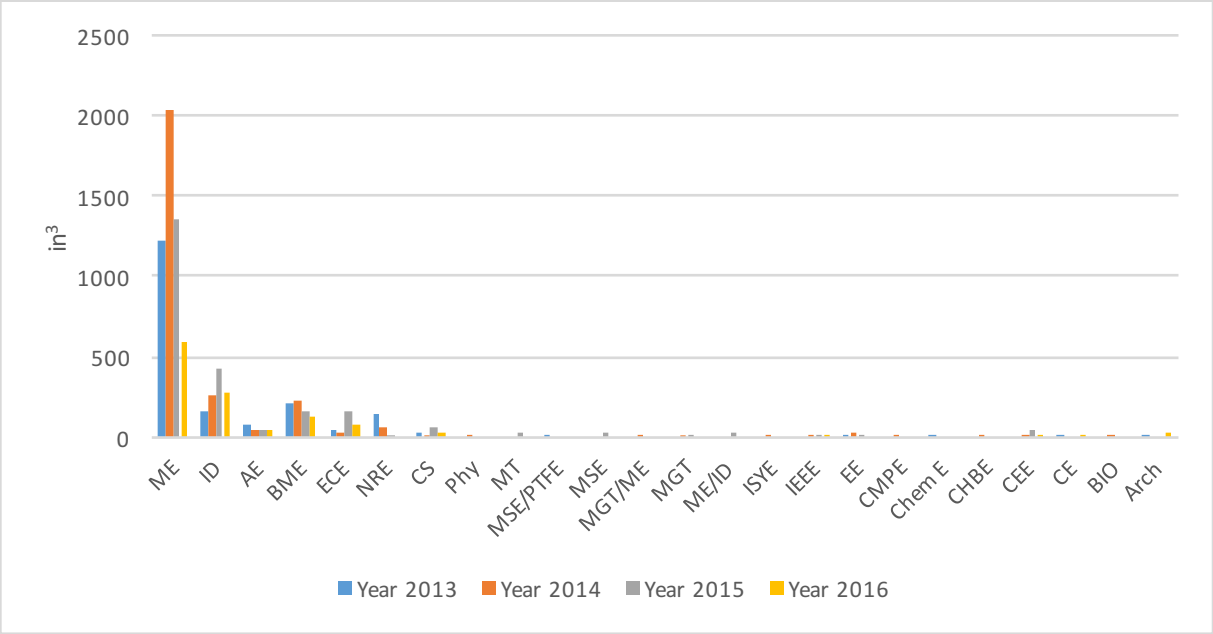
David scanner/ Next engine scanner

- ❏ Using the wiki/guide, scan an object
- ❏ Optional: Print your model in color on the MCOR

Appendix 5: Professional 3D printer material usage

Professional 3D Printers material usage in cubic inches by majors (as of 06/30/2016)

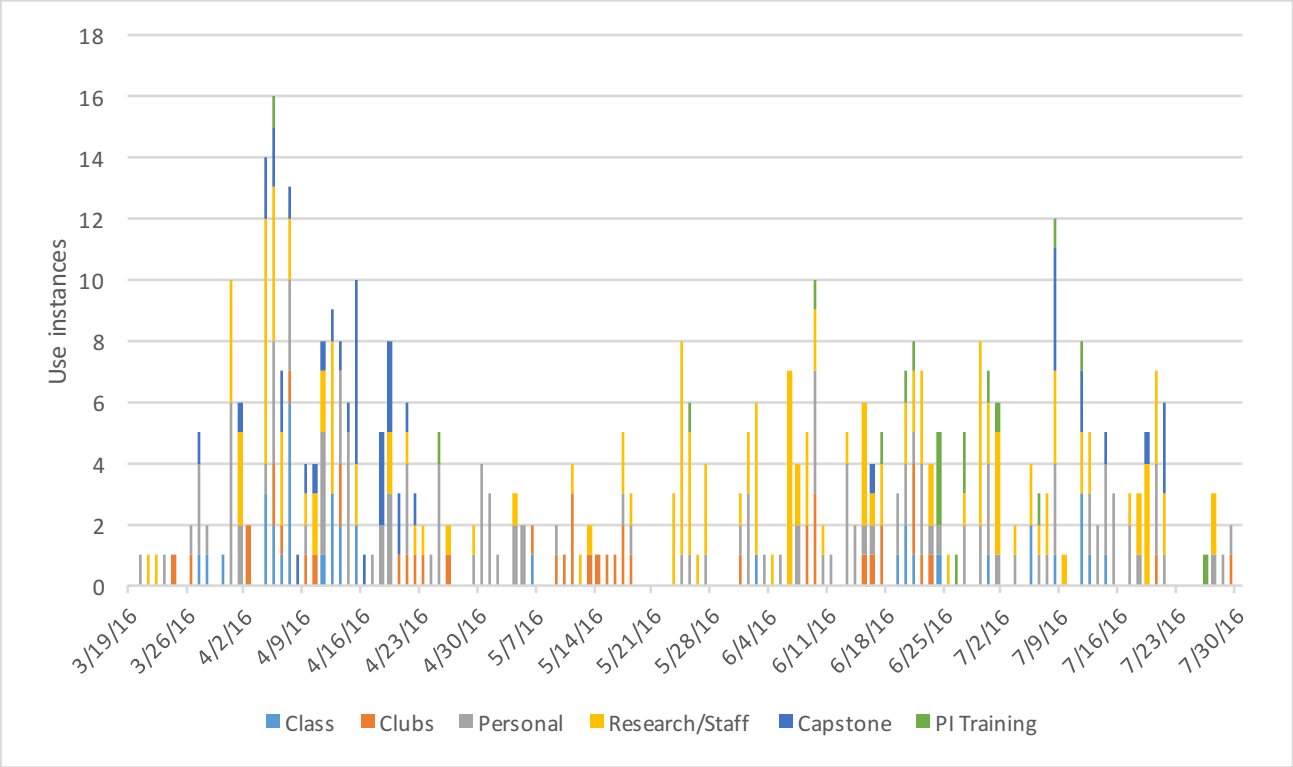
Majors	Year 2013	Year 2014	Year 2015	Year 2016	Total	%
ME	1229.55	2033.25	1358	601.3	5222.1	63.2153506
ID	158.33	260.83	429.9	277.4	1126.46	13.6361931
AE	81.19	52.13	53.66	46.9	233.88	2.83119936
BME	208.78	225.03	157.5	121.53	712.84	8.62917801
ECE	49.13	30.31	164.98	86.32	330.74	4.00372361
NRE	148.16	57.69	20.57		226.42	2.74089345
CS	25.17	18.66	57.59	25.23	126.65	1.53314263
Phy		1.91			1.91	0.02312122
MT			33.66		33.66	0.4074661
MSE/PTFE	0.56				0.56	0.006779
MSE			26.87		26.87	0.32527077
MGT/ME		4.28			4.28	0.0518109
MGT		19.42	14.91		34.33	0.41557668
ME/ID			38.14		38.14	0.46169807
ISYE		1.6			1.6	0.01936856
IEEE		0.18	2.05	0.53	2.76	0.03341077
EE	4.25	33.17	4.31		41.73	0.50515627
CMPE		0.57			0.57	0.00690005
Chem E	1.47				1.47	0.01779487
CHBE		3.05			3.05	0.03692132
CEE		3.02	42.48	0.62	46.12	0.55829876
CE	0.84			3.23	4.07	0.04926878
BIO		0.89			0.89	0.01077376
Arch	10.36			29.35	39.71	0.48070347
Grand Total	1917.79	2745.99	2404.62	1192.41	8260.81	100



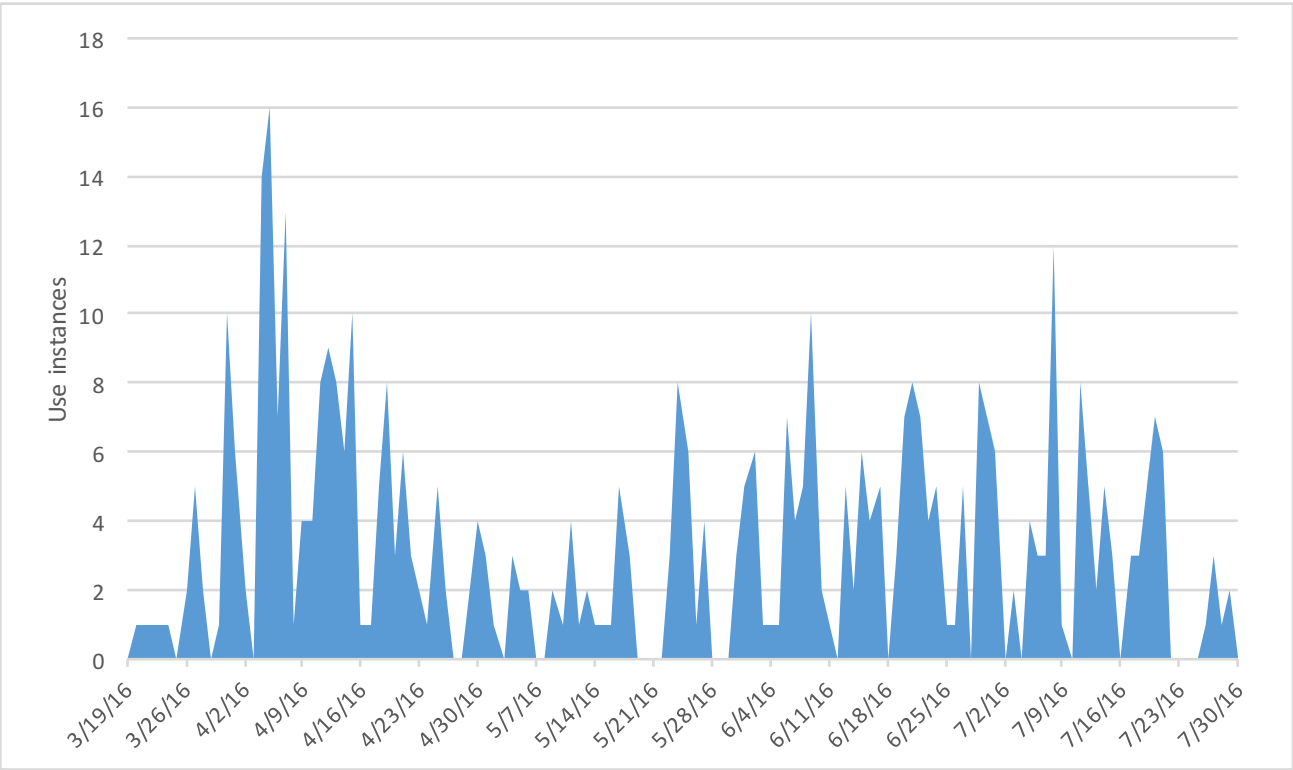
Appendix 6: Waterjet Daily Usage

Daily Waterjet Usage by Category

Category	Class	Clubs	Personal	Research/Staff	Capstone	PI Training
Total Hours	39	47	135	154	45	19



Total Use Instances by Day



Provisional Training Guide

Version 2.0 (September 2018)

Check off anything that you feel you have adequate knowledge of as you undertake a Provisional Period. Ask for help from the PI on duty. If they do not know how to help you ask the respective room's Master. When you feel comfortable with everything on this list, schedule a meeting with the DIrector of Operations to discuss becoming a full PI.

Name: _____ **Date:** _____

3D Print

General

- ❑ Form 2 resin printing
- ❑ Fusion 3
- ❑ Markforged
- ❑ What to print and what not to print

Common Troubleshooting

- ❑ Part not sticking to bed

Electronic

General

- ❑ Breadboards
- ❑ Oscilloscope
- ❑ PCB Mill (also KiCad or EAGLE)
- ❑ Arduino projects

Laser

General

- ❑ Rotary tool
- ❑ Cermark
- ❑ DXF cleanup

Common Troubleshooting

- ❏ Importing
  - ❏ DXF
  - ❏ PDF
  - ❏ Ai

Metal

General

- ❏ Mill
- ❏ Lathe
- ❏ Changing speeds on the bandsaw
- ❏ Dremel
- ❏ Chop saws (aluminum vs. steel)
- ❏ Changing belt on belt sander
- ❏ Buffing wheel (polishing)

Waterjet

General

- ❏ Waterjet Brick (for small parts)
- ❏ Handling brittle materials (low pressure)
- ❏ Flow
- ❏ ProtoMAX

Common Troubleshooting

- ❏ Garnet clog in hose
- ❏ Clear movement faults
- ❏ Pump does not run

Wood

General

- ❏ Nail gun
- ❏ Hand tools
- ❏ Table router/manual router
- ❏ Track saw
- ❏ Wood lathe
- ❏ Using a sled for crosscuts on table saw

Paint Booth

General

- ❏ Create a basic stencil on the lasers and use it
- ❏ Strip paint off of an object without damaging the object
- ❏ Post process and paint a 3D print (using XTC-3D or primer filler or bondo)

Maintenance

- ❏ Identify when booth filters need to be changed, and change them
- ❏ Identify when mask filters need to be changed, and change them

Craftland

General

- ❏ Vinyl Cutter
- ❏ Sewing
- ❏ Embroidery

CNC

General

- ❏ Shapeoko:
  - ❏ Load .gcode file

- ❏ Set origin
- ❏ Run Machine
- ❏ Specify metric or imperial

❏ Large CNC

- ❏ Startup/shutdown
- ❏ Hold down
- ❏ Basic tool-path construction in Fusion 360
- ❏ Simulation in Fusion 360 **IMPORTANT**
- ❏ Load gcode file
- ❏ Set z and y zero
- ❏ Touch off tool in z-axis
- ❏ Know set ATC tool numbering
- ❏ Run cut