Georgia Tech Invention Studio
ISPI Basic Skills Checklist
Version 3.2.1 (January 2017)

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

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.

Before you start the test:

1. Read this wiki article: http://inventionstudiowiki.gatech.edu/wiki/Recruitment_and_Training
2. Find an ISPI to check you off.
3. Perform the test tasks!

Hints:

- You can take each test separately.
- You have to wait 24 hours after getting trained to get checked off.
- If you fail a section you will have to wait 24 hours to retake it.
- You can keep your parts after you get signed off.

Wood Room Test *Required:* *Plywood Sheet* *2"x 4" Stock*	ISPI Name _____ ISPI Signature _____	Date:

Trained by:

ISPI Name: _____ Date Trained: _____

Signature: _____

Re-training recommended by: (24 hour rule applies)

ISPI Name: _____ Date and Time: _____

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Refer to the examples provided for how the completed product should look. Using only the tools in the wood room, complete the following tasks:

1. Cut out a 3” by 5” plywood rectangle on the Bandsaw. This is to be used for the base.
2. Cut a 7” piece of 2x4 stock using the Miter Saw.
    a. Use the template to draw GT logo on remaining piece of plywood. Then cut out the logo using the scroll saw.
    b. Using the Spindle Sander, smooth the inside curves of the GT.
3. Use the disc sander to round edges on the plywood base.
4. Use drill press to drill holes two holes in the plywood base. (These holes will be use in the next step to attach the plywood base to the 2x4 piece, so choose the location of the holes carefully.)
    a. Select an appropriate drill bit for the wood screws.
5. Use the hand drill to attach the plywood base to the 2x4 using two wood screws
    a. CLAMP!
    b. Create two pilot drill holes in the 2’’ by 4’’ to prevent wood from splitting.
6. Use whatever tools necessary to attach the GT logo to the 2x4 using two wood screws.
    a. CLAMP!
    b. Create pilot drill holes to prevent wood from splitting.
7. Clean up after yourself.
8. Have a PI compare your copy to the example copies.

Laser Test *Required:* *Plywood Sheet (in a box over banana)* *IS Logo in Vector Format*	ISPI Name _____ ISPI Signature _____	Date:

Trained by:

ISPI Name: _____ Date Trained: _____

Signature: _____

Re-training recommended by: (24 hour rule applies)

Name:_____
Date:_____
GT Email:_____
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ISPI Name: _____ Date and Time: _____

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The goal is to engrave the IS logo using two different depths and cut out the design.

1. Demonstrate the laser shutdown and startup procedure.
2. Download and bring the IS logo from the recruitment page on a flash drive
    a. It is already in a vector format.
3. Change the Fill & Stroke of the existing lines to:
    a. Deep engrave the gear
    b. "Invention Studio" and all shapes in the center are shallow engraved
    c. "Design - Build - Play" is not engraved
    d. Add a shape of your choice to cut out the design
4. Show the finished product to a PI to be signed off

Soldering Test *Required:* *Perforated board* *LED* *1k ohm resistor* *Wire and Solder*	ISPI Name _____ ISPI Signature _____	Date:

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ISPI Name: _____ Date Trained: _____

Signature: _____

Re-training recommended by: (24 hour rule applies)

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1. Find and set aside an LED, 1K ohm resistor, a spool of wire, and a spool of solder
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 and solder it to the perforated board.
    a. Strip it on both sides so one exposed end goes into the board and the other can be clipped to by an alligator clip
    b. Mark wire either with the color of the insulation or tape as the positive end of the circuit
5. Place the resistor on the board and solder the resistor.
    a. Make sure to place the resistor close enough to the wire soldered in step 4.
    b. Make a solder joint between the wire soldered in step 4 and one 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. Create another wire like in step 4 and solder it to the negative end of the LED
8. Tin and turn off the iron
9. Wash your hands!
10. Hook up 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.

Waterjet Test *Required:* *Waterjet checklist sheet of Aluminum* *Material properties will be located on wall behind waterjet*	ISPI Name _____ ISPI Signature _____	Date:

Name:_____
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Trained by:

ISPI Name: _____ Date Trained: _____

Signature: _____

Re-training recommended by: (24 hour rule applies)

ISPI Name: _____ Date and Time: _____

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1. Demonstrate waterjet shutdown and startup procedure.
2. Take the test .DXF file from the wiki and put it on a flash drive.
3. Bring the file to the waterjet computer and import it into OMAX Layout. The .DXF file is in inches.
4. Prepare the file for cutting. Use tabs for both parts. Make sure the parts are positioned to optimize cut area.
5. Export to OMAX Make and set proper material settings. Be efficient with space on the test material.

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.

6. Secure the material in the waterjet using an appropriate method for the sheet you are cutting. Any bowing or shifting during the cut is a failure.
7. 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.

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8. Cut out the part. When finished, record your information and the pump hours in the logbook.
9. Keep both parts. They will be used to complete the metal room checklist.
10. Show the finished parts to a PI to get checked off.

Metal Shop Test *Required:* *Components from the Waterjet Test*	ISPI Name _____ ISPI Signature _____	Date:

Trained by:

ISPI Name: _____ Date Trained: _____

Signature: _____

Re-training recommended by: (24 hour rule applies)

ISPI Name: _____ Date and Time: _____

ISPI Name: _____ Date and Time: _____

ISPI Name: _____ Date and Time: _____

ISPI Name: _____ Date and Time: _____

1. Complete the waterjet test and keep both parts.
2. Use the shear to remove the extra flange on one side of the large plate. After you do this, all four sides will be the same height.
3. Remove tabs and deburr the edges using the belt sander.
4. 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. (These holes will be used to attach the GT plate to the big plate later on.)

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5. 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. (Hint: Take the rivet to the drill bit box, and use it to find the right size bit, it should be larger than the rivet.)
6. Countersink the holes.
7. 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.
8. 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.

9. Show the finished box to a PI to be checked off.

10. Have a PI compare your copy to the example copies.

3D Printing Test *Required:* *Example Files from Thingiverse*	ISPI Name _____ ISPI Signature _____	Date:

Trained by:

ISPI Name: _____ Date Trained: _____

Signature: _____

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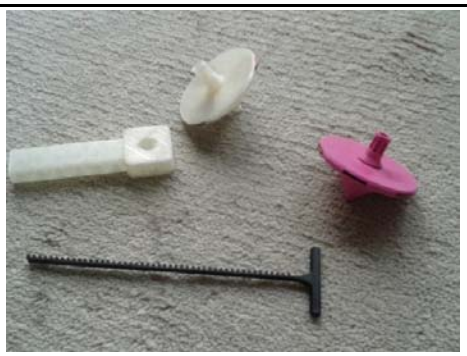
1. Unload filament from UP! Mini/Afinia.
2. Reload filament from UP! Mini/Afinia.
3. Do a full bed level for either an UP! Mini or Afinia
4. Print and assemble 1 of the 3 projects below:
5. Show a PI your functioning part

A spinning top assembly http://www.thingiverse.com/thing:1395135/#files	
A scissorarm claw grabber http://www.thingiverse.com/thing:1053701/#files	
Working microgear heart keychain http://www.thingiverse.com/thing:24675/#files