This syllabus is intended to aid instructors in providing training for this tool, and for quick reference by existing users. It is not intended to teach you the tool by itself.

1. Safety

1.1. Materials

- Can catch fire
- Can produce toxic fumes

1.2. Laser

- High-power laser can cause burns or severe eye damage
- Laser compartment must remain closed

1.3. Electricity

- Mains 240V inside control panel
- High voltages (2kV) in control panel and around laser tube

1.4. Lid

- Do not operate if the lid doesn't stay open on its own
- Users may hit their head on the lid when arranging materials

2. Startup checks

2.1. Enclosure is intact and all access panels are closed

- Check the laser enclosure and viewing windows aren't damaged
- Check all access panels are locked closed

3. Usage

3.1. Starting of the machine

- Check there are no obstacles for when the laser cutter moves to the home position
- Tap your tag on the access control
- Ensure the external extractor fan is running
- Release the E-Stop
- Power on the machine (green button/key switch)
- Ensure the internal air assist/pump is running (unless cutting paper)
- Ensure the chiller is running
  - If it is not, alarm will continue sounding for more than a second and machine should not be used.

3.2. Stopping of the machine

- Return the laser to the home position ("Datum" button)
- Power off the machine (red button/key switch)
- The E-stop should be pressed in an emergency, this will cut power to the laser
- Remember to log out if leaving the machine unattended for any period of time

3.3. Hazards

- The laser can cause burns and blindness
- The laser compartment must remain closed, and the lid-sensor must not be bypassed
- The laser cutter contains high voltages (2kV, 240V) and users must keep clearof the wiring in the laser compartment and control panel
- There is a risk of fire with **any** material and the laser cutter must not beleft unattended, even for a minute (there is pause button and an emergency stop)

3.4. General

- Know how to power-up the cutter and check that the extraction, watercooling and air assist are working
- Know which materials may be cut safely, that some plastics may producechlorine or cyanide gases, and that some materials may catch fire more easilythan others
- Know that the cutter works best with coolant temperature between 10-20C,should not usually be used above 25C, and how to check the temperature
- Basic use of the software
- Setting appropriate power/speeds for different materials
- Using the cutter's control panel to move the head/carriage
- Positioning the workpiece and setting Z (vertical) alignment
- Focusing the laser
- Using the test button before cutting

3.5. Materials

- Acceptable materials include:
  - Acrylic
  - Laser safe plywood
  - Laser safe silicone rubber
  - Laser safe vinyl
  - Paper/cardboard
  - Glass (engraving only)
  - PLA (short cuts only)
- Unacceptable materials include:
  - Metal (engraving only, preparation required)
- Consult the complete list of materials on the wiki page
- Ask a maintainer if you are unsure of suitability

3.6. Post Cutting/Engraving

- Once you have finished your work, turn off the laser cutter, log out of the access control, and clean up the bed
- Leave the machine in the state you would expect to find it

4. Maintenance

4.1. Basic

4.1.1 Removing dirt and debris

- Remove large debris by hand
- Use vacuum cleaner to remove small debris

4.1.2 Checking alignment of visible guide laser

- Put scrap material in the laser cutter and focus
- Close the lid
- Briefly press and release the "Laser" button to fire the laser
- Open the lid and align the guide laser with the mark on the material

4.2. Intermediate

- Cleaning mirrors and lens
- Checking alignment of laser

- Minor corrections of alignment (mirrors 2 and 3 only)

4.3. Advanced

- Removal of bed for extended cleaning
- Full alignment
- Replacement of laser tube