



TEXAS TECH UNIVERSITY
J.T. & Margaret Talkington College of Visual & Performing Arts
School of Art™

SCULPTURE STUDIO GUIDE & SAFETY PLAN

Rooms covered – Art 3D Annex 107, 107B, 108, 109, 109B, 109C, 110, 110A, 111, 111A, 111B, 112, the Foundry shed and the outdoor work spaces.

Responsible Individual - William Cannings 742-3825, office Art 3D Annex 109A

Department Safety Officer – Mark Bond 834-1559, office Art 101

November 2, 2017

Emergencies

In case of fire exit the building through the doors near the vending machines. If you know that the gates are open out into the parking lot you may exit through the foundry yard. If that direction is blocked, exit through the front doors or the woodshop. Meet out in front of the Physical Plant next door towards the Rec Center. There are fire alarm pull stations near the exit doors, if you pull it also call 911 to inform them of the situation.

In case of an Active Shooter lock the hallway door, turn off the lights, hide out of sight and remain quiet. If you know the shooter is in your immediate area barricade the door with anything you can to prevent or slow entry and call 911. Silence your phone but check it or your email for instructions from TechAlert! Wait until there is an “all clear” announcement from TechAlert! before leaving, do not rely on social media for information.

In case of a medical or security emergency call 911 or use the blue emergency call box located near room 105.

In case of a tornado or severe weather, go to the center hallway or the restrooms.

Chemical Spills

Small chemical spills can generally be handled in the studio with the spill containment kit. The spill containment kits are clearly marked and located under the sinks in 107 & 109. Spills should be handled in the following manner:

1. Assess the need to evacuate the lab /studio.

2. If you don't know what the chemical is, call Environmental Health and Safety (EH&S) **(806) 742-3876** (during regular business hours) or **(806) 742-3328** (after hours).
3. Look up the chemical in Safety Data Sheet (SDS)
4. If you feel confident following the cleanup instructions on the SDS proceed with cleanup.
5. If you don't feel confident or don't have the materials on hand for cleanup, because the spill is too large, call EH&S.
6. Report all spills that need more than paper towels cleanup to the SOA DCHO mark.bond@ttu.edu. He will arrange for waste pickup.

First Aid

1. Eyewash stations are located in rooms 107, 109, 110, 111, and outdoors by the wheelchair lift. If you get irritating chemicals in your eye immediately splash water in your affected eye(s) for fifteen (15) minutes unless otherwise instructed. If you get foreign matter lodged in your eye (metal, wood, etc.) do NOT rub your eye! The eyewash station may not dislodge something stuck in your eye; you will need to go to the emergency room in that case.
2. The First Aid kits are located throughout the studios and are clearly marked.
3. There are two kinds of burns that need attention:
 - a. **Minor cuts / burns** – can be attended to in the lab/studio. (examples – cuts that are not deep and stop bleeding and burns without large blisters) Minor cuts should be cleaned with antiseptic spray, alcohol wipes, or triple ointment. Cover them with a sterile Band-aid. Minor burns should be immersed in cool (not cold) running water for 15 minutes. Then apply a sterile bandage. Do not apply ice or ointments. If the wound does not heal properly seek medical attention.
 - b. **Major cuts / burns** - these are deep cuts or burns that will need IMMEDIATE medical attention. (examples – cuts pulsing blood or will not stop bleeding, or more than ¼” deep or with jagged edges. Major burns develop large blisters or char the skin. Major cuts should have pressure applied with a clean compress. Major burns should NOT be immersed in cool water, but covered with a clean compress and held above heart level if possible. In both cases, seek immediate medical attention.

When in doubt, always seek professional medical attention – use the blue emergency box or dial 911.

The complete Texas Tech University Chemical Hygiene Plan and other helpful documents can be found online at <http://www.depts.ttu.edu/ehs/Web/Default.aspx>

Records of Employee / Student training are located in the School of Art main office.

Introduction

We at the School of Art endeavor to create a safe, healthy environment for all to work in so they can have a long and productive creative life. The following information will help you achieve these goals. Failure to follow the safety policies and procedures may lead to disciplinary action.

Be aware that words such as “water based,” “all natural,” and “organic” or “green” do not indicate the safety of a material. There are many items in nature that are hazardous to humans. Art supplies and materials may be “non-toxic” when “used as directed” but can become hazardous when not used as directed, such as heating, sanding or spraying the material.

Personal safety is usually more of an issue when fewer people are around in the evenings and weekends. Always be aware of your surroundings, know who is around you or not, keep your ears open by keeping music low and not using headphones. When working with machinery or hazardous processes always have more than one person present. Do not work when impaired by lack of sleep, illness, drugs or alcohol. All the buildings have combination locks on at least one door, so never prop open doors to help keep unauthorized people out. Doors can remain open during class time (**except rooms 111 & 111a which are rated fire doors**) and when the room is occupied by an authorized person. Doors must be kept locked when the room is not occupied.

General rules

All students must have signed the Student Safety Training Form BEFORE they can participate in any hands on studio / lab activities.

The Safety Data Sheets for these labs are located in rooms 107, 109, 110 and 111.

Chemicals and materials not listed in the Safety Data Sheet yellow binder cannot be stored or used in this lab without the consent of the Responsible Individual and the Safety Data Sheets being added to the SDS binder.

Any container other than the original container a chemical comes in is considered a “secondary container.” This includes open containers such as trays. Food or drink containers cannot be reused as secondary containers. All secondary containers **must be** labeled according to the OSHA GHS standard. The safety coordinator can answer GHS labeling questions. The RI will provide appropriate secondary containers.

No spraying may be done in these rooms except 111a.

All flammable and combustible liquids and gasses must be stored in the yellow flammable cabinet when not in use. After class, or any work sessions all flammables and combustibles **must be** returned to flammable cabinets. Lockers or open shelves are not acceptable storage for flammable and combustible liquids or gasses. NO EXCEPTIONS!

All solvents and corrosives must be barcoded into the inventory system by Environmental Health and Safety, including any student purchased. For details contact the SOA Safety Coordinator.

Procedures that are not listed in the Standard Operating Procedures section cannot be used without consent of the Responsible Individual and until the new procedures **have been added** to this Safety Plan.

Food and drink are not allowed to be stored or consumed in these rooms

No tobacco use is allowed in the studio, including smoking, vaping and smokeless tobacco.

Long pants are required and closed toe shoes are required in these rooms.

Housekeeping is to be kept up with to provide a safe work space. Aisles and exits are to be kept free of slip, trip and fall hazards. Bench tops are to be free of excess storage and clutter. Extension cords can only be used temporarily and must be picked up at the end of class or work periods.

Sharp objects, such as xacto knife blades, utility knife blades and saw blades must be disposed of in an approved “Sharps” container, never the regular trash.

Art Installations must be pre-approved by the Safety Coordinator if they involve public spaces. If in doubt, ask first.

Never stand on anything other than a ladder or stepstool to increase your reach. Climbing on chairs, stools and tables frequently leads to falls and injuries.

Nothing can be hung or stacked closer than 18” (in the vertical dimension) to a fire sprinkler.

Do not hang anything from any pipes, sprinkler heads or conduit. You may hang objects of less than one pound from suspended ceilings. If you need to hang multiple objects get approval from the Building Manager first.

DO NOT WEAR HAIRSPRAY while working in the welding studio. These hair products are FLAMMABLE and your hair can easily be set on fire by flames and sparks from welding, grinding or sanding metal.

No bicycles, skates, roller blades, skateboards, scooters, etc., are allowed in buildings.

Pets and animals are not allowed in buildings. Service animals for persons with disabilities are permitted as long as they are in compliance with section 7 of TTU OP 34.22.

Children are not allowed in Studios / Labs without Minors in Laboratory forms filled out and approved in advance.

No smoking inside the building, including e-cigarettes or vaping, or within 20 feet of any doorway. No alcohol or illegal drugs in any Studios / Labs.

Wash hands upon leaving the studio.

Standard Operating Procedures:

Room 107, mixed media studio

- Wear eye protection when working or around others working.
- Clothing requirements, as specified, are found in the individual SOPs.
- Turn on room exhaust fan (north-east wall).
- The monitor requires a VGA or HDMI cable to connect with laptops, etc.
- Open and close the overhead door with caution. Secure the chain.
- Store flammable media and solvents in the flammable cabinet. They must always be stored in the flammable cabinet when not in use.
- Keep flammable cabinet doors closed.
- Keep sinks clean, and mop any standing water.
- Empty the trashcans into the hopper by the loading dock in 109.
- The eyewash station is located by the overhead door.
- Be mindful of tripping hazards such as electrical cords, pneumatic hoses, etc.
- Do not leave electrical and pneumatic reels in the down position.
- Clean and return tools to the tool cabinet when you are finished.
- Close tool cabinet before leaving.
- Report any malfunctions, damage, or breaks to the professor or studio supervisor.
- Close all studio doors and turn out lights when leaving.

Room 107B, Undergraduate Individual studio spaces

- Wear eye protection when working or around others working.
- Clothing requirements, as specified, are found in the individual SOPs.
- Open and close the overhead door with caution. Secure the chain.
- Store flammable media and solvents in the flammable cabinet, room 107. They must always be stored in the flammable cabinet when not in use.
- Keep flammable cabinet doors closed.
- Keep sinks clean, and mop any standing water.
- Empty the trashcans into the hopper by the loading dock in 109.
- The eyewash station is located in 107 by the overhead door.
- Be mindful of tripping hazards such as electrical cords, pneumatic hoses, etc.
- Keep your studio space clean and organized.
- Clean and return tools to the tool cabinet when you are finished.
- Report any malfunctions, damage, or breaks to the professor or studio supervisor.
- Close all studio doors and turn out lights when leaving.
- These studio spaces are merit based - if you don't work, you lose the space.

Room 108, Sculpture Alternative Space (SAS)

- The Sculpture Alternative Space (SAS) is a presentation, exhibition, performance, and experimental space.
- The SAS is reserved for sculpture classes between Monday and Thursday.
- Open scheduling is available from Friday to Sunday. The scheduling calendar is on the west entrance doors. First come, first served.
- You must leave the SAS clean and have patched and painted the walls (if used)
- Paint and spackle are stored in the east side lockers. See the professor or studio supervisor for access. Clean all tools used and return them to the locker.
- The walls have plywood backing up to 12'
- The hanging pipe grid can hold up to 3000lbs
- Access is available to compressed air and 110V power.
- The video projector requires a HDMI cable.
- The monitor requires a VGA cable.
- The control pad on the south wall operates the projector screen. Return the screen to the up position when you have finished.
- Do not remove or move light can fixtures from the track.
- Turn all lights off and close the doors.
- Report any malfunctions/damage/concerns to the professor or studio supervisor.

Annex 109, Metals Studio

- Wear all appropriate PPE when working in this studio - safety glasses, long pants, cotton shirt, welding cap, leather gloves, and sturdy footwear.
- Do not wear flammable materials while working in the studio, i.e. hair spray, etc.
- Ensure that all fume snorkels are turned on when using either the gas torches, MIG Welder, TIG welder, and spot welder, and are within an 18" range of your work.
- Hand tools, power tools, pneumatic tools, nuts, bolts, abrasives, and general sculpture consumables are located in the tool room.
- Return all tools when you have finished working.
- Report any malfunctions/damage/concerns to the professor or studio supervisor.
- Cleanliness correlates to safety, productivity, creativity, success, and a long artistic career.
- Clean your work area and tools.

Room 109C, Grinding and Sanding

- Wear PPE suitable for the task: eye protection, ear protection, gloves, etc. Secure all loose clothing, hair and remove hanging jewelry.
- Visually inspect sanding belts, and disks making sure they are in good condition before operating. Do not use if disks, belts, and stones are torn, chipped or broken.
- Use the table of the sanding machine to control the position of your work as much as possible.
- Small or irregular shaped pieces or forms should be held in a clamp or special jig or fixture instead of fingers.
- Turn on exhaust system and open damper gate for the machine you are using. Making sure all other gates are closed. Turn off the system when you have finished.
- Do not use hand held angle grinders or sanders in this studio – use them in the Foundry/Blacksmithing shed or in the work yard
- Clean the work area and machines when you have finished.
- Report any malfunctions/damage/concerns to the professor or studio supervisor.

Room 110, Mold making, Ceramic Shell

- When using this studio follow these guidelines:
- Wear safety glasses.
- Use protective gloves, and dust masks as necessary, i.e. plaster and silica work.
- Turn on the lights.
- Turn on fume extraction snorkels when working with wax, move snorkels within an 18” range to capture fumes. Check that the damper is open (yellow handle on the side of the snorkel).
- Turn on fume hood for the stove top when in use.
- Use of alcohol lamps is permitted. They must be returned to the flammable cabinet when not in use.
- Return all flammable liquids or media to flammable cabinet when not in use.
- Empty used plaster into bags or let dry in rubber bucket – empty hard and dry plaster into blue trashcan.
- Fill one of the work sinks with cool water to wash out buckets and tools used for plaster work. Do not let plaster dry on tools.
- Hand washing sinks are for hand washing only.
- Clean up your work area before leaving, empty blue trashcan into the hopper by the loading dock in 109.
- Turn off lights.
- Close the studio door.
- Report any malfunctions/damage/concerns to the professor or studio supervisor.
- First Aid kit is in the hallway between 110 and 109.

Room 111, Prep Room

- Turn on lights.
- The exhaust fan is designed to be left on but check to see if it is operating. The switch is on the north wall, it will be lit if on.
- Mask work areas with brown paper.
- Do not eat or drink in the studio.
- Use the appropriate level of PPE for the task at hand. This could include, nitrile gloves, eye and ear protection, and respirator (if approved and certified by the EH&S)
- Follow the SOP when using compressed air.
- Clean up thoroughly when you have finished. Sweep or vacuum, throw out used rags and masking, use the blue trashcans.
- Empty solvent containers should be left on the counter tops to evaporate completely before recycling in the sculpture yard.
- Paint cans need to be empty and dry before disposal.
- Be respectful of other’s work, whether in progress or drying.

Room 111A, Sculpture Spray Booth

- Exhaust fan must be turned on before using the spray booth.
- Door must be closed while in operation.
- Do not eat or drink in the spray booth.

- Wear the appropriate level of PPE for the task at hand. This could include, nitrile gloves, eye and ear protection, and respirator (if approved and certified by the EH&S)
- Mask any areas to protect from overspray. Use the provided brown paper.
- Follow the SOP when using compressed air.
- Leave the exhaust fan running for a minimum of 5 minutes after you have completed your task. Once the air is clean in the spray booth you can move your work to the prep room 111 for drying.
- Clean up thoroughly when you have finished. Sweep or vacuum, throw out used rags and masking, use the blue trashcans.
- Turn off the exhaust fan and the lights and close the door before leaving.

111C, Resin Room

- Turn on lights.
- The exhaust fan is designed to be left on but check to see if it is operating. The switch is on the east wall, it will be lit if on.
- Mask work areas with brown paper.
- Do not eat or drink in the studio.
- Use the appropriate level of PPE for the task at hand. This could include, nitrile gloves, eye and ear protection, and respirator (if approved and certified by the EH&S)
- Follow the SOP when using compressed air.
- Clean up thoroughly when you have finished. Sweep or vacuum, throw out used rags and masking, use the blue trashcans.
- Empty solvent containers should be left on the counter tops to evaporate completely before recycling in the sculpture yard.
- Paint cans, mold rubber, and casting plastic containers need to be empty and dry before disposal.
- Be respectful of others work, whether in progress or drying.

Arbor Press

- For best operation, the arbor press must be bolted to a stationary object that is also affixed to the floor.
- When using the press, be sure the work is mounted securely in it. Do not attempt to use the press with the workpiece mounted on an angle.
- Use only accessories designed for the arbor press. Attachments and equipment used in the pressing operation must be as strong as the press. Use steel collars and blocks to press against the workpiece.
- Do not overload the press by using handle extensions (cheater bars).
- When not in use, the ram should be in the down position to prevent accidents.
- Know the arbor press and accessories. Read and understand owner's manual.
- Wear a face shield or safety glasses.
- Never place hands in jeopardy.
- Always check your set up, i.e., see that the ram contacts workpiece squarely before applying pressure.
- Keep your mind on your work. Be alert.
- Make sure your workpiece, punch, anvil and accessories are securely clamped.

Don't force the arbor press or its accessories.

Hand Tools (general)

Hand tools are non-powered. They include anything from axes to wrenches. The greatest hazards posed by hand tools results from misuse and improper maintenance.

When using hand tools, the following apply:

- Use proper eye protection (safety glasses, goggles or face shield).
- Use the right tool to complete a job safely and efficiently.
- Before using a tool, be sure it is in clean and good condition
- Make sure saw blades, knives, or other tools are directed away from aisle areas and other employees working in close proximity.
- When using knives, always cut away from your body.
- Keep knives and scissors sharp; dull tools can be more hazardous than sharp ones.
- Around flammable substances, use spark-resistant tools made from brass, plastic, aluminum, or wood.
- Replace or repair all wooden handles that are loose, splintered, or cracked.
- Do not use impact tools such as chisels, wedges, or drift pins that have mushroomed heads.
- Do not lay tools down at the edge of a workbench. Do not lay tools where they could roll off, where someone could bump or trip over them.
- When you are finished with the tool, return it to the tool room or tool cabinet. Do not leave tools lying around.
- Only use a tool if you know how to use it properly. If you are unsure, check with the professor or studio supervisor.
- Report any tools that are defective or in unsatisfactory condition to the professor or studio supervisor.

Plasma Torch

- You must be trained by the professor to use this equipment.
- Wear tinted safety goggles or a face shield of **no less than a #5 lens** and gloves. If only wearing tinted goggles, apply UV protective cream or lotion, if operating for a prolonged period of time to protect against burning.
- ***Always turn the power “OFF” before changing tips, electrodes, electrode adapters, baffles, brass ends or heat shields.***
- Turn on exhaust system for cutting table.
- Always put your tools back after you set up. Practice good housekeeping at all times.
- If for any reason the machine is not operating properly, it must be reported immediately to the professor or studio supervisor.
- Turn the power off whenever leaving your workstation.
- Check the condition of the wire harness. Notify supervisor immediately if it is in poor repair. Check for cuts, tears or breaks.
- Check the electrode and tip to be sure they are in good operating condition. Never over tighten them, but be sure they are tight. Make certain that the power is off.
- Check the baffle for cracks.
- Check the porcelain heat shield for cracks.
- Blow out any moisture from the lines before using the cutting torch.
- Always hook up the ground cable.
- Be sure to use the correct torch end for the job you are doing.

- Keep the tip approximately 1/8th-1/16th inch away from the material being cut.
- Keep the tip clean with a wire brush every 2 or 3 cuts.
- Try to keep the torch perpendicular with the material to ensure a straight cut.
- Do not go faster than the torch can cut. Blow-back reduces longevity of the tips and electrodes.
- Make sure long or loose hair is contained or restrained

3 in 1 machine

- Before using the 3 in 1 take a minute to refresh yourself with all of its accessories and functions, if anything is not familiar you must ask either the professor or studio supervisor
- Determine that the surrounding area is clean and clear and free of anything that could interfere with your operation of the machine. Make sure that the people working around you are aware of what you are about to do and an appropriate distance away before operating the 3 in 1 machine.
- Wear the appropriate PPE, safety glasses, protective gloves, pants, and sturdy footwear.

Overview

- The 3 in 1 machine is design to be used with light gauge sheet metals (20 gauge and thinner). It incorporates a slip-roller, shear and manual sheet metal brake into one machine. You can potentially crease, curve and cut light gauge metal on this machine.
- There is a limitation in the size of material you can use in terms of height, width and thickness. The maximum dimensions of this machine are written on the red metal tab fixed to the top.
Please be advised that cutting metal thicker than this dimension can result in personal injury and/or a mechanical failure in the machine itself.
- Verify that the 3 in 1 machine is firmly locked down using the screw pad on the lower frame before performing any operation.
- All of the machines actions happen simultaneously in different locations and are all driven by one mechanical lever arm. Keep this in mind when manipulating the lever arm.
- Before beginning any work on this machine be sure of these things:
 - That the machine is secured in place and that all functions are operating smoothly and correctly.
 - That any safety guards are firmly in place and secured
 - That your posture and stance are correct for applying the force necessary to perform your operation. This includes being prepared for the sudden release of pressure when the operation is complete
 - That you have identified all dangerous areas of the tool and are prepared to keep your hands and other body parts a safe distance from these points
 - That you know how you will react if something makes you uncomfortable during operation of the machine
- Metal sheet stock is the material this machines is designed to use. Steel, aluminum, and any other bendable sheet stock is permissible to use on the 3 in 1. **20 gauge is the thickness limit.**
- An understanding of the machine will show you that all 3 operations are manipulated at once when turning the lever arm. Care must be taken to be sure nothing is in the machine in a way that could interfere with the moving parts. This is very important.
- When done, return the machine to the state in which you found it and make sure to clean up the surrounding area completely.

Tips for Proper Use of 3 in 1 machine

1. Shear

- The sheet metal shear is located on the lower section of the machine where you will notice a horizontal bed. The shear is used for precise and clean straight cuts in thin sheet metal.
- The cutting action occurs at the intersection of the bed and the blade. There is a stock arrester that lowers and clamps the material in place as it is cut. Keep your hands away from all of these areas when cutting with the shear.
- Rotate the lever arm slowly when the stock is loaded correctly. Be careful of where your hands are in relation to the tool, tables, and arm when putting extreme force on the lever arm.
- Once the shear has cut through the sheet material the side that has been cut off will be dropped behind the cutting blade. If your piece is of considerable length ask a classmate, studio supervisor or professor to assist you.
- Before releasing the stock arrester, remember to support your material so it does not fall to the floor. -Always be careful of a recently cut-edge as it will likely be very sharp.

2. Brake

- The brake is designed to allow the user to bend or otherwise crease sheet metal up to 90 degrees. Remember that steel has a memory so you must break it slightly past the degree to which you want the bend to be. After the bend it will relax and assume the slightly less significant bend which will be permanent for all intents and purposes.
- The brake is located in the middle of the machine, just under the rollers.
- Before inserting the piece of metal to be bent, envision the bend you want to make and set the fingers (plates) accordingly. If you have questions surrounding the type or degree of bend you want to make please ask the professor or studio supervisor for assistance. Be careful when loosening the plates to move or remove them, they will fall when loosened.
- With the plates in the proper position, insert the sheet material between the 90 degree channel and the tapered plates above being careful to keep your hands clear of the pinch point. (A line where you want to make the bend can be drawn on your material with a pencil to aid in proper alignment)
- Rotate the lever arm slowly when the stock is loaded correctly. Be careful of your hands in relation to the tool, tables, and arm when putting extreme force on the lever arm.
- Sometimes, depending on the size of the work and degree of the bend, it may take great care to remove the work from the machine.
- Always be careful of a recently shaped metal-edge as it can be very sharp.

3. Slip Roller

- The slip roller is a device used to make simple curves in sheet metal. The operation relies on a series of rollers to stretch the metal into a curved shape. This operation happens at the upper most section of the 3 in 1 machine. This part of the machine should be covered to keep the rollers and users protected until needed.
- The slip roller is governed by a set of limitations on material thickness like the other two operations. Refer to the specification plate in red on the front of the machine.
- Check to make sure the rollers are clean and clear of debris before attempting to roll any metal.
- Set the rollers for your material thickness and desired curve. Use scrap of the same material and thickness as test pieces.
- While facing the machine insert your metal into the front roller while simultaneously turning the lever arm. Be very careful to keep your hands away from the roller while turning the arm. Also be aware of your material twisting up and out of the top of the machine.

- Continue rolling until the material travels through the machine at which time you will collect it from the top taking care not to drop it to the floor once it is released from the rollers. For some operations the roller bars may need to be removed to remove your material. **DO NOT ATTEMPT** this by yourself the bars are extremely heavy.
- After your satisfied with the results swing the metal cover back over the tops of the rollers and clean the surrounding area of any scrap metal you may have produced and place it in the proper bins for recycling.
- Always be careful of a recently shaped metal-edge as it can be very sharp.

Hydraulic Press

- Wear PPE suitable for the task: Eye Protection, Ear Protection, gloves, leather apron, etc.
- Machine can be operated from controls on right side of press or remotely operated with yellow control box.
- Ensure both table pins are through the press table and secured with safety cotter pins prior to starting.
- Remove plates and work and ensure the table is cleared prior to moving table up or down.
- Use hydraulic jack on left side of machine to relieve weight on table pins.
- Remove safety cotter pins from rear of machine and pull table pins out. The hydraulic jack can then be used to position table to desired work height.
- Replace table pins and safety cotter pins before using the press.
- Relieve pressure on hydraulic jack before initiating press.
- Use top and bottom steel plates when possible to protect the hydraulic ram.
- Stand clear of machine when initiating the press.
- **LEAVE RAM IN THE UP POSITION BEFORE TURNING OFF MACHINE.**
- Wipe down entire machine, sweep debris from surrounding area and report any malfunctions.

Abrasive Cut-Off Wheel

- Only properly trained and authorized students are permitted to do abrasive cut-off.
- Always wear eye protection.
- Keep working area clean.
- Never use cut-off tools around flammable liquids or gases.
- Do not wear loose clothing or jewelry with cut-off tools.
- Always secure work place.
- Do not over reach, keep footing and balance at all times.
- Always unplug tool before servicing or when not in use.
- Inspect before use: for damaged parts, cut-off discs, and cords for cracks or damage, all guards and shields in place.
- Always cut so sparks do not contact you or someone else.
- Always work with proper lighting.
- Keep the work area clean and tidy
- Clean and return cut-off wheel (electric or pneumatic) to the tool room.

Air Compressors

- Only trained personnel should use an air compressor.
- Wear eye protection.

- Before each use, check the compressed air system and electrical components for signs of damage, deterioration, weakness and leaks. Report damage to the professor or studio supervisor.
- Never weld or drill holes in the air tank.
- Release air slowly when draining moisture or depressurizing the compressor system.
- Keep fingers away from a running compressor, fast moving and hot part could cause injury.
- Ensure all belt and pulley systems are operating properly and properly guarded.
- Never use an air compressor for the purpose of supplying breathing air.
- Never operate or repair in or near flammable gas or vapor.
- Never stand on or use the unit as a handhold.
- Disconnect power and release all pressure from the system before performing any maintenance work on the machine.
- Do not use extension cords with an air compressor.
- Do not exceed pressure limits for any component in the system.

Electric Grinders

- Portable grinders are difficult to handle because of their size and weight. Extra care is needed to avoid injury and to protect the grinding wheel from damage. When using portable grinders, observe these precautions:
- Wear appropriate clothing such as, safety glasses or a face shield and gloves.
- Guard against electric shock. Make sure that the cord is in good shape. Do not use the grinder in the rain or in damp conditions.
- Make sure that any guards are in place before turning the machine on.
- Inspect the grinding wheel or other attachments for chips, cracks, or loose parts.
- Do not use damaged wheels or attachments. They could shatter and fly apart when the wheel comes up to speed. Make sure that the attachments are rated for the RPM that the grinder will produce.
- Make sure that adjusting keys or wrenches are removed before turning the grinder on.
- Warn other people in your work area before you start grinding. Make sure that everyone within range is wearing eye protection.
- Secure the item you are working on in a vice if at all possible. Avoid holding small items in your hands. Use clamps where possible.
- Do not force the tool into the work. It may “kick back” violently.
- Make sure that the grinder is unplugged before changing wheels or attachments.
- Let the grinder come to a complete stop before laying it down.
- Clean and tidy the work area.
- Clean and return grinder to the tool room.

Sewing Machine, Bernina

- DO keep all loose clothing, hair, jewelry, and parts of body clear of sewing area.
- DO ensure that your chair is adjusted ergonomically.
- DO ensure machine light is operating when using the machine
- DO ensure the machine is switched off when not in use, changing of needles, bobbins and threads etc.
- DO keep feet clear of the pedals when the machine is switched off as the machine retains a small amount of power, which can still run the machine
- DO make sure the machine has a needle guard on.

- DO NOT remove the needle guard under any circumstances.
- DO not sew over pins.
- DO use the Safety glasses (PPE) when sewing heavy materials e.g. canvas, denim etc.
- DO contact wardrobe supervisor/s and report any technical/mechanical issues.
- DO cease to use the equipment if broken or you are unsure how to repair it.
- DO write on the 'Out of Order' notice board if a machine is broken or unable to be used.

TROUBLE SHOOTING

- • Make sure machine is threaded correctly.
- • Make sure needle is put into machine correctly
- • Make sure bobbin is threaded correctly
- • Make sure bobbin is put into machine correctly.
- • Please notify supervising faculty member if machine is broken or not working.

SHUTDOWN

- Red OFF switch
- Clean workspace and put waste in the bin.

SEWING MACHINE, Industrial

- Wear your PPE – safety glasses.
- When turning the power on, keep your hands and fingers away from the area around/under the needle and the area around the pulley.
- Power must be turned off when the machine is not in use, or when the operator leaves his/her seat.
- Power must be turned off when tilting the machine head, installing or removing the 'V' belt, bobbin winder pulley, adjusting the machine, or when replacing.
- Avoid placing fingers, hairs, bars, etc., near the pulley, 'V' belt, bobbin winder pulley, or motor when machine is in operation. Injury could result.
- Do not insert fingers into the thread take-up cover, under/around the needle, or pulley when the machine is in operation.
- If a belt cover, finger guard, and/or eye guard are installed, do not
- operate machine without these safety devices.
- If the machine's oil pan has an oil sump, never operate the machine before filling it.
- If the machine is lubricated by a drop oiler, never operate the machine before lubricating.
- Avoid using the machine in dusty conditions.

Band Saw Safety

1. Wear PPE suitable for the task: eye protection, ear protection, gloves, etc. Secure all loose clothing, hair and hanging jewelry.
2. Clean the table and area around the band saw before beginning work and when you are finished.
3. Make all adjustments to the machine before turning it on.
4. Adjust the upper guide so that it is no more than a ½" above your work.

5. Adjust the blade speed to the specific material and task. Never use a dull blade.
6. If the blade is not tracking properly or needs adjustment, stop the saw and see the professor, studio supervisor, or 3D technician.
7. Be extremely cautious of the exposed blade. Always push to the side of the blade, never directly in line with it. Make sure your fingers are clear at the end of a cut. Use push sticks.
8. Avoid backing out of saw cuts you could pull the blade off the wheel.
9. In general, thin and less dense materials need a faster blade speed, and thicker or more dense materials need a slower blade speed.

Bench Grinder

- Wear the appropriate PPE: safety glasses, face shield, gloves, leather-apron, hearing protection.
- Check workspaces and walkways to ensure no slip/trip hazards are present.
- Ensure all guards and safety shields are in position before starting the grinder.
- Ensure that the wheels do not touch the work rest and that the gap between wheel and rest is no greater than 1.5mm.
- Check that wheels are running true and are not glazed or loaded.
- Locate and ensure you are familiar with the operation of the ON/OFF starter.
- Stand to the side of the wheels when starting up.
- Let the wheels gain maximum speed before starting to grind.
- Do not grind on the side of the wheel.
- Small objects must not be held by hand.
- Never leave the machine running unattended.
- Do not bend down near the machine whilst it is running.
- Never force the work piece against a wheel.
- Slowly move the work piece across the face of the wheel in a uniform manner.
- Leave the machine in a safe, clean and tidy state.
- Report any malfunctions or breakage to the professor or studio supervisor.

Bench Oven with digital controls

- Appropriate PPE such as insulated gloves, safety glasses and tongs should be used for handling hot material.
- Trained personnel are only allowed to operate the oven.
- Be sure to set the correct temperature.
- Do not place flammable solvents in this oven. This oven is not designed for handling flammable solvents.
- Do not allow the product/material to remain in the oven for too long.
- Be careful when placing combustible materials (such as paper, cardboard or wood) into the oven.
- Do not use combustible racks, trays, holders, spacers, etc.
- Periodically, clean all combustible material from non-combustion racks, trays, holders, spacers, etc.
- If combustible products must be processed in the oven, extreme care must be taken to insure that the operating temperature does not exceed the ignition temperature of the product. See the MSDS for more information.
- Use a drip pan if necessary to collect dripping media.
- Remember you are working with elevated temperatures. Do not touch surfaces they could be hot and cause burns.

- Do not breathe hot oven air. Heated air could burn lungs.
- Ensure you know what you are putting in the oven can be heated safely at the oven operating temperature.
- Do not operate the oven with the doors open.
- This oven has a maximum temperature of 450°F
- Do not store materials on top of the oven.
- Keep the oven doors travel, free from restriction.
- Do not leave the equipment unattended while in operation.
- It is important that the oven be kept clean. Build-up of combustible deposits must be periodically cleaned. The build-up of condensed vapors or combustible debris is a major cause of fires.
- Important, follow the shut-down procedure: flip “heating” switch to “cool down” until the oven is below 100 degrees F before turning the unit off.

Bench Vise – General

- ALWAYS make sure the workbench top is secure.
- ALWAYS use eye, face, and ear protection, as required with the task.
- ALWAYS keep moving parts lubricated with multipurpose grease.
- ALWAYS keep workpiece centered in jaws. Uneven clamping pressure across jaws could damage vise.
- DO NOT over tighten jaws or lockdowns, damage to vise or work piece could result. TIGHTEN BY HAND ONLY.
- DO NOT unscrew jaw beyond maximum opening.
- DO NOT place pressurized containers in vise.
- DO NOT use extreme heat or prolonged heat on vise.
- DO NOT strike any part of vise; permanent damage could result.
- Report any malfunction or damage to the professor or studio supervisor.

Blasting Cabinet

- Wear safety glasses, and hearing protection if using for prolonged periods of time.
- Objects/materials to be media blasted must be dry and free of grease and oil.
- Cabinet doors must be closed and latched for the unit to operate.
- Do not operate the cabinet using more than 80lbs air pressure
- Use the provided arm/glove protectors and never operate the unit without them in place and properly sealed.
- Do not point the media-blasting gun (inside the cabinet) at the viewing glass.
- Replace plastic glass protector when visibility is reduced.
- Dust-off objects/materials inside cabinet before removing them, using the air nozzle located inside the cabinet.
- Turn off unit and supplied compressed air.
- Clean the work area and machine when you have finished.
- Report any malfunctions/damage/concerns to the professor or studio supervisor.
- This unit can operate with a variety of blasting media, check with the professor before changing or adding any media.

BLENDER

- Wear eye protection. The use of ear protection is recommended during extended operating periods
- Unplug from outlet when not in use, before putting on or taking off parts, and before cleaning.
- To protect against electrical hazards, do not immerse the blender base in water or other liquids.
- Avoid contact with moving parts.
- Keep hands and utensils out of container while blending to prevent the possibility of severe personal injury and/or damage to the blender. A rubber scraper may be used but must be used only when the blender is not running.
- Blades are sharp. Handle carefully.
- Always operate blender with cover in place.
- When blending hot liquids, completely remove the stopper in the cover before turning on the blender.
- DO NOT use carbonated liquids in the blender jar or any blending container. Using carbonated liquids in the included blender jar or any other compatible blender jar may result in injury.
- DO NOT blend oil or oil-based products such as peanut butter for greater than 5 minutes.
- Never remove blender jar from base unit until the blade and coupling have completely stopped.
- Position container assembly on motor base so that it is firmly seated and not tilting to one side.
- Always add liquid ingredients first, unless otherwise specified in recipe. Do not fill above MAX line.
- Always hold container with one hand when starting and while blending. Never operate without jar lid properly clamped in place.
- Wash and dry container after each use
- Report any malfunctions/damage/concerns to the professor or studio supervisor.

Car Kiln

- Wear, eye glasses and protective clothing, including heat reflecting apron and jacket if the kiln is opened while hot.
- The door must be secured when closed using the 5 screw latches.
- The gas burners are located on the rear of the kiln.
- The kiln is to be operated by the professor, shop supervisor or trained persons.
- The damper should never be more than half closed. This creates too much back -pressure.
- Monitor the kiln during operation.
- Remove any flammable/combustible materials/solvents near or on the kiln.
- Use the pyrometer by inserting the probe through the car-kiln door opening.
- Replace the pyrometer in its holding place on the front of the kiln when operation is complete. Be careful the pyrometer probe can be very hot.
- Keep the kiln car tracks free from debris and obstacles.
- Do not store materials on the kiln.
- Clean the kiln after use and it has cooled down.
- Report any malfunctions/damage/concerns to the professor or studio supervisor.

C-Clamp

- Place the object on a smooth surface; position the clamp so that the “C” is surrounding both the surface and the object.
- Turn the handle until the objects are squeezed/clamped together.
- Ensure that the clamp is tightly secured

- Check frequently to see if the object is still secure
- Avoid catching fingers and clothing when tightening clamp.
- Avoid dropping clamp on floor or toes
- Return the clamp to the tool room or tool closet when finished.

Chop Saw

- You must be properly and thoroughly trained before attempting to do any work with or on any chop saw.
- It is the duty of each operator to immediately eliminate or report any changes occurring on the machine or in the material being processed which changes may affect the machine's safe operation. Report these to the professor or studio supervisor
- DO HAVE the power disconnected when making any adjustment or changing blades.
- DO NOT wear loose clothing.
- ALWAYS WEAR safety glasses and a face shield, leather gloves, and hearing protection.
- ALWAYS HOLD the work firmly against the fence using the cam lock clamps
- GUARDS must be in place and used at all times.
- DO NOT switch on the machine until all safety devices and guards are in proper position and adjustment and are fully operational.
- REMOVE CHIPS and pieces of scrap from table before using machine.
- BE SURE blade is free cutting, secured, free from chips, cracks, and vibration. NEVER use a defective blade.
- Allow the motor to come up to full speed before starting cut.
- Use extreme caution when using the saw near flammable materials. The blade may "throw" sparks when it contacts the item you are cutting and may ignite nearby materials.

Compressed Air Station

1. Wear PPE suitable for the task: eye protection, ear protection, gloves, etc.
2. Connect hose and pneumatic tool to the station. Turn on the compressed air at the ball valve (the handle will be inline with the supply line).
3. Adjust the air pressure at the regulator specific to the task.
4. DO NOT use compressed air to clean skin, it is very dangerous.
5. Turn off the ball valve when you are finished. Hold the hose before releasing at the connection. Remove the tool and roll the hose, return it to the tool room or leave it at the station on the hook.
6. Clean up where you have worked.
7. Report any malfunctions.

Cordless Drill

- Wear the appropriate PPE, safety glasses, leather gloves, and sturdy footwear.
- Ensure you have a suitable safe work area
- Examine the drill and battery for obvious damage, inform the professor or studio supervisor
- Do not use dull or damaged drill or driver bits
- Check the correct drill or driver bit is correctly fitted
- Avoid wearing loose clothing that may cover your hands
- Keep fingers, hands, clothing and hair well clear of the rotating drill chuck, drill bit, or drill driver

- Beware of hot drill bits caused by friction or abrasion
- Securely clamp your project to a stable work surface
- Allow the drill to reach operating speed, then apply load gradually. Do not apply excessive force.
- Be cautious of drilling too close to edges and corners
- Leave the workbench, work area, and cordless hand drill clean & tidy.
- Return the Battery for re charging if it is low.

Dremel Rotary Tool

- Wear PPE as needed for working, safety glasses, dust mask, protective gloves, and sturdy footwear.
- Visibly check the tool and power cord for damage, inform the professor or studio supervisor if you suspect or find a problem.
- Secure your project or work piece in a vice or using clamps
- Do not hold your work with your hands
- Secure all tooling in collet and recheck tightness during your work time.
- Ensure power cord is clear of any moving parts and cutting/grinding/carving area.
- Be considerate of those working around you, the Dremel can potentially create a lot of noise and dust.
- Work in a well ventilated area
- Clean the Dremel and work area when you have finished
- Return tools to the tool room or tool cabinet.

Metal Lathe

- Do not use this machine unless you are authorized or have been instructed in its safe use and operation.
- Always wear eye protection.
- Correct dress is important, remove rings and watches, and roll sleeves above elbows.
- Always stop the machine before making adjustments.
- Handle sharp cutters, centers, and drill bits with care.
- Know where the emergency stop is before operating the lathe.
- Use pliers or a brush to remove chips and swarf, never your hands.
- Use the correct tool for the job.
- Do not change spindle speeds until the lathe come to a complete stop.
- Remove chuck keys and wrenches before operating.
- Handle heavy chucks with care and protect the lathe ways with a block of wood when installing or removing a chuck.
- Clamp work securely with minimum overhang.
- Use the correct spindle speed and feed rate for material.
- Never lay tools directly on the lathe ways.
- Keep tooling overhang as short as possible.
- Never attempt to measure work while the machine is running.
- Never file lathe work unless the file has a handle.
- Protect the lathe ways when grinding or filing.
- Use two hands when sanding the work piece. Do not wrap sand paper or emory cloth around the work piece.

- Clean the machine and work area after use.
- Clean tools and put them away where they belong.
- Lock the machine out and the tool cabinet, and replace keys in lock box.
- Report any malfunctions, damage, or breakage to the professor or shop supervisor.

English Wheel (aka, Metal Ace Imperial 28F Cast Iron Wheeling Machine)

- Appropriate PPE is required: safety glasses, gloves, and closed toed shoes.
- Make sure the material being shaped is clean, de-burred, and within the capacity of this machine – 16gage Cold Rolled steel. The capacity for aluminum depends upon the alloy type, hardness and the way the material is being annealed.
- It is best to use a low carbon steel such as 1018 AKDQ or Aluminum or Silicon killed steel.
- Low pressure is required to work material into desired shapes.
- Keep the rolling wheels clean
- Remove all pressure from the rolling wheels when the machine is not being used. Damage will result to the rolling wheels if you do not.
- Keep all adjusting screws snug, there is no need to over-tighten.
- It is way beyond the scope of this or any other written form to instruct you on the use of this machine. The old adage “practice makes perfect” is well taken here. It is a machine of “feel” and “feedback” until the desired effect is achieved.
- Be careful not to run your fingers in-between the wheels while tracking the metal.
- Report any problems, damage, or breakage of parts immediately to the professor.
- Clean the machine and the work area when you are finished.

Finger-Brake

- The finger-brake is designed to allow the user to bend/ fold or otherwise crease sheet metal, from 0 up to 120 degrees. Remember that steel has a memory so you must break it slightly past the degree to which you want the bend to be. After the bend it will relax and assume the slightly less significant bend which will be permanent for all intents and purposes.
- Wear safety glasses and protective gloves
- Make sure the finger-break is clean and free of dirt, dust, and obstructions
- Adjust the clamping pressure and gap of the fingers for the gauge of sheet metal being used.
- If you have removed fingers for a folding operation return them after you have completed your project.
- The finger-brake is designed for sheet metal only
- Do not bend rod, bar, or other shaped metal stock you will damage or break the fingers.
- While bending/folding/creasing be mindful of the counter weights which assist in the operation. Make sure their path of movement is free and clear of obstructions, and they are properly secured.
- Always be careful of a recently shaped metal-edge, as it can be very sharp.
- Clean the work area and machine when you have finished.
- Report any malfunctions/damage/concerns to the professor or studio supervisor.

GAS FORGE

- PPE is required: Safety glasses, ear protection, gloves, fire resistant work jacket.
- Turn on ventilation system and ensure all flammable materials are free of the area.
- Ensure airflow valve is in the open position and press the start button to initiate ignition sequence.

- The forge is equipped with automatic ignitor. Stand clear of forge after start sequence is initiated. Wait 5-10 seconds and forge will light.
- Once started, adjust airflow valve on front of machine in order to keep the flame inside the firebox. This will ensure the optimum heat transference to your metal.
- Push red stop button when work is complete and wait for forge to cool prior to leaving. The forge should be cool to the touch before you leave the foundry area.
- Wipe down entire machine, sweep debris from surrounding area and report any malfunctions.

Oxygen/ Acetylene Torches

- PPE is required: Safety glasses, gloves, leather apron, etc.
- Turn on welding fume snorkels, open dampers, and ensure all flammable materials are free of the area.
- Connect torch body and desired torch head to hoses and ensure torch valves are closed.
- Both Oxygen and Acetylene pressures are dependent on thickness of material and operation (Welding, heating, cutting).
- Refer to chart on vent hood in metal shop to determine required tip size and gas pressures.
- Turn on main oxygen valve located next to regulator (one full turn) and adjust working pressure to desired output by turning clockwise on regulator valve.
- Turn on main acetylene valve located next to regulator (1/4 turn) and adjust working pressure to desired output by turning clockwise on regulator valve.
- Crack acetylene valve on torch body and ignite torch with safety striker. Adjust the flame to a long, yellow feathery flame before initiating oxygen mix.
- Crack oxygen valve on torch body slowly. This allows for both gasses to properly mix in torch body and achieve desired neutral flame.
- When task is complete, close acetylene valve on torch body first, followed by oxygen valve.
- Close both main acetylene and oxygen valves and relieve gas pressure from regulators by turning regulator valves in counter clockwise direction.
- Turn regulator valves in counter clockwise direction until they are loose but not completely backed out or removed.
- Bleed remaining pressure from hoses by cracking both valves on torch body. Ensure torch is cool to the touch and properly store hoses and torches on storage racks next to worktable.
- Wipe down entire worktable, sweep debris from surrounding area and report any malfunctions to the professor or studio supervisor.

Hammers (General)

- PPE is required: safety glasses and closed toed shoes.
- Ensure the work area is clear of debris.
- Ensure there is adequate lighting in the work area.
- Keep your fingers away from the striking area.
- Do not use any tools if you feel drowsy or unwell.
- Do not wear loose clothing, jewelry or long loose hair while using a hammer.
- Inspect the hammer for damage prior to each use.
- Do not use any broken or unsafe tools inform the professor or studio supervisor.
- Do not use a hammer with a loose or damaged handle.
- Do not use a handle that is cracked, broken or loosely attached to the head.
- Do not use a hammer head with cracks, chips, mushrooming or excessive wear.

- Do not use a hammer with cracks in the claw or eye section.
- Do not use a hammer for a purpose for which it was not designed or intended.
- Do not use one hammer to strike another hammer.
- Do not redress, grind or weld a hammer-head.
- Do not strike an object with the side or cheek of the hammer.
- Select a hammer that is comfortable for you.
- Select a hammer that is the proper type, size and weight for the job.
- Select a hammer with a striking face diameter that is approximately 12 mm (0.5 inches) larger than the face of the tool being struck.
- Ensure the head of the hammer is firmly attached to the handle
- Look behind you and above you before swinging a hammer.
- Watch the object you are hitting.
- Hold the hammer with your wrist straight and your hand firmly wrapped around the handle.
- Strike a hammer blow squarely with the striking face parallel to the surface being struck. Always avoid glancing blows and over/under strikes.

Hand Saws

- Wear appropriate PPE: safety glasses and closed toed shoes.
- Ensure the work area is clear of debris.
- Ensure there is adequate lighting in the work area.
- Keep your fingers away from the cutting area.
- Use a saw handle that keeps your wrist in a natural position in the horizontal plane.
- Protect the teeth of the saw when not in use.
- Keep hacksaw blades clean and lightly oiled.
- Do not operate any equipment if you feel drowsy or unwell.
- Do not wear loose clothing, jewelry or long loose hair while using a saw.
- Do not apply too much pressure on the blade as the blade may break.
- Do not twist when applying pressure.
- Inspect the saw for damage prior to each use
- Do not use any broken or unsafe equipment inform the professor or studio supervisor
- Select a saw with the proper shape and size for the stock being cut.
- Select a saw with the appropriate number of teeth per inch (TPI) for the stock being cut and the desired finish.
- Select an appropriate blade for the material being cut (e.g. wood, plastic, metal, etc.).
- Ensure the blade is sharp and clean.
- Ensure the blade is securely mounted.
- Ensure the blade is in good condition; no nicks, cracks or missing teeth.
- When using a hacksaw ensure the teeth are pointing forward.
- Check the material for any defects such as knots and foreign objects such as nails, staples or screws; remove metal objects.

- Be aware of sawdust or other debris from cutting the material.
- Ensure the stock is firmly in place. Use a clamp or vise as required.
- Start the cut by placing your hand beside the cut mark with your thumb upright and pressing against the blade. Start the cut carefully and slowly to prevent the blade from jumping. Pull upward until the blade bites.
- Start with a partial cut and then set the saw at the proper angle.
- Apply pressure on the downward stroke (i.e. away from you) only.
- Cut using steady strokes.
- Use the entire length of the blade in each cutting stroke.
- Cut harder material more slowly than soft material.

Horizontal Bandsaw

- Appropriate PPE is required: safety glasses, and protective gloves.
- Before using the band-saw take a minute to refresh yourself with all of its accessories and functions, if anything is not familiar you must ask either the professor or studio supervisor.
- Determine that the surrounding area is clean and clear and free of anything that could interfere with your operation of the machine. Make sure that the people working around you are aware of what you are about to do and an appropriate distance away before turning on the horizontal band-saw.
- The Horizontal Band-saw is used to make straight cuts through hard metals. -Before beginning any work on the band saw be sure of these things:
 - That the blade guides are set properly to control the blade as it is cutting and locked in place as close to the stock as possible.
 - That the stock is locked securely in the vise.
 - That the hydraulic down-feed is set to the proper speed for the cut to be made.
 - That the casters are locked in place so the saw cannot move while cutting.
 - That the stock that is being cut off is supported and will not fall to the floor when cut through.
 - That coolant/cutting fluid is turned on and flowing when the blade is moving.
 - That you have identified all dangerous areas of the tool and are prepared to keep your hands and other body parts a safe distance from these points.
 - That you know how you will react if something makes you uncomfortable during the cut and that you know where the off switch is and how best to access it if needed.
- Most metals can be cut on the Horizontal Band-saw. Extremely hard metals such as carbide and hardened steels cannot be cut. The blade does not go fast enough to properly cut wood. All material should be inspected prior to cutting and be free from any suspect foreign material or strange inclusions.
- Never place any part of your body in the path of the descending arm, even if it is locked in place.
- If you are cutting either heavy or long stock, you must be prepared for the weight distribution change when your stock has been cut through and the offcut falls off of the saw.
- Use caution when removing your stock as the cut may leave sharp burrs on the both the cut piece and the offcut.
- Return the saw to the state in which you found it when your cuts are completed and be sure to thoroughly clean the band saw and surrounding area after use.

Clean the cutting area, cutting fluid sometimes will contaminate the floor – use sawdust to soak up the fluid, sweep this up when finished.

Hot Glue Gun

- Examine the power cord and tool for obvious damage.
- If the heating element does not work inform the professor or studio supervisor
- Ensure that the cord does not create a slip/trip hazard.
- Ensure the workspace is well ventilated.
- Never leave the tool unattended when turned on or still hot. Leave unplugged when not in use.
- Keep fingers clear of the extremely hot tip and molten glue.
- Always wear safety glasses and leather gloves that are resistant to hot temperatures to protect against burns.
- During use, keep the gun in a position where it will have no contact with objects that easily catch fire. It is best placed on a support stand with the nozzle facing down.
- When placed on the support stand, place a material such as cardboard below the tip to help catch any molten glue that drips from the tip. The gun should never be placed on its side as the hot tip or molten HMA glue can cause a fire.
- Avoid prolonged use. This could overheat the tip element causing it to fail.
- Turn off and wait until the tip element has completely cooled before storing the glue gun away correctly.
- Leave the work area in a safe, clean, & tidy condition.

Hot Wire Foam Cutter and Hot Knives

The hot-wire foam cutter is a tool used to cut polystyrene foam and similar materials. This device consists of a thin, taut metal wire, often made of nichrome or stainless steel, or a thicker wire preformed into a desired shape, which is heated via electrical resistance to approximately 200°C. As the wire is passed through the material to be cut, the heat from the wire vaporizes the material just in advance of contact.

- Wear safety glasses, and use leather gloves at all times while using foam wire cutter.
- Always know where the power off switch is located in case of emergency.
- Always turn switch to off position when not in use.
- Always disconnect the foam wire cutter from the power source before servicing, repairing, or making any adjustments.
- Keep hands a safe distance away from the heated wire while in use.
- Never touch the wire when the machine is on.
- Work in a well-ventilated area when using this device – fumes are toxic.
- Do not use the device near combustible materials.
- Wear nonflammable protective garments that cover arms and legs to prevent burns.
- Do not wear loose clothing, as they could come into contact with the heated wire.
- Tie up long hair or wear protective hair covering to prevent hair from coming in contact with the heated wire.
- Clean the machine and workspace when finished.
- Return machine to its appropriate location.
- Report any malfunctions/damage/concerns to the professor or studio supervisor.

MIG welder

- Appropriate PPE must be worn: safety glasses, welding helmet, leather gloves, cotton shirt or welding jacket, and sturdy footwear.
- Ensure no slip/trip hazards are present in workspaces and walkways.
- Ensure the work area is clean and clear of grease, oil, and any flammable materials.
- Keep the welding equipment, work area and gloves dry to avoid electric shocks.
- Ensure gloves, welding torch and work leads are in good condition.
- Ensure others are protected, by using portable UV screens.
- Ensure fume extraction snorkels are on, that the dampers are open and within an 18” range of your work-zone before beginning.
- Ensure work leads do not create a tripping hazard.
- Faulty equipment must not be used. Immediately report suspect equipment to the professor or studio supervisor.
- Ensure machine is correctly set up for voltage, wire speed feed, and gas flow is turned on.
- Ensure ground cable makes firm contact to provide a good electrical connection.
- Pull the trigger on the welding gun to strike the arc and begin the process.
- Turn off the power when cleaning or changing the electrode or shielding gas cup.
- Never leave the welder running unattended.
- Switch off the machine and fume extraction.
- Close gas cylinder valve.
- Hang up welding gun and leads.
- Return the MIG welder to its storage area.
- Leave the work area in a safe, clean, and tidy condition.

Optical Tracer

- The optical tracer is used in conjunction with the plasma torch.
- The professor, and studio supervisor (trained personal) will assist you in operating this equipment.
- No unsupervised operations allowed.
- Provide a black line drawing or pattern cut from white paper/card of the desired shape to be cut.
- The unit can cut steel in a range from 16 gauge to 3/4” thick. Other non-ferrous materials can be cut also.
- Wear shade 5 welding glasses while the machine is tracing and cutting.
- Clean the tracing table after each use.
- Do not use the tracing table as a storage area or work surface – damage may occur.

Pneumatic Shaker/Mixer

- The shaker/mixer is designed for quart and gallon containers.
- Secure lids.
- Secure container into shaker/mixer using the clamp handle.
- Connect the compressed air line. Turn on ball valve.
- Mix the product for the needed amount of time.
- Turn off and disconnect the compressed air line.
- Remove container.
- Clean any spills.

Pallet truck

- Wear safety glasses and protective gloves.
- Keep hands and feet clear of the pallet trucks operation.
- Push the trigger in the handle forward to activate the jack, pull the handle back and forth to raise the pallet forks.
- Pull the trigger in the handle backwards to lower the pallet forks.
- The pallet jack is rated to lift 6000lbs.
- Keep the pallet jack clean.
- The pallet jack is designed to be used on a smooth surface.
- Return the pallet jack to its storage area
- Report any malfunctions/damage/concerns to the professor or studio supervisor.

Planishing Hammer

- This planishing hammer is designed and intended for use by properly trained and experienced personnel only. If you are not familiar with the proper and safe operation of a planishing hammer, do not use until proper training and knowledge have been obtained.
- Do not use this planishing hammer for other than its intended use.
- Always wear approved safety glasses/face shields while using this planishing hammer. Everyday eyeglasses only have impact resistant lenses; they are not safety glasses.
- Before operating this planishing hammer, remove tie, rings, watches and other jewelry, and roll sleeves up past the elbows. Remove all loose clothing and confine long hair. Non-slip footwear or anti-skid floor strips are recommended.
- Wear ear protectors (plugs or muffs) during extended periods of operation.
- Do not operate this machine while tired or under the influence of drugs, alcohol or any medication.
- Make all machine adjustments or maintenance with the machine unplugged from the power source.
- Remove adjusting keys and wrenches. Form a habit of checking to see that keys and adjusting wrenches are removed from the machine before turning it on.
- Check damaged parts. Before further use of the machine, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced.
- Provide for adequate space surrounding work area and non-glare, overhead lighting.
- Keep the floor around the machine clean and free of scrap material, oil and grease.
- Don't use in dangerous environment. Don't use power tools in damp or wet locations, or expose them to rain. Keep work area well lighted.
- Keep visitors a safe distance from the work area. Keep children away.
- Give your work undivided attention. Looking around, carrying on a conversation and "horse-play" are careless acts that can result in serious injury.
- Do not overreach. Keep proper footing and balance at all times.
- Use the right tool at the correct speed and feed rate. Do not force a tool or attachment to do a job for which it was not designed. The right tool will do the job better and more safely.
- Use recommended accessories; improper accessories may be hazardous.
- Maintain tools with care. Follow instructions for lubricating and changing accessories.

- Disconnect tools before servicing or changing accessories.
- Use leather gloves when handling sheet metal.
- Keep hands, fingers and arms away from the hammer and anvil during operation.
- Do not exceed the maximum rated air pressure to the regulator.
- Disconnect tool from air supply when not in use.
- Turn off the machine before cleaning. Use a brush or compressed air to remove chips or debris — do not use your hands.
- Do not stand on the machine. Serious injury could occur if the machine tips over.
- Never leave the machine running unattended. Turn the power off and do not leave the machine until it comes to a complete stop.
- Remove loose items and unnecessary work pieces from the area before starting the machine.

Pliers and Wire Cutters

- Wear personal protective equipment that is appropriate for the hazards you may be exposed to while performing the required task.
- Ensure there is adequate lighting in the work area.
- Oil pliers and wire cutters regularly. A drop of oil on the hinge will make the tools easier to use.
- Do not use any tools if you feel drowsy or unwell.
- Do not wear loose clothing, jewelry or long loose hair.
- Do not use any broken or unsafe tools, report to the professor or studio supervisor
- Do not cut hardened wire unless the pliers or wire cutters are specifically manufactured for this purpose.
- Do not bend stiff wire with light pliers. Needle nose pliers can be damaged by using the tips to bend large wire. Use a sturdier tool.
- Do not use pliers as a hammer.
- Do not hammer on pliers or wire cutters to cut wires or bolts.
- Do not extend the length of handles to gain greater leverage. Use a larger pair of pliers for gripping or a bolt cutter for cutting.
- Do not use cushion grip handles for jobs requiring tools with electrically insulated handles. Cushion grips do not protect against electric shock.
- Do not use pliers on nuts and bolts; use a wrench.
- Select pliers or wire cutters that are the proper type and size for the job.
- Use side cutting (Lineman) pliers to grip, splice or cut wires, and strip insulation.
- Use long nose pliers to grip small objects, reach awkward places, holding wires, bend loops and attach wires.
- Use utility pliers to grip round, square, flat and hexagonal objects.
- Use diagonal cutting pliers to cut and skin wires, cut and remove pins, nails and other fasteners.
- Use flat nose pliers to grip, turn and bend wires.
- Use slip joint pliers to adjust nuts or bolts.
- Use end cutting pliers to cut wires, nails or rivets close to work.
- Ensure the cutting edges are sharp. Dull and worn cutting edges require more force to cut material.

- Avoid pinching your fingers between plier jaws.
- Pull on pliers; do not push away from you when applying pressure. If the tool slips unexpectedly, you may lose your balance or hit your hand against something.
- Cut material at right angles.

Pneumatic shear

The pneumatic shear is designed to shear sheet metal.

- Wear safety glasses and protective gloves.
- Make sure the shear and material support table are clean and free of other materials/debris/obstructions
- The shear is activated by the foot pedal press it firmly when you need to cut, and release it after the shear has completed its cutting stroke.
- Make sure the ‘material stop arms’ and ‘stop’ on the rear of the shear are free of obstructions.
- Keep fingers clear from material clamp (yellow in color)
- Material will drop at the rear of the shear, support heavy or long drops.
- Clean up remnant drops at the rear of the shear when finished.
- Report any malfunctions/damage/concerns to the professor or studio supervisor.

Pneumatic Power Tools

- Appropriate PPE must be worn to protect against hazards that may be encountered while using pneumatic tools. Eye protection is required and face protection is recommended
- Never carry a tool by the air hose.
- Never yank the air hose to disconnect it from the receptacle.
- Keep cords and hoses away from heat, oil, and, sharp edges.
- Disconnect tools when not using, before servicing, and when changing accessories such as blades, bits, and cutters.
- Keep all observers at a safe distance from the work area.
- Compressed air guns should never be pointed toward anyone. The user should never “dead-end” it against him or herself or anyone else.
- Secure work with clamps or a vise, freeing both hands to operate the tool.
- Avoid accidental starting. Do not hold fingers on the switch button while carrying tools.
- Maintain tools with care
- Be sure to keep good footing and maintain good balance.
- Damaged or broken portable air tools, you should inform the professor or studio supervisor
- Pneumatic power tools shall be secured to the hose.
- Do not use air hoses to lower or raise tools.
- Keep the lines and connections in good condition.
- Use right size equipment for the job being done.
- When changing bits, sockets, or attachments, the hose shall be disconnected.
- Pneumatic tools that shoot nails, rivets, or staples, and operate at pressures more than 100 pounds per square inch, must be equipped with a special device to keep fasteners from being ejected unless the muzzle is pressed against the work surface.
- Keep your work area clean and tidy.

Power Bender

- The power bender is designed to allow the user to bend tubing or solid shaped stock metal into various radii, the minimum radius is 18" the maximum is infinite.
- You must have been instructed on how to use this equipment by the professor before operating.
- Wear safety glasses, protective gloves, pants, and sturdy shoes.
- Make sure the power bender is clean and free of dirt, dust, and obstructions
- Install the correct dies for the material stock being curved.
- Use material supports when curving long material stock.
- Stand to the side of the machine while the bending operation is in process.
- Make sure their path of movement is free and clear of obstructions.
- Do not apply too much pressure on the upper wheel - this can cause a failure and/or damage to the equipment.
- Material can become hot/ and sharp edges develop during the bending process.
- **Never walk away** from the equipment when it is powered on.
- Clean the work area and machine when you have finished.
- Make sure all power is off.
- Report any malfunctions/damage/concerns to the professor or studio supervisor.

Power Tools (general)

- Power tools can be extremely dangerous if they are used improperly. Common accidents associated with power tools include abrasions, cuts, lacerations, amputations, burns, electrocution, and broken bones.
- When working around power tools, you must wear the necessary personal protective equipment (PPE) and avoid wearing loose clothing or jewelry that could catch in moving machinery.
- Operate power tools only if you are trained and familiar with the tool.
- Inspect all power tools and cords before using them. They should be clean and in good condition. Do not use a tool if the cord is damaged or loose.
- Make sure the work area is well lit- do not use the power tool if you cannot see the work area clearly.
- Make sure the tool is off before plugging it into a power source.
- Do not distract or disturb a co-worker who is using a power tool.
- Ensure that cords and hose are not posing a tripping hazard.
- Do not use power tools near areas of water.
- Report any tools that are defective or in unsatisfactory condition to the professor or studio supervisor.

Pressure Washer

- Always wear full eye protection (goggles, face shield and dust mask), protective clothing, gloves, and rubber boots when operating the machine to protect yourself from burns caused by hot spray, fluid injection, or debris dislodged by high pressure spray.
- Never point the spray gun at other persons or any part of the body.
- Never put hands or fingers over the spray tip while in operation.
- Never use your hands to stop or detect leaks.
- Always shut off the unit and trigger the pressure gun to relieve system pressure before removing the spray tip or before performing any machine service.

- Never alter or modify this equipment! Your personal safety as well as the safety of other persons is at stake.
- Never exceed the factory pressure or temperature rating of the system. Be sure all accessory equipment and system components used will withstand the pressure developed.
- Never let the pump run without water supply flowing through the unit.
- Never let the unit run for more than five minutes with the gun in the closed position.
- Keep all persons at a safe distance when using the machine.
- Never attempt to clean or wash down the machine using its own spray gun. The machine is water protected, but not waterproof. Cleaning the machine in this manner will increase the hazard of electrical shock and/or damage to the machine.
- Never leave an operating machine unattended. Always shut off the machine and relieve pressure before leaving the machine.
- Never spray liquids or toxic chemicals such as insecticides or weed killer.
- Do not operate the machine where combustible fumes or dust may be present.
- Do not use detergents, which are not compatible with the discharge hose. Read and follow the instructions given by the detergent's manufacturer. Also follow directions on the container regarding contact with the eyes, nose, and skin.
- Always provide approved vent stacks if the machine is to be used in an enclosed area.
- Comply with all national, state, and local codes for locating, venting, and using the machine in enclosed areas. Exhaust fumes contain odorless, invisible gases, which can kill without warning.
- Always connect the machine to the correct electrical supply outlet. Comply with all local and national codes and ordinances regarding electrical requirements.
- Do not allow electrical extension cord connections to fall or lay in water. Use only extension cords rated for use with this machine.
- Always respect and be alert to the potential hazards of electrical equipment, moving parts, and high-pressure spray.
- Always disconnect the electrical plug before performing any repairs or service on the machine. DO NOT attempt repairs or modifications you do not understand.
- DO NOT route hose in a manner that will cause sharp bending, kinking, cutting, abrasion, or exterior damage.
- DO NOT pull on the hose to move the machine, untangle knots, or use any other excessive pulling stresses.
DO NOT use the hose if cuts, leaks, abrasions, bulges, or coupling damage is evident.
- Always examine hose couplings and quick disconnect (if provided) before each operation. If leaking is evident, do not use. Contact the professor or studio supervisor
- Never leave the discharge hose lying on the floor or ground to be driven over by vehicles or damaged by falling objects. Always coil and hang the hose immediately after use.

Rotex Hole Punch

- Wear eye protection.
- The punch is designed to make holes in sheet material, the maximum gauge for steel; 18 gauge, softer materials; 16 gauge.
- Do not exceed the maximum thickness rating, damage to the machine will occur.
- Do not use cheater bars or extend the handle with any means to punch.
- Clean material only.

- The punch and dies are designed to work together, when adjusting use the peg and slot spanner to keep upper and lower punch and die together.
- Always check alignment of dies before cutting.
- Keep fingers clear of punching operation.
- Hold material while punching.
- Clean and lubricate the machine periodically.
- Clean work area after use.
- Report any malfunction, damage, or breakage to the professor or shop supervisor.
- Keep the handle in the upright position when not in use.

Sanding Machine Safety

- Wear PPE suitable for the task: eye protection, ear protection, gloves, etc. Secure all loose clothing, hair and hanging jewelry.
- Clean table and area around sanding machine before and after working.
- Visually inspect sanding belts, and disks making sure they are in good condition before operating. Do not use if disks or belts are torn.
- Use the table of the sanding machine to control the position of your work as much as possible.
- Small or irregular shaped pieces or forms should be held in a clamp or special jig or fixture instead of fingers.
- Turn on exhaust system and open damper gate for the machine you are using. Making sure all other gates are closed. Turn off the system when you have finished.

Report any malfunctions or concerns to the Professor, studio supervisor, or 3D Technician.

Scissor lift table

- Wear safety glasses and protective gloves.
- Keep hands and feet clear of the Scissor lift tables operation.
- Push the trigger in the handle forward to activate the jack, pump the foot pedal to raise the table.
- Pull the trigger in the handle backwards to lower the Scissor lift table
- The Scissor lift table is rated to lift 1650lbs.
- Keep the Scissor lift table clean.
- The Scissor lift table is designed to be used on a smooth surface.
- Return the Scissor lift table to its storage area
- Report any malfunctions/damage/concerns to the professor or studio supervisor.

Screwdrivers

- Wear appropriate personal protective equipment such as safety footwear and safety glasses.
- Ensure the work area is clear of debris.
- Ensure there is adequate lighting in the work area.
- Do not use any tools if you feel drowsy or unwell.
- Do not wear loose clothing, jewelry or long loose hair while using a screwdriver.
- Do not use any broken or unsafe tools, inform the professor or shop supervisor
- Do not lean or push on a screwdriver with any more force than is necessary

to maintain contact with the screw.

- Do not hold the stock in one hand while using the screwdriver with the other hand. If the screwdriver slips out of the slot, it could cut your hand.
- Do not hammer screws which cannot be turned.
- Do not grind the tip of the screwdriver to fit all sizes of screw heads.
- Do not try to use a screwdriver on a screw head for which it was not designed.
- Do not use a screwdriver for prying, punching, chiseling, scoring, scraping or stirring paint.
- Do not use pliers on the handle of a screwdriver for extra turning power.
- Do not expose a screwdriver blade to excessive heat. Heat can affect the temper of the metal and weaken the tool.
- Do not use a screwdriver to check if an electrical circuit is live.
- Do not carry screwdrivers in your pockets.
- Do not use a screwdriver for a purpose for which it was not designed or intended.
- Select a screwdriver that is the proper type and size for the job. The tip of a slotted screwdriver should be the same width as the screw head.
- Ensure the material or stock is secure. Use a clamp or vise as required.
- Position the screwdriver directly over the screw being driven.
- Apply enough pressure on the screwdriver to maintain contact with the screw.

Bench/Slot/Rod shears

- Shears must be securely fastened to a bench or purpose designed stand.
- PPE must be worn, safety glasses, sturdy footwear, and protective gloves.
- Working parts should be well lubricated (use an appropriate lubricant, not WD40) and the blades free of dirt and rust.
- Ensure no slip/trip hazards are present in work area.
- Sufficient space must exist around the machine to prevent accidental contact with others.
- Report suspect (broken, improperly working) machinery immediately to the professor or studio supervisor.
- Do not cut material beyond the machines capacity with respect to thickness, shape, or type.
- Support large material while cutting.
- Hold material securely while cutting.
- Ensure fingers and limbs are clear before operating the shears.
- Leave the shear, and work area, safe, clean, and tidy.

Silica Diffuser – ceramic shell

- Wear eye protection and use a dust mask if working for prolonged periods of time
- Turn-on diffuser after dipping wax model in slurry
- Slowly lower wet (with slurry, but not dripping) into aerated silica.
- Look for uniform coverage.

- Turn off, silica diffuser.
- Allow the work to dry thoroughly between coats.
- Clean and tidy the work area.
- Report any malfunctions/damage/concerns to the professor or studio supervisor.

Slip Rollers

The slip roller is a device used to make simple curves in sheet metal. The operation relies on a series of rollers to stretch the metal into a curved shape.

- Wear eyeglasses and protective gloves.
- Check to make sure the rollers are clean and clear of debris before attempting to roll any metal.
- The rollers are designed for clean sheet metals, if rollers are equipped with slots on the right side of the front rollers they may be used for rolling rod of the same dimension.
- Set the rollers for your material thickness and desired curve. Use scrap of the same material and thickness as test pieces.
- The maximum thickness for the gauge of material is written on the rollers. Do not exceed this maximum – you will break, distort, and damage the rollers.
- While facing the machine insert your metal into the front roller while simultaneously turning the lever arm. Be very careful to keep your hands away from the roller while turning the arm. Also be aware of your material twisting up and out of the top of the machine.
- Continue rolling until the material travels through the machine at which time you will collect it from the top taking care not to drop it to the floor once it is released from the rollers.
- Release tension on the front rollers before opening the top roller to remove rolled work piece
- Always be careful of a recently shaped metal edge, as it can be very sharp.
- Clean machine and work area when finished.
- Report any malfunctions/damage/concerns to the professor or studio supervisor.

Slurry mixer

- Wear safety glasses and protective gloves (if necessary).
- Remove the lid on the slurry mixer.
- Push the RED switch on the wall, the orange safety light will flash-this disables the mixing blade.
- Dip your wax model slowly into slurry, fully submerge and gently move around in a circular motion. Take care not to let go.
- Pull the wax model out slowly and allow drips to fall off.
- The wax is now ready for silica coating, move to either fine or medium silica as necessary.
- Follow the guidelines for building the shell.
- Clean the lip of the slurry mixer.
- Replace the lid on the mixer.
- Twist and pull (gently) the RED switch to reenergize the mixing unit. The flashing safety light will stop.
- Important - you must turn the mixer back on, or the slurry will solidify.
- Clean the work area immediately or let drips dry and chip them up with a floor scrapper.
- Report any malfunctions/damage/concerns to the professor or studio supervisor.

Soldering Iron

- Wear the appropriate PPE, safety glasses, long pants, and sturdy-shoes.
- Examine the power cord and iron for obvious damage. Inform the professor or studio supervisor.
- Ensure that the cord does not create a slip/trip hazard
- Ensure the workspace is well ventilated to prevent fumes in the breathing zone e.g. use, in open area with cross ventilation or with fume extraction system
- Check condition of soldering tip. Replace if damaged.
- Ensure tip is 'tinned' & free from waste build-up. Once the tip has warmed-up, wipe on a damp sponge to clean
- Leave the soldering iron in the stand when warming up
- Never leave a soldering iron unattended when turned on or still hot. Leave unplugged when not required.
- Never touch the soldering tip. Keep your fingers clear.
- Avoid positioning your head directly over the soldering process. Soldering often creates fumes that can be toxic.
- Avoid prolonged use. This could overheat the tip element causing it to fail or oxidize
- Always allow the soldering iron to reach the desired temperature. This can take several minutes
- Ensure electrical cords are well clear of the soldering process. Do NOT touch electrical cords with the tip
- Wash your hands after using solder – many soft solders contain toxic lead products.
- Never leave the machine unattended when still switched ON or when switched OFF but still HOT.
- Turn off and wait until the tip element has completely cooled before storing the machine away correctly.
- Never flick the iron to remove excess solder.

Spot Welder

- Appropriate PPE must be worn: welding glasses – shade 5, leather gloves, cotton shirt or welding jacket, and sturdy footwear.
- Ensure no slip/trip hazards are present in workspaces and walkways.
- Ensure the work area is clean and clear of grease, oil, and any flammable materials.
- Keep the welding equipment, work area and gloves dry to avoid electric shocks.
- Ensure the electrode tips of the arms are not deformed and meet together well when they are closed and are in good condition.
- Ensure others are protected, by using portable UV screens.
- Ensure fume extraction snorkels are on, that the dampers are open and within an 18” range of your work-zone before beginning.
- Ensure power leads do not create a tripping hazard.
- Faulty equipment must not be used. Immediately report suspect equipment to the professor or studio supervisor.
- Ensure machine is correctly set up for material thickness and weld timer is set before turning on.
- Turn off the power when cleaning electrode tips.
- Never leave the welder running unattended.
- Switch off the machine and fume extraction.
- Hang up power leads.

- Return the spot welder to its storage area.
- Leave the work area in a safe, clean, and tidy condition.

Step Ladder

- Use the step ladder on a smooth and stable surface only!
 - Whenever possible have a second person or “spotter” to keep the step ladder secure and stable.
 - Never use the top step to stand on – this is very unstable/unsafe.
 - Never move a stepladder with tools or other materials resting on the top step or other steps.
 - Do not place platforms between step ladders unless the step ladders and platform are designed to be used together and will lock in place.
- Report any malfunctions/damage/concerns to the professor or studio supervisor.

Stove top

- Wear safety glasses and protective gloves (if necessary)
- Turn on the hot plate you want to use the red light on the front panel will indicate it is powered.
- Turn on exhaust fume hood
- Monitor heating and adjust the temperature as necessary.
- Keep wax at the lowest possible temperature.
- The unit is designed for continuous use-do not turn off until necessary.
- To switch off the heating element turn the knob on front panel until the red light goes out.
- Keep the work area clean, scrape up spilt wax and reuse as soon as possible.
- Report any malfunctions/damage/concerns to the professor or studio supervisor.

TIG Welder

- Appropriate PPE must be worn: safety glasses, welding helmet, leather gloves, cotton shirt or welding jacket, and sturdy footwear.
- Ensure no slip/trip hazards are present in workspaces and walkways.
- Ensure the work area is clean and clear of grease, oil, and any flammable materials.
- Keep the welding equipment, work area and gloves dry to avoid electric shocks.
- Ensure gloves, welding torch and work leads are in good condition.
- Ensure others are protected, by using portable UV screens.
- Ensure fume extraction snorkels are on, that the dampers are open and within an 18” range of your work-zone before beginning.
- Ensure work leads do not create a tripping hazard.
- Faulty equipment must not be used. Immediately report suspect equipment to the professor or studio supervisor.
- Ensure machine is correctly set up for current, voltage, and gas flow is turned on.
- Ensure ground cable make firm contact to provide a good electrical connection.
- Strike the arc before placing the tip of the filler wire in the weld zone.
- Turn of the power while changing tungsten electrodes.
- Never leave the welder running unattended.
- Switch off the machine and fume extraction.

- Close gas cylinder valve.
- Hang up welding gun and leads.
- Leave the work area in a safe, clean, and tidy condition

Power Trip Hammer, Big Blu

- Wear appropriate PPE - safety glasses, ear protection, gloves, leather apron.
- Prior to starting, check hex bolts on top and bottom of drawing dies to ensure tightness. **THESE MUST BE CHECKED EVERY 5 MINUTES TO ENSURE THEY HAVE NOT LOOSENED IN THE HAMMERING PROCESS.**
- Lubricate 4 tracks on sliding mechanism under the hydraulic ram and the hydraulic ram with lubricating can provided. **LUBRICATE THESE COMPONENTS EVERY 5 MINUTES TO ENSURE YOU DON'T CAUSE UNNECESSARY WEAR ON MACHINE.**
- Stand clear of machine and turn on compressed air ball valve located at top rear of machine.
- The foot control bar located at bottom front of machine initiates hammering process dependent on pressure. Slowly press foot control bar until desired hammering impact and speed are achieved.
- **DO NOT PLACE HANDS ON OR NEAR DIES UNLESS MACHINE IS OFF.** Clean top and bottom dies with brush or rag periodically to prevent debris from contaminating forging area.
- Turn off the ball valve when you are finished.
- Lubricate machine again and check tightness of hex bolts prior to clean up.
- Wipe down entire machine, sweep debris from surrounding area and report any malfunctions to the professor or studio supervisor.

Vacuum Cleaner

- Do not leave appliance when plugged in.
- Do not use with damaged cord or plug. If appliance is not working as it should, has been dropped, damaged, left outdoors, or dropped into water, inform the professor or studio supervisor.
- Do not pull or carry by cord, close a door on cord, or pull around sharp edges or corners. Do not run appliance over cord. Keep cord away from heated surfaced.
- Do not unplug by pulling on cord. To unplug, grasp the plug, not the cord.
- Do not handle plug or appliance with wet hands.
- Do not put any object into openings. Do not use with any opening blocked; keep free of dust, lint, hair, and anything that may reduce airflow.
- Keep hair, fingers, and all parts of body away from openings and moving parts.
- Do not pick up anything that is burning or smoking, such as cigarettes, matches, or hot ashes.
- Do not use without dust bag and/or filters in place.
- Turn off all controls before unplugging.
- Do not use to pick up any liquids, flammable or combustible liquids such as gasoline or use in areas where they may be present.
- Use extra care when cleaning on stairs.

Vacuum Former

- Wear appropriate PPE - safety glasses, long pants, sturdy shoes, and cotton or leather gloves.
- Wearing a protective workshop apron is encouraged.

- Tie back long hair or wear a cap
- Ensure this machine has a suitable safe work area with no tripping hazards (electrical cords, pneumatic hoses, etc.)
- Check the general condition of the forming table.
- Use matching forming frames and vacuum boxes.
- Ensure that all clamping arrangements are adequate, secure and correctly adjusted.
- Familiarize yourself with all machine operations and controls.
- Before switching on the power, ensure all controls are in their correct positions.
- Check all adjustments, i.e. heat settings and vacuum pressures, before attempting to vacuum form around a mold or shape.
- Take particular care when vacuum forming very hot thermoplastic materials.
- High vacuum pressures are used in this forming process, do not place body parts on or near the vacuum port when pressurized.
- Pre-heat the oven to be sure it has reached the required temperature. Always handle heated plastic material with suitable cotton or leather gloves.
- Turn off the heater element (oven) as soon as possible, and keep your hands well clear of any hot surfaces.
- Ensure that the vacuum pressure is released to zero before removing the frame from the vacuum box.
- Only use low-pressure compressed air to cool down an article or to clean down the work area.
- Clean the work area and machine when you have finished.
- Report any malfunctions/damage/concerns to the professor or studio supervisor.

Vertical Milling Machine

- Do not use this machine unless you are authorized or have been instructed in its safe use and operation.
- Always wear eye protection.
- Correct dress is important, remove rings and watches, and roll sleeves above elbows.
- Always stop the machine before making adjustments.
- Handle sharp cutters, centers, and drill bits with care.
- Know where the emergency stop is before operating the machine.
- Use pliers or a brush to remove chips and swarf, never your hands.
- Use the correct tool for the job.
- Always use sharp milling bits and cutting fluids where possible to reduce friction and cutting forces.
- Clamp work securely in vice and/or milling table.
- Use the correct cutting speed for milling bit size and material.
- Make sure you clean up the work area and machine once you are finished.
- Place all tools used back where they belong.
- Lock the machine out and the tool cabinet, and replace keys in lock box.
- Report any malfunctions, damage, or breakage to the professor or shop supervisor.