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1. Machine Shop Staff

(L to R) Paul Tompkins, Roland Pierson, and Jim Howard

2. Shop Safety, Shop Hours
- SAFETY GLASSES and SHOES are required when working in the student shop
- NO FOOD OR DRINK is allowed in the student shop
- USE CAUTION when working with any hand or power tool
- The first step in preventing personal injury or machine damage in the shop is to make sure you are familiar with and know how to correctly operate the equipment you are using. If you don’t know, ask the area technician or shop personnel.
- Accidents are caused by inattention, taking chances, horseplay, bad judgment, fatigue, uncooperativeness, improper clothing, defective tools, etc.
• By following the safety rules given in the following pages and by cooperating with, and following any additional instructions the area technician or shop personnel might have, we can prevent mishap.
• Please read over this manual carefully and follow the rules described. If you have any questions about the operation of any machine or tool, ask the area technician or personnel for instructions.

**Shop Hours:**
• Regular hours: The Student Shop space will be open M-F 7am-4pm. Access to the student shop may be limited during scheduled classes, and holidays.
• Nights and weekend access must be obtained by asking your instructor to apply for access to campus safety. This will require your full name and student ID number.
• Delta and Rockwell drill presses and Delta wood scroll saw will always be available for use.
• Machine tools including Band Saw, Belt Sander, Milling Machine, Large and Small Lathe, as well as precision tool cabinet, will only be available when shop is supervised.
• For the winter term, supervision will be Tuesday-Thursday 8AM -4PM.

3. **General Shop Safety Rules**
• In case of injury, report it to the shop personnel. The campus safety phone number is x6911
• SAFETY GLASSES and appropriate clothing/shoes are required at all times in the shop.
• SHOES must be worn in any shop area. The minimum footwear must cover the entire foot. No one wearing sandals will be allowed to use the shop space.
• DO NOT operate any equipment unless you are familiar with its operation. If you have any questions regarding the use of equipment ask the area personnel.
• Avoid excessive use of compressed air to blow dirt or chips from machinery, to avoid scattering chips. Never use compressed air guns to clean clothing, hair, or aim at another person.
• In case of injury, report it to the shop personnel. The campus safety phone number is 6911.
• If chemicals get in the eye, wash eye for 15 minutes in the eye wash. Notify campus safety at 6911.
• Do not wear ties, loose clothing, jewelry, gloves, etc. around moving or rotating machinery. Long hair must be tied back or covered to keep it away from moving machinery.
• Do not work in the shop if tired.
• Never indulge in horseplay in the shop areas.
• All machines must be operated with all required guards and shields in place.
• A brush, hood or special tool is preferred for removal of chips, shavings, etc. from the work area. Never use hands.
• Keep fingers clear of the point of operation of machines by using special tools or devices, such as push sticks, hooks or pliers, etc. Never use a rag near moving machinery.
• A hard hammer should not be used to strike a hardened tool or any machine part. Use a soft faced hammer.
• Practice cleanliness in shop areas.
• Keep the floor around the machines clean, dry and free from trip hazards. Do not allow chips to accumulate.
• Before starting a machine, always check it for correct setup and always check to see if machine is clear by operating it by hand, if possible.
• Do not drink alcoholic beverages before or during work in the machine shop area. Do not bring food/snacks into the shop.
• Don't rush or take chances. Obey all safety rules.
• Heavy sanding and painting should only be done in well ventilated areas, preferably on the loading dock.
• Follow all appropriate precautions when working with solvents, paints, adhesives or other chemicals. Use appropriate protective equipment.

4. Drill Press Safety Rules
• Run drill at correct RPM for material, and drill bit size. General rule is the harder the material or the bigger the drill bit size, the slower the RPM.
• Always hold work in a vise or clamp to the drill table.
• Use the proper cutting fluid for the material being drilled. Ask the shop personnel about the appropriate fluid for the material you are machining.
• Remove chips with a brush, never by hand.
• Ease up on drilling pressure as the drill starts to break through the bottom of the material.
• Don't drill with too much pressure.
• Always try to support part on parallels or a backing board when drilling through material.
• Always clean drill shank, sleeve and spindle hole before mounting bit.
• Never try to loosen the drill chuck while the power is on.
• Never clean the machine while it is still in motion.
• If the drill binds in a hole, stop the machine and turn the spindle backwards by hand to release the bit.
• When drilling a deep hole, withdraw the bit frequently to clear chips.
• Always remove the drill chuck key from the spindle immediately after using.
• Wear safety eye protection while drilling.
• Let the spindle stop of its own accord after turning the power off. Never try to stop the spindle with your hand.
• Plexiglas and other brittle plastics can be difficult to drill. Ask the shop personnel for advice on drill and coolant selection when drilling these materials.
• DO NOT wear gloves when operating the drill press
5. Lathe Safety Rules

- Move the tool bit a safe distance from the collet or chuck when inserting or removing work.
- Don’t run the machine faster than the proper cutting speed.
- If any filing is done on work rotating in the lathe, file left handed to prevent slipping into the chuck. Never use a file without a handle.
- Do not grasp or touch chips or turnings with your fingers, but get rid of them using a blunt instrument. It is safer to turn off the lathe before clearing chips then to leave it running.
- Remove chuck key from chuck immediately after using.
- Turn chuck through by hand before turning on the power to be sure there is no binding or clearance problem.
- Stop the machine before taking measurements.
- DO NOT wear gloves when operating lathe.

• Work must be clamped securely in a vise and vise clamped tightly to the table, or work must be clamped securely to the table.
• Make sure cutter is rotating in the proper direction before cutting material.
• Before turning on the machine the spindle should be rotated by hand to make sure it is clear for cutting.
• Make sure the power is off before changing cutters.
• Always use the proper cutting fluid for the material being cut.
• Never run the machine faster than the correct cutting speed.
• Make sure that the machine is fully stopped before taking any measurements.
• Always use cutters which are sharp and in good condition.
• Don't place anything on the milling machine table such as wrenches, hammers, or tools.
• Always stay at the machine while it is running.
• Don't take too heavy a cut or use too rapid a feed.
• Remove the collet tightening wrench immediately after using it.
• Before cleaning the mill remove cutting tools from the spindle to avoid cutting yourself.
• DO NOT wear gloves when operating milling machine

7. Band Saw Safety Rules
• The upper guide and guard should be set as close to the work as possible, at least within ¼ inch.
• If the band breaks or comes off its track, shut off the power and stand clear until the machine has stopped.
• If the saw stalls in a cut turn the power off and reverse the blade by hand to free it.
• Use lubricating stick on blade before operating.

8. Table Saw Safety Rules
• Stand to one side, never directly in line with, the work being fed through the saw.
• Use the proper blade for the material and type of cut. Do not use a rip blade for cross cutting. Do not use a plywood blade for anything but plywood.
• Inspect the blade before using it, make sure it is the proper blade and is sharp and free from cracks.
• Never allow your fingers to get near the blade when sawing. Use a pusher stick to rip narrow pieces of stock. Don't use push sticks to remove scrap for scrap removal, shut off the machine and wait until the blade stops, then remove scraps.
• Guards must be in place at all times. Never remove the guard.
• If the piece of material is too large, get someone to assist in tailing off for you. Never try to do it alone. Tailing off refers to supporting a large work piece by supporting it underneath with your hands.
• If you are tailing off for someone else, let them guide the work through the saw. You should just support the work without influencing the cut.
• Never reach over the saw to obtain something from the other side.
• When shutting off the power, never attempt to stop the saw quickly by shoving anything against the blade. Make sure the saw has stopped before leaving it.
• Never make any adjustments to the saw while it is running. Turn off the power and make sure the saw is completely stopped before attempting to adjust it.
• Do not allow material to collect on or around the saw table. Sweep up sawdust and material scraps regularly while working to minimize chances of slipping or stumbling.
• Make sure that you clean up thoroughly around the saw before leaving the area. If you don’t you could be the cause of someone else having an accident.
• The circular blade of the table saw should be set to 1/8 inch above the work.
• Get shop personnel approval before using the saw.

9. Power Hand (Skill) Saw Safety Rules
• Before using any power tool, inspect it to make sure the cord is not damaged in any way, that the ground pin is intact, and that the blade is sharp and undamaged.
• Do not use the saw in a wet area.
• Do not run the extension cord across walkways where people might trip over it or where the cord may be run over and damaged.
• Keep your head out of the path of particles thrown out by the blade.
• Disconnect the power cord before cleaning, changing blades, or making any adjustments to the saw.
• When necessary to raise the guard for certain types of cuts, use the guard lever.
• Never wedge, wire or otherwise jam the guard to prevent it from working.
• Wait until the saw stops before lifting it from the cut.
• Before setting the saw sown, make sure the guard is closed, as the blade may still be turning.
• Don’t carry the saw with your fingers on the switch trigger.
• Don’t pull the saw backwards in a cut if you can avoid it.
• Use the proper blade for the type of cut to be made.
• Do not use the cord to move or drag the saw.
• Do not use the power saw for cuts if you cannot keep a firm and secure grip on the saw and the material being cut. A hand saw is still the best for some kinds of work and often faster. Before cutting small work pieces, shop personnel should be consulted.

10. **Belt Sander Safety Rules**
   • Do not operate sander without the guards in place.
   • Always attempt to place your work against the rest table on the sander.
   • Do not operate the sander if the belt is ripped or torn.
   • Do not sand any material that will give off a dangerous dust.