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SHOP RULES

1. Check in with Shop personnel when entering the Shop to work.
2. The shop is only to be used with proper supervision for purposes relative to the overall
   mission of the University: shop manager, shop monitor, or class instructor must be present.
3. You must complete Shop Orientation and training before using any equipment.
4. There shall be **no unauthorized visitors** in the shop
5. Eye Protection: safety glasses, goggles, or face shields are **required** to be worn at **all times** in the shop in the shop.
6. Proper ear protection should be worn at all times while working in the shop.
7. Use of a dust mask is recommended while working in the shop.
8. Work Clothing:
   – any loose clothing, hair, jewelry, etc are not permitted in the shop
   – **closed toe shoes only**; no flip flops, sandals, high heels, etc
9. No horseplay… running, fooling around, etc may contribute to an accident
10. **Be Alert!** Please consider the safety of all persons while working in the shop
11. Report all accidents, missing or malfunctioning equipment or tools to shop personnel.
12. Do **not** attempt to repair or alter the equipment yourself. Do **not** attempt to operate malfunctioning equipment
13. Do not operate any equipment while under the influence of drugs, alcohol or any medication.
14. Cell Phones are **NOT ALLOWED** in Shop area.
15. Headphones, I-Pods, Discman, etc. are allowed as long as they do not distract operator.
16. **NO TOOLS/EQUIPMENT are to be removed from the Shop without permission.**
    Anyone caught taking shop property without authorization will loose all Shop access.
    A student caught stealing Shop equipment will be turned in to Campus Police.
17. Always clean your work area and check out before leaving the shop.

Safety & Health Procedures

PERSONAL SAFETY:

Woodworking can be dangerous unless safe and proper operating procedures are followed. As with all machinery, there are certain hazards involved with the operation of power tools. Using the machines with respect and caution will considerably lessen the possibility of personal injury. However, if normal safety precautions are overlooked or ignored, personal injury to the operator may result. Safety equipment such as guards, push sticks, hold-downs, feather boards, eye protection, dust masks and hearing protection can reduce potential

risks of injury. But even the best guard won't make up for poor judgment, carelessness or inattention. Always use common sense and exercise caution in the workshop. If a procedure feels dangerous, don't try it. When in doubt ask shop personnel for an alternative procedure that will be safe. **REMEMBER: Your personal safety is your responsibility.** The best way to protect oneself from injury is to have a clear understanding of how the tools work and what are the potential dangers. If you understand the underlying forces at work, you will be able to foresee and avoid accidents caused by ignorance or carelessness.

ACCIDENTS:

Dial 911 on any campus phone to report emergencies

Any accident should be reported immediately and, if needed, first aid applied. First aid is the "immediate, temporary care given the victim of an accident of sudden illness until the services of a physician can be obtained."

A recent consideration in first aid care is Blood borne pathogens. These include serious diseases such as the HIV virus that causes AIDS, and hepatitis B and C viruses. To protect yourself, Universal Precautions must be observed. Universal Precautions mean treating all human blood/fluids as if it was infected, regardless of the person who is injured. This can best be accomplished by wearing vinyl or latex gloves when treating a victim. If a blood spill occurs, notify the Instructor or Shop Supervisor immediately. Remember that serious accidents do not occur if workers are safety conscious and follow recommended precautions.

FIRE PREVENTION:

1. Be aware of any ignition sources; open flames, sparks, heating elements, spark gaps (motors,
   switches, friction, static, etc)
2. Do not use flammable liquids in the presence of ignition sources, and vice versa
3. Flammable liquids give off vapors, which may burn or explode. Be sure they are properly
   stored and labeled. Report spills immediately.
4. Do not overload electrical circuits, and report ANY electrical malfunctions immediately to
   shop personnel.
5. Good housekeeping is a key element in fire prevention, and proper standards must be
   enforced in the shop.
6. Flammables Store all flammable material in the Flammable storage Cabinets.
   This includes: paint, paint thinner, spray paint, acetone, wood finish, etc.

LOUD NOISES:

Exposure to loud noises can cause hearing loss. The loss of hearing is cumulative, and happens gradually so you may not realize you are damaging your hearing

when you use loud equipment. Use of proper fitting and authorized earplugs or earmuffs is strongly recommended when using loud equipment for an extended period

GENERAL RULES

1. SEEK INSTRUCTION AND ADVICE. Never use any type of tool for which you have not received specific instruction on its proper and safe use by the shop supervisor, shop monitors, or class Instructor even if you have previous experience. You must know the tool's application and limitations, as well as the specific hazards of its operation before using any tool. If you are unfamiliar with any tools, ask one of the appropriate shop personnel to assist you.
2. KEEP WORK AREA CLEAN. Cluttered areas and benches invite accidents. Keep book bags, extension cords and other material out of the walkways. Always be alert to other people in the area.
3. DO NOT PERFORM SET-UP OR LAYOUT WITH THE MACHINE RUNNING. Turn the machine on only when ready to perform operation.
4. NEVER ADJUST THE MACHINE'S SETTINGS WITH THE TOOL RUNNING.
5. FAMILIARIZE YOURSELF WITH THE MACHINE BEFORE USING IT. Always know where the on/off switch is. If an emergency situation arises, turn off the power first (if possible).
6. ALWAYS CHECK MACHINE SETTINGS BEFORE USE. The previous user may have left the settings wrong or loose. Always reset the tool to its zero position when done.
7. PERFORM A DRY RUN WITH THE MACHINE OFF AFTER CHANGING SETTINGS. Make sure that all adjustments are tight and locked, and that movement is free.
8. USE THE RIGHT TOOL. Don't force a tool or attachment to do a job for which it was not designed.
9. SECURE THE WORK. Use clamps or a vise to hold the work when practical.
It's safer than using your hand and frees both hands to operate the tool. The saw will likely throw the wood violently than cut it unless it is firmly fixed against the table and fence.
10. ALWAYS HOLD THE LONG SIDE OF THE CUT. Keep hands a safe distance from the blade.
11. BOTH ENDS OF WOOD MUST BE SUPPORTED, EVEN AFTER THE CUT. The free end of a cut must not bind with the blade after the cut is made.
12. DO NOT CUT SMALL PIECES ON CIRCULAR SAWS. Always keep hands at least 6" away from circular blades. Clamp small pieces or fashion a jig or hold-down. Otherwise, use hand tools to make cuts on small pieces.
13. DO NOT CUT IRREGULARLY SHAPED, WARPED, OR SPLIT WOOD. The wood must sit flat against the saw's table and fence.
14. DO NOT CUT WOOD CONTAINING NAILS OR OTHER FOREIGN MATERIALS. Metal will dull blades, instantly cause sparks, and become dangerous projectiles.
15. USE CAUTION WHEN CUTTING THROUGH KNOTS. Knots will often fragment unpredictably, turning into dangerous projectiles.

16. DO NOT START MOTORS WITH THE BLADE TOUCHING THE WOOD. Allow the blade to reach full speed before beginning the cut.
17. MAKE CUTS WITH SLOW STEADY FEED. Do not try to cut too quickly or abruptly. Always be prepared to stop the cut. Sudden movements invite a loss of control.
18. KEEP HAND OUT OF THE CUT PATH AT ALL TIMES. Always be aware of your hands in relation to the blade. Always be aware of the cut path.
19. Be Patient! Always let machine come to a complete stop before removing scraps.
20. DO NOT OVERREACH. Keep proper footing and balance at all times. Do not reach over or across blades and moving parts. Do not reach under machines that are on.
21. DO NOT USE DULL OR DAMAGED BLADES. Stop cutting and alert shop personnel if cutting is difficult.
22. DISCONNECT TOOLS THAT APPEAR TO BE DAMAGED OR MALFUNCTIONING. Alert shop personnel. Never reconnect tools found disconnected without the permission of shop personnel.
23. REDUCE THE RISK OF UNINTENTIONAL STARTING. Make sure switch is in "OFF" position before plugging in power cord.
24. NEVER LEAN ON TOOL. Serious injury could occur if the tool is tipped or if the cutting tool is accidentally contacted.
25. DIRECTION OF FEED. Feed work into a blade or cutter against the direction of rotation of the blade or cutter only.
26. NEVER LEAVE TOOL RUNNING UNATTENDED. TURN POWER OFF. Don't leave tool until it comes to a complete stop. Do not turn your back on running tools.
27. TOOLS MUST BE CHECKED OUT BY SHOP PERSONNEL FOR USE OUTSIDE OF SHOP. You must leave your Student ID.
28. NO TREATED LUMBER ALLOWED IN THE SHOP.
29. REMOVE ALL NAILS FROM SALVAGED WOOD BEFORE WORKING
30. NO LEAD ALLOWED! DO NOT USE ANY MATERIALS CONTANING LEAD BASED PAINTS. If you are unsure about the composition of the painted materials, it will be assumed that the paint is lead based.
31. KEEP AISLES AND WORK AREA CLEAN AND CLEAR.

GENERAL TERMINOLOGY:

Grain: the fibrous structure of the wood, evident in the light and dark streaking of the soft spring growth (light) and hard summer growth (dark) of the tree **Grain figure:** the pattern formed by the grain on the surface of a longitudinal cut (along the grain); the character of this pattern depends on the cross-section of the wood **Knots:** areas of dense, twisted grain that occur where limbs branch apart (literal knots in the grain) **Softwoods:** wood of evergreen trees (not necessarily soft) **Hardwoods:** wood of deciduous or broad-leafed trees (not necessarily hard) **Milled lumber:** wood that has been processed (cut, planed, and sanded) into regular dimensions (also called stock) **Rip-cut:** a cut in a board along its long dimension, with the grain **Crosscut:** a cut in a board across its short dimension, across the grain **Kerf:** the groove or cut made by a blade **Miter:** refers to an angle; a miter joint is one in which both pieces are cut at an angle, and a miter gauge is a guide used hold the wood at a set angle **Fence:** the metal bar used to guide the wood along a straight path, or against which the wood is held when making a cut **Butt joint:** 90 degree

joint in which the end of one piece abuts the side of another **Hold-down:** a simple clamping mechanism used to hold a piece of wood while cutting **Jig:** any specially constructed mechanism used to facilitate a specific cutting procedure **Blade Set:** the alternating angled offset of the teeth of a blade **Kickback:** the sudden backward force produced when the blade stalls or binds in the wood during a cut **Dado:** a groove cut into a piece of flat wood **Rabbet:** a step cut into the end or edge of a piece of flat wood (a half dado) **Molding or millwork:** shaped, decorative profiles cut into wood

UNDERSTANDING POWER TOOLS:

Obviously, the most dangerous parts of power tools are the moving parts. All of the machinery in this shop is powered by electric motors, and the radial forces produced by spinning shafts, pulleys, blades and belts can be particularly dangerous**.**

This danger arises from two effects of spinning parts:
(1) outward forces—wood and debris can become violent projectiles when thrown by spinning blades
(2) inward forces— loose clothing, jewelry, hair, and fingers can be grabbed, wound up, and pulled in and mangled by any spinning machinery.
Always be aware of the danger of these radial forces. Always wear eye protection, never stand in line with circular blades, and always maintain a safe distance from spinning parts when the tool is operating.
Understanding how saw blades cut will help you cut efficiently, accurately, and safely.

There are two basic types of saw blades: the circular blade and the straight (or band) blade. The teeth point in the direction in which the saw will push the wood if allowed, or will throw debris. If the blade and/or the wood is twisted or becomes misaligned, the side of the blade will foul out against the wood and create friction.

This will cause one of three things to happen:
(1) the blade will heat up and dull or break
(2) the blade will stall out and kickback
(3) the blade will throw the wood.

If the blade begins to bind, ease off the cut and try to correct the alignment. If the blade stalls out, hold the wood in place (or the saw in some cases) and turn off the motor. As you will not have time to react in the third possibility, preventive measures are critical. If the blade throws the wood, it will either throw it away from the machine, in which case you must not be in line with the blade, or it will pull the wood away from you toward the blade, in which case you do not want your hand too close as it will be pulled in after it.

Wood that is irregularly shaped, warped, or split parallel to the cut will be prone to move as it is cut, creating a dangerous situation. Cutting through knots is also hazardous, as they are dense and brittle. When cut, knots can fragment unpredictably; creating debris that can become violent projectiles. If excessive force is required, the blade is dull or not

appropriate for the material being cut. Forcing a cut will overheat the blade and create the potential for it to bind in the wood. Every blade is designed to cut a specific kind of material and to make specific kinds of cuts. Using a blade to cut the wrong kind of material can result in damage to the blade and injury to the operator.

-**Circular blades** can only be used to make straight cuts (Never try to cut a curved cut with a circular blade).
-**Straight or band blades** can cut both straight and curved cuts. -Blades designed to cut
wood generally have larger teeth, and blades for metals and plastics have small teeth. Never try to cut metal with a wood cutting saw, and cut plastics only on approved machinery -**Never cut wood that might contain nails or other foreign materials**. -Metal will instantly
dull a wood cutting blade and potentially create hazardous debris.

Another characteristic important to straight blades is the width of the blade. The width of the blade determines the kinds of curves that can be cut with it. The more narrow the blade, the tighter the curve possible. Wide blades can only make straight or gently curving cuts, whereas a very narrow blade can make very tight curves with a small radius. If the blade binds up during a curved cut then the blade is too wide to make the turn. Trying to force a blade to curve too tightly will wear out the blade and the blade guides very quickly, potentially breaking the blade.
Listen to the sound of the machine as it cuts, and be aware of any changes in pitch as the cut progresses. You will usually hear the motor begin to strain if the blade begins to bind, even before you see or feel it. If you hear the machine having trouble, ease off and re-correct, or stop the cut. Try to identify the problem before proceeding.

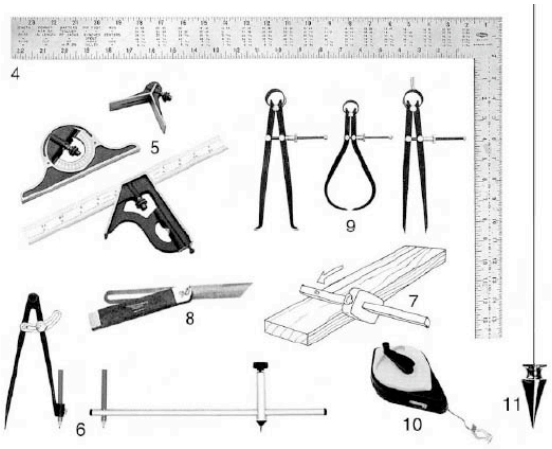
LEVEL ONE TRAINING:
Marking and Layout

A. Accuracy: "Measure twice and cut once." When unsure, cut a little long and physically check fit.
B. When measuring for cuts, remember that blades have thickness and will turn a portion of the wood into sawdust.
C. Cut on one side (waste side) of pencil mark

D. Tools for layout:

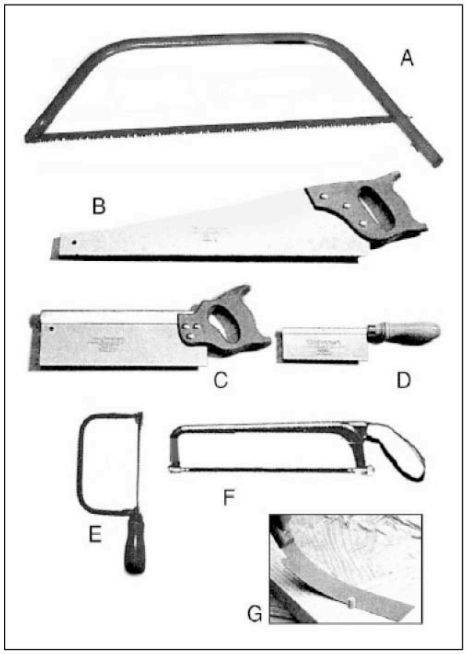
1. Pencil (not shown)
2. Scribe: (not shown) A scribe is any kind of sharp, pointed metal marking tool. Because a pencil mark is not as thin as a scratch or knife cut, a scribe mark is more precise.
3. Tape measure (not shown)
4. Square: L-shaped, right-angle metal straight edge
5. Combination Square: an adjustable 90 degree and 45 degree angle gauge with an a ruler on
one side and an offset that can be set against the edge of a board for accuracy on the other

6. Compasses: marks circle around a center point
7. Marking gauge: an adjustable scribe that slides along the edge of a board to mark a set distance from that edge
8. Bevel: an adjustable gauge for transferring variable angles
9. Calipers: two prong measuring device similar to a compass (from left to right: inside calipers,
outside calipers, dividers)
10. Chalk line: a chalk impregnated string on a reel for snapping straight lines
11. Plumb bob: a pointed weight on a string used for determining true vertical
12. Level: (not shown) a rigid straightedge with bubble gauges for determining true vertical and true horizontal.



Hand Tools

Hand Saws Few tools are as useful or as often overlooked or misused as the handsaw. When used correctly, the handsaw is a quick and efficient way accomplishing precise cuts. When misused, the handsaw is tiresome and sloppy. The hand saw should be used any time a power tool would be difficult or dangerous to use.



Kinds of Saws: Each type of saw is designed for a specific task. Using the wrong saw for any task means wasted effort and poor accuracy.

A. Bow Saw: A large, double-action toothed band blade is held in tension like a bowstring. It is used for cutting limbs and rough lumber

B. Rip, Panel or Crosscut Saw: General-purpose saws. The teeth configuration determines whether the saw is appropriate for ripping, crosscutting, or sawing panels.

C. Back Saw: A straight wide blade stiffened along the

top edge for accuracy and that cuts on the push or "back" stroke. It is used for cutting miters, tennons, and dovetails.
D. Gent Saw: A smaller version of the backsaw used for very precise work
E. Coping Saw: A saw with a narrow, thin blade (cuts on the pull stroke) held in tension by a deep C-shaped arm. It is used for cutting intricate curves. The blade can be inserted through a hole in the piece to make a trapped cut.
F. Hack Saw: A saw with a fine-toothed band saw blade held in tension. It is used for cutting metals and some plastics. The blade cuts on the push stroke.
G. Flush-cut Saw: an extra thin, flexible blade that cuts on the pull stroke. It is used to cut wooden dowels and pins flush without marking the surface. Also useful for various detail cuts.

Hammers
A hammer is a very basic tool for any carpenter.
A. Hammer Safety
1. Use the proper size and type of hammer for the job.
2. Never throw a tool.
3. Check the head to see that it is securely fastened to the handle.

B. Most Common Hazards
1. Smashing thumbs and fingers.
2. Fumbling and dropping.
3. Being hit on the head during the back swing.

Chisels
A wood chisel is used to cut mortises into wood for hardware and other items. It is made of a steel blade heat treated throughout so it can be sharpened its entire length. Chisel sizes are determined by the width of the blade. Blades are available in 1/8" to 1", and in 1/4" increments from 1" to 2". A chisel is made to either cut by hand or cut by holding the chisel and striking it with a hammer or mallet. Either way, the beveled side should be turned down. This enables you to prevent the chisel from cutting too deep by rocking it back on the bevel. This raises the cutting edge.

Chisel Safety:
1. Keep chisels sharp. A sharp tool is less dangerous than a dull one because less pressure needs to be used.
2. Drive wood chisels outward, away from your body.
3. Never put your hand in front of the cutting edge.
4. Remove nails or screws from the wood before you use a chisel on it.
5. Never use a wood chisel as a pry or wedge. The steel is hard and may break.
6. Always carry a chisel with the sharp end down.
7. Never carry sharp tools with points sticking up.

HAND HELD POWER TOOLS

Hand Drill

1. Configuration: hand held drill
2. Cutting Action:
   a. Work is secured and drill moved by hand
   b. Can be used to drive screw with special bits
3. Adjustment: varies with model
   a. Trigger can be locked on
   b. Speed can be adjusted
   c. Direction can be reversed
4. **Safety:**
   a. Do not drill "blind". Do not drill without ascertaining backside of work is clear of obstructions.
   b. Do not drill into tabletop or support.
   c. Do not abuse electrical cord.
   d. Keep electrical cord free of snags.
   e. Use both hands on drill. If the bit binds up, the drill will try to wrench itself violently from your grip, be prepared

Hand Sanders All of the same precautions taken with the large stationary sanders also apply to the smaller hand sanders, especially the hand belt sander. The finishing and random orbit sanders, however, produce far less force and are thus generally safer. Always wear a dust mask when sanding, especially when there is not a dust collector on the machine.

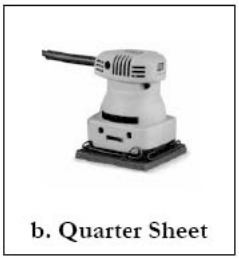
NEVER SAND WOOD PAINTED WITH LEAD-BASED PAINT IN THE WOOD SHOP. Special hazardous materials precautions must be taken with the dust produced from sanding lead-based paint. If you cannot determine with absolute certainty that a paint is **not** lead-based, treat it as if it were. All hand sanders are equipped with trigger locks that lock the sander in the on position. Make sure the lock is off before plugging in the sander. Some hand sanders are equipped with dust collecting bags. Always check these bags before and after use, and empty any dust inside.

Finishing Sanders

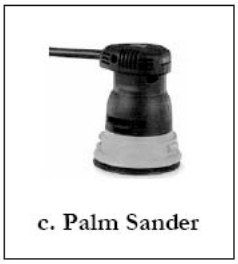
1. Configurations: small, hand held vibrating pad sander
   a. Half Sheet Finish Sander: uses a half sheet of sandpaper
   b. Quarter Sheet Palm Sander: uses a quarter sheet of sandpaper
   c. Palm/Orbital Sander: round pad, Velcro backing

2. Action: sanding pad vibrates in a randomly changing circular motion

a. Half Sheet



b. Quarter Sheet



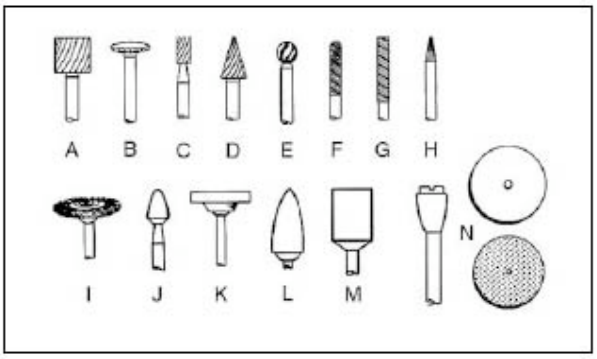
c. Palm Sander

Hand Belt Sander

1. Configuration: small, hand held belt
2. Action: belt rotates around two pulleys; sander is moved while wood is held stationary
3. **Safety:**
   a. Use both hands to hold the sander firmly. Always be able to hold against the direction of belt rotation.
   b. Secure the wood. The sander will try to throw loose wood.
   c. Never approach from attacking angle. Do not tear the belt on sharp corners.
   d. Be aware of belt tracking and tension. Shut off machine and alert shop personnel if belt tracks wrong, especially if sparks are created.
   e. Do not use if belt is loose or torn. Alert shop personnel.
   f. Keep hands away from abrasive surfaces, especially near intake gaps.
   g. Do not sand electrical cord, loose clothing and/ or cloth in the sanding area. Keep electrical cord free of snags.

Dremel

A small, all-purpose shaping device for very detailed work. It is similar in configuration to a router without a guide base, and can be utilized for shaping, sanding, grinding, and much more.



A-E : High speed cutters for general purpose shaping of wood, metal or plastics
F – H : Tungsten carbide cutters: longer lasting cutters
I : Wire brush: for cleaning corrosion and rust on metals
J – M : Grinding points: for grinding metal
N : Cutting disks and Mandrel

SAFETY: WEAR EYE PROTECTION

Jig Saw

1. Configuration: hand held, with a short stout blade extending from bottom (foot)
2. Cutting Action: the blade reciprocates up and down, cutting on the up stroke
3. Adjustment: varies with model
   a. Trigger can be locked on
   b. Speed can be adjusted
   c. Single action or orbiting blade
   d. The foot tilts on some models
4. Cuts: straight or curved cuts in moderately thin wood (up to length of blade)
5. **Safety:**
   a. Do not cut "blind". Do not cut without ascertaining backside of cut is clear of obstructions.
   b. Do not cut into tabletop or support.
   c. Do not cut electrical cord.
   d. Keep electrical cord free of snags.
   e. Make sure blade extends completely through material throughout stroke
   f. Secure material before cutting. Small and/or thin material may flex or vibrate causing loss of
   control.

Pneumatic Tools

Pneumatic tools are powered using compressed air and must be connected to the shop's air supply. Before use of the tool, the tool should be oiled with proper air tool oil.

Brad Nailer:

1. Configuration: pneumatic 18 or 16 gage
2. Nailing Action: Used only to fasten wood together
3. Adjustments: Nails vary from 5/8 of an inch to 2 1/2 inches.
4. Loading: Clips must be pulled back and proper nail size must be placed in with heads up
5. **Safety**: **a. Always wear eye protection**.
   b. Keep all body parts a safe distance away from the area of nailing.
   c. **NEVER POINT THE NAIL GUN IN THE DIRECTION OF OTHERS.**
   d. Avoid nailing in areas of knots, metal, and/or other hard areas in the wood.
   e. Always have nailer pointed against the wood when nailing.

Die Grinder:

1. Configuration: Hand held rotary grinder.
2 Action: Uses different bits for many different grinding purposes
3. Bit Requirements: Use the proper bit for the proper material.
4. **Safety:**
   a. Safety glasses, dust mask, and ear protection are required for use of the tool.
   b. Be aware of body parts near grinding bits.
   c. Be aware of loose clothing and material.
   d. Item in which you are grinding must be properly clamped or held down

STATIONARY POWER TOOLS

14" Band Saw / 36" Band Saw

1. Configuration: long, continuous band blade looped around large upper and lower wheels
2. Cutting Action: Wood is moved on table into blade
3. Adjustments: Table top tilts for beveled cuts 0\45°
4. Cuts: straight cuts and wide curves
   a. Versatile: rip-cuts, crosscuts, miters, and long radius curves.
   b. Curves and rip-cuts are cut freehand
   c. Cuts any size piece of wood that will fit through throat and on table
   d. Crosscuts and miters are cut with miter gauge
5. **Safety:**
   a. Wood must flat against table and stable. Never cut round or unstable wood without secondary support (such as a jig). The downward force of the blade will twist round or unstable stock as it cuts, causing the blade to bind, kink, and break.
   b. Set guard 1/4" above wood.
   c. Never force a curved cut tighter than allowed by the blade width
   d. Watch your fingers, especially at the end of the cut.
   e. Never back out of long cuts with the machine running. Backward pressure can cause the blade to jump its guides, hang up, and break.
   f. Plan your cuts before you begin cutting. Make sure the wood will clear the throat throughout the cut. Make release cuts before cutting long curves.

Floor Drill Press

1. Configuration: overhead drill mounted above adjustable table
2. Cutting Action: a. Drill bit is mounted in a chuck, which travels up and down on the quill
   b. Drills holes perpendicular to table
3. Adjustments: a. Variable speed (change with drill on only)
   b. Table elevation
   c. Quill can be locked
   d. Depth stop for setting hole depth

Power Drills The principle danger of power drill is the loss of control by the operator and the danger of loose material being twisted up onto the bit. Remember, the bit is spinning, creating the hazards of radial forces. It is important to note which bits are appropriate for what materials. In general, wood cutting bits can be used only to cut wood, whereas metal cutting bits can cut both metal and wood.

A. Countersink: creates an enlarged hole with an angled bottom to allow screw heads to set below the surface
B. Combination Bit: a flat tapered bit with a shoulder for drilling and countersinking holes for wood screws

C. Forstner Bit: a very precise bit for cutting large holes over 1/2 inch
D. Masonry Bit: a bit for drilling holes into masonry or cement
E. Bullet Point Bit: a woodcutting bit with a "bullet" point that reduces point drift and cuts a hole with a flat bottom (also called a Brad-point bit)
F. Reduced Shank Twist Bit: a large twin-fluted bit with a smaller shaft
G. Twist Bit: a twin fluted bit with a beveled point appropriate for general drilling in wood or metal
H. Spade Bit: a flat, inexpensive bit for boring large holes over 1/2 inch wide. Not accurate and tend to tear-out the beginning and ends of cuts
I. Auger: drills large deep holes with a brace or slow speed hand drill. The threaded point screws into the wood and pulls the bit deeper. IT CANNOT BE USED IN THE DRILL PRESS.
J. Fly Cutter: an adjustable hole saw. IT CANNOT BE USED WITH A HAND DRILL AND CAN ONLY BE USED IN THE DRILL PRESS.
K. Hole Saws: for sawing large holes (1 to 3 inches) through wood no thicker than twice its length (3-1/2 inches max)

4. Safety:

a. Use only bits appropriate for the material.
b. Make sure that the bit tight and straight in chuck.
c. Remove key from chuck before turning on.
d. Secure wood, clamping it whenever possible.
e. Do not drill into metal table.
f. Place a scrap of wood under work to avoid tear-out.
g. Check drill speed: faster for soft materials or small bits, slower for hard material or large bits.

h. Never use auger bits in the drill press.
i. Avoid awkward hand positions in which a sudden slip would cause hand to go into the cutting tool.
j. Hold work in left hand and operate drill with right hand.
k. Never wear gloves, jewelry, loose clothing, or long loose hair.

Scroll saw

1. Configuration: a short thin blade held through the table by a long arm
2. Cutting Action: the blade reciprocates up and down, cutting on the down stroke
3. Adjustments a. The table tilts for bevel cuts
   b. The blade can be easily removed and inserted through a hole in the wood to allow trapped cuts
4. Cuts: intricate and delicate curves in flat, thin wood
5. **Safety:** a. Watch your fingers
   b. Make sure blade has teeth pointing down
   c. Make sure tension is adjusted properly on the blade
   d. Do not push too hard on wood. You want only enough pressure to maintain good contact on the down stroke, not the up stroke.

SANDERS:

The large stationary sanders are used primarily for shaping and coarse sanding. These sanders remove material very quickly and must be used very carefully. Deep gouges can be quickly cut into the wood surface, and edges can easily be sanded crooked.

Safety: a. Always hold the piece securely, and sand with light, even pressure
b. Use the tables and guides whenever a straight or beveled edge is required and use of such aids is possible.
c. Trying to sand too quickly will result in poor accuracy and sloppy work.
d. The primary danger of power sanders is that the users underestimate their hazard because there are no blades. They can however be just as dangerous as saws.
e. Never wear gloves, loose clothing, hair, jewelry
f. Never sand pieces too small to hold safely
g . Do not use if belt or disk is loose or torn. Alert shop personnel.
h. Hold wood firmly, always be able to hold against the direction of sander.
i. Use sanding disk on down side, not up side
j. **NEVER POWER SAND METALS, INCLUDING NAILS, SCREWS, OR OTHER FASTENERS IN THE WOOD. Sparks can ignite airborne sawdust.**

Oscillating Spindle Sanders

1. Configuration: A cylindrical sanding spindle mounted in a table
2. Action: The spindle spins (and on some models oscillate up and down) while the wood is moved against the tabletop.
3. Adjustments: some models have interchangeable spindles of various diameter
4. **Safety:**
   a. Keep material flat against the tabletop.
   b. Use light pressure. Do not burn out the sandpaper.

Large Belt Sander:
1. Configuration: Large belt running horizontally, mounted to table
2. Action: Belt rotates around two pulleys, work is eased into sanding surface
3. **Safety**: a. always wear safety glasses/goggles
   b. keep work flat to table
   c. never attempt to sand small items that are difficult to hold/control
   d. never force wood into belt
   e. if belt becomes torn or tracks off – shut down and notify shop personnel

LEVEL TWO TRAINING:

Special care must be taken with tools that cut with a circular blade. These blades cut with tremendous forces, and the radial motion of the blades can both throw wood and debris outward and pull fingers and loose clothing inward. The wood being cut must be held securely at all times. If allowed, the blade will try to move the wood violently rather than cutting it. NEVER CUT FREEHAND WITH MOUNTED CIRCULAR SAWS NEVER PLACE HANDS CLOSER THAN 6" TO A MOVING BLADE

Laguna BAND SAW
1. Configuration: long, continuous band blade looped around large upper and lower wheels
2. Cutting Action: Wood is moved on table into blade
3. Adjustments: Table top tilts, Blade Guides raised-lowered
4. Cuts: re-sawing, ripping, straight cuts and thick stock
5. **Safety:**
   1. Wood must flat against table and stable. Never cut round or unstable wood without secondary support (such as a jig). The downward force of the blade will twist round or unstable stock as it cuts, causing the blade to bind, kink, and break.
   2. Set guard 1/4" above wood.
   3. Never force a curved cut tighter than allowed by the blade width
   4. Watch your fingers, especially at the end of the cut.
   5. Never back out of long cuts with the machine running. Backward pressure can cause the blade to jump its guides, hang up, and break.
   6. Plan your cuts before you begin cutting. Make sure the wood will clear the throat throughout the cut. Make release cuts before cutting long curves.

Sliding Compound Miter Saw
1. Configuration: circular blade mounted on a double action arm
2. Cutting Action: a. slides forward above wood
   b. swings down in chopping motion

c. slides back on rails, cutting on the push stroke
d. rail assembly can be locked so that saw can only chop like a standard miter saw
e. wood is held in place while blade is moved

3. Adjustments: a. Blade assembly swivels for miter cuts 45/0\45°
b. Blade assembly tilts for bevel cuts 0\45°
4. Cuts: straight cuts a. Compound crosscuts and miter cuts in long boards
5. **Safety**: a. Firmly fix wood against table and fence: never cut freehand.
b. Hold wood with left hand, cut with saw in right hand.
c. Slow steady feed: DO NOT TRY TO CUT TOO QUICKLY.
d. Always check for square.
e. Tilted blade bevel cuts are most prone to binding and thus most dangerous.
f. Always return saw to its full start position after the cut.
g. Never "gang cut." Never cut more than one piece at a time.

Reciprocating Saw

1. Configuration: hand held, with a stout blade extending from end
2. Cutting Action: the blade reciprocates in and out, cutting on the in stroke
3. Adjustment: a. The shoe is both hinged and removable
b. The blade can be reversed
c. Variable speed

4. Cuts: freehand rough cuts (up to length of blade)
5. **Safety:** a. Do not cut "blind". Do not cut without ascertaining backside of cut is clear of obstructions.
b. Do not cut into tabletop or support.
c. Do not cut electrical cord.
d. Keep electrical cord free of snags.
e. Make sure blade extends completely through material and beyond shoe throughout stroke
f. Secure material before cutting. Small and/or thin material may flex or vibrate causing loss of control.
g. Use both hands to hold the saw

Circular Hand Saw:

1. Configuration: hand held circular blade
2. Cutting Action: Wood is held in place while blade is moved
3. Adjustments: a. Blade can be raised or lowered for cut depth
b. Blade tilts for bevel cuts 0/45°
4. Cuts: straight cuts -Rips-cuts and crosscuts on stock too large to fit on table saw, radial arm saw, or miter saw
5. **Safety:** a. Use only with direct training and supervision
b. Set blade depth so that the teeth emerge completely from underside of cut.
c. Keep the blade aligned along straight path. Make sure you don't bind the blade.
d. Never cut "blind." Always ascertain that underside of cut is clear of obstructions.
e. Do not cut into tabletop or supports.
f. Make sure both sides of the cut are supported even after the cut is made.

g. Do not cut electrical cord.
h. Allow blade to stop spinning before placing saw down after cut is finished.
i. Take extreme care when making bevel cuts, as the angle between the blade and foot can bind the blade easily.
j. Always hold saw with both hands.
k. Secure small and/or thin work with clamps. The wood must not be allowed to move during the cut.

Hollow Chisel Mortiser

1. Configuration: Hollow square chisel with a drill bit in the center built in a press.
2. Cutting Action: Bores a squared hole
3. Adjustments: a. Uses different sizes of chisels from ¼"-½"
4. **Safety:** a. Secure wood in vise
   b. Use the proper chisel/ bit combination
   c. Tighten bit and remove chuck
   d. Do not over work chisel and bit
   e. Do not mortise your hand

Panel Saw:

1. Configuration: wall mounted- bearing guided circular blade
2. Cutting Action: Wood is held in place while blade is moved
3. Adjustments: a. Blade can be raised or lowered for cut depth
   b. Blade tilts for bevel cuts 0/45°
4. Cuts: straight cuts -Rips-cuts and crosscuts on stock too large to fit on table saw, radial arm saw, or miter saw
5. **Safety:** a. Use only with direct training and supervision
   b. Set blade depth so that the teeth emerge completely from underside of cut.

SAFETY MANUAL/TRAINING CONSENT FORM

I _____ have received and reviewed the
(print name)
College of the Arts - Safety Manual from the University of Louisiana at Lafayette.
I acknowledge my responsibility to conform to these rules and all others alluded to in this manual. I understand and accept all penalties for failure to conform to these rules.

The Student has successfully completed the following Levels of Shop Training.

LEVEL	SUPERVISOR SIGNATURE	STUDENT SIGNATURE	DATE OF TRAINING

Additional Comments:

EMERGENCY CONTACT INFORMATION:
Name:
Phone Number:

Fletcher Hall Studio Policy

Students must show consideration for their fellow classmates, and faculty.

- Students must maintain a clean working environment and respect the available facilities
    - All spray paints, spray adhesives, bondo, etc… must be used in one of the two spray booths. No spraying or use of chemical agents, or solvents is permitted at your workstation.
    - All flammables including spray paints, spray adhesives, bondo, etc must be stored in metal cabinets, one is provided by the spray booth in JLF 101 and one is provided in JLF 110.
    - No extension cords are permitted in the studios.
    - No hand tools or power tools of any kind are permitted to be used in studio during class hours M-F 8:AM-4:50PM or during hours in which the wood-shop is open.
    - No sanding of any kind is permitted in the studios at anytime. All sanding, whether wood, plaster, metal, bondo, acrylics, must be done in the wood shop. Do not sand near computers!!!!
    - Plaster, mortar mixes and concrete mixes must be used only in designated areas, no mixing or pouring plaster, mortar, or concrete is permitted at studio workstations.
    - After studio hours beginning at 4:50 PM the only hand tools permitted in the studios are hand saws, hammers, chisels, or block planes.
    - After shop hours beginning at 10:00 PM the only power tools permitted in studio are rotary tools, scroll saws, hand drills or cordless drills. Students assume the responsibility for knowing all safety requirements of any approved tool they own or borrow and bring into studio.
    - The following tools are not permitted in the studio at any time: band saws, circular saws, table saws, radial arm saws, miter saws, jigsaws, reciprocating saws, or similar saws, routers, belt sanders, palm sanders, spindle sanders, disc sanders, grinders, or similar sanders/grinders, kilns, hand torches, soldering or welding equipment, or similar heat sources, pneumatic tools, and drill presses.
- All work and materials must be performed or stored at a students workstation. At no time may work be stored or materials be stored in corridors, crit areas, or JLF101.
    - All walkways both within and around studios must be clear in case of fire or emergency for egress.
    - This includes the work space of the first year studio. Upper level students are allowed to use unoccupied first-desks after studio hours to do their work however, upper class students should respect the fact that the desk are assigned to first year students and they have precedence in using it as a work space. All students are expected to have the desk cleaned by the time the morning classes start.

- Radios, MP3 players, computers, etc... brought in the studio must be used with headsets,

- All students are required to attend shop orientation and safety classes prior to using the woodshop. In addition all students are responsible for knowing the woodshop safety manual.

- No smoking is permitted in the building, including the courtyard, breezeway, and balconies.

- Students shall be respectful of their environment or loose the privilege to work there.

SHOP RULES

1. Check in with Shop personnel when entering the Shop to work.
2. The shop is only to be used with proper supervision for purposes relative to the overall mission of the University: shop manager, shop monitor, or class instructor must be present.
3. You must complete Shop Orientation and training before using any equipment.
4. There shall be **no unauthorized visitors** in the shop
5. Eye Protection: safety glasses, goggles, or face shields are **required** to be worn at **all times** in the shop in the shop.
6. Proper ear protection should be worn at all times while working in the shop.
7. Use of a dust mask is recommended while working in the shop.
8. Work Clothing:
   - any loose clothing, hair, jewelry, etc are not permitted in the shop
   - **closed toe shoes only**; no flip flops, sandals, high heels, etc
9. No horseplay… running, fooling around, etc may contribute to an accident
10. **Be Alert!** Please consider the safety of all persons while working in the shop
11. Report all accidents, missing or malfunctioning equipment or tools to shop personnel.
12. Do **not** attempt to repair or alter the equipment yourself. Do **not** attempt to operate malfunctioning equipment
13. Do not operate any equipment while under the influence of drugs, alcohol or any medication.
14. Cell Phones are **NOT ALLOWED** in Shop area.
15. Headphones, I-Pods, Discman, etc. are allowed as long as they do not distract operator.
16. **NO TOOLS/EQUIPMENT are to be removed from the Shop without permission. Anyone caught taking shop property without authorization will loose all Shop access.**
    A student caught stealing Shop equipment will be turned in to Campus Police.
17. Always clean your work area and check out before leaving the shop.

-Student workers are **not allowed** to "check out" or train other students on a piece of machinery. If a student needs help with a cut, help them… but you are not here to build their project. Students are only allowed on equipment per their level, any student working on a "higher" level machine will loose all shop access. Any student worker allowing this behavior will be fired, and also loose shop access.

-Student workers **are** allowed to do outside work/homework while in the shop. If it becomes a problem where you ignore students and what they are doing, outside work will be banned…think 5 hours of dusting.

-The daily list is to be completed and signed off on for every shift. Any missing or damaged equipment is to be listed here as well as any tools/equipment that has been signed out by a student.