

**NHTI – CONCORD'S COMMUNITY COLLEGE  
MECHANICAL AND MANUFACTURING ENGINEERING  
TECHNOLOGY DEPARTMENT  
MET- MFT- RAET- AMPT Programs**

**MACHINE SHOP SAFETY REGULATIONS F2014-S2015**

**GENERAL NOTE ON MACHINE SAFETY:** Any machine can be dangerous. Metal cutting machines are powerful and produce very large forces in order to shear materials. These machines can easily injure the operator or others nearby if proper safety procedures and usage is not followed. Do not assume anything about the operation of the machine or the process, if you have any doubts or questions about any part of a process or a particular machine; **DO NOT HESITATE TO ASK YOUR INSTRUCTOR.** Always respect the power and force of the machine and make sure everything is properly set, tightened securely, and the cutting area is clear before turning on the power.

The following safety rules must be adhered to at all times. All directions given by instructors and/or department faculty must be followed at all times. Violation may result in expulsion from the shop and/or suspension from the course (or program) with resulting grade penalty, which may result in failure of the course.

Do not tamper with or attempt to defeat any safety device, switch, or mechanism on any tool or on any machine in the shop. Safety equipment is in place for your safety and for the safety of the instructors. Any infraction of this rule will result in expulsion from the shop and a grade penalty of AF (Administrative Failure) for the course. Suspension from the program and/or college may also result.

**Personal Safety**

1. Students are expected to attend lab sessions in a wide awake, alert, and clear minded state. Students under the influence of substances, either prescribed or illegal, which can alter their ability to work safely on machine tool equipment will not be allowed to work in the lab. Due to the potentially dangerous situations that may be present, this is for the student's safety as well as others in the lab session.
  - a. Students under an approved medical treatment plan using doctor prescribed substances which can impair the senses or their state of mind should notify their instructor and seek other arrangements. Other arrangements may or may not be possible.
  - b. Students using illegal substances (not prescribed by a doctor) which impair the senses or their state of mind will be asked to leave the lab and will be warned once of the future consequences. This would result in removal from the course, the program, and/or the college depending upon the circumstance. Also, NHTI Security will be informed and legal action may result.

2. Safety glasses with side shields must be worn in all areas of the machine shop, L133 at all times. Other lab rooms: L109, L128, L131, and L132 will require safety glasses to be worn at times when directed by the instructor. In general, safety glasses must be worn while operating any machine in these labs.

Note: Prescription glasses are not considered safety glasses. Safety glasses must be worn over prescription glasses.

3. Dress appropriately for machine operation in the lab:
  - a. Short sleeve shirts are preferred. Long sleeves should be rolled up to the elbow with no loose ends. Shirts should not have large open neck areas, hot chips may enter through the opening.
  - b. No loose clothing of any kind should be worn. Neckties, sweat shirts with neck pull strings, or anything that is loose may have the potential for entanglement in the moving parts of a machine, and should be avoided.
  - c. No chains, bracelets, or other loose jewelry which could get caught in a machine should be worn. Remove such items or do not wear them to the lab. Lanyards should be put away in a pocket or contained under a shirt.
  - d. Sturdy work shoes are recommended which have non-slip treads. Steel toed shoes or boots are best. Avoid smooth soled shoes. No sandals or open toe shoes are allowed.
  - e. Long hair must be protected from entanglement in machinery by being secured. Tie long hair back, use a hat, headband, or other method to prevent hair from entanglement in moving parts of the machine.
4. Always use proper lifting techniques when lifting heavy or bulky objects:
  - a. Lift using your legs muscles, not your back muscles.
  - b. Protect your hands. Work gloves may be used when handling rough edged stock. Gloves are not to be worn when a machine is turned on or during its operation. See rule for glove usage.
  - c. Use a lift cart or other device to assist the lifting of a heavy object. The department has two lifting devices available for use in the labs.
  - d. If you cannot lift something safely on your own, ask the instructor for help.
5. Wear other safety devices and/or clothing as directed by the instructor, e.g. safety face shields, welding masks, leather protective clothing for welding/casting etc.
6. Always remove gloves before turning on or operating a machine. If material is rough or has sharp edges and gloves must be worn, handle the material with the machine stopped and the main power turned off.

7. Report any injury to an instructor and get first aid immediately, no matter how minor the injury.
8. Know the location of the shop emergency stop pushbuttons; these are the master electrical power off switches for the machines in the lab.
9. Know the location of the nearest fire extinguisher and fire blanket.
10. Know the emergency evacuation procedure and where it is posted.
11. Know how to contact emergency services if required. Know the "Emergency Call Box" locations and the nearest phone.
12. Know what an MSDS (Material Safety Data Sheet) is and where they are located in the shop.

### **Facility Use**

1. A businesslike atmosphere shall exist in the shop at all times. No running, throwing of items, or general fooling around will be tolerated. No food is to be brought into or consumed in the lab. Drinks in re-sealable or non-spill containers are allowed.
2. At least two qualified people must be in the shop at all times when operating machinery. No student is allowed to work in the shop alone. A department approved instructor must be present in the room.
3. All projects must be approved by a department instructor prior to starting. Do not operate any machine without the approval of an instructor.
4. Do not operate any machine without a department instructor present in the room.
5. Do not operate or use any equipment with a DO NOT OPERATE tag on it.
6. Do not operate any circuit breakers or disconnect switches, except Emergency Stop buttons when necessary. Notify an instructor if a problem either appears to exist or does exist.
7. Use good housekeeping practices:
  - a. Clean and return all tools to their proper storage area when you have finished using them. If you do not know where something goes, ask an instructor.  
  
Notify an instructor of any broken or damaged cutting tools or other equipment issues promptly.
  - b. Break down all setups and clean any machine you have finished using. Do not leave cutting tools or the workpiece setup on a machine unless permitted to do so by the instructor. Other lab groups are using the same lab and the same machines.

- c. Remove cutting tools before starting to clean the machine. This can prevent accidental injury while cleaning chips. No cutting tool should be left in a spindle (mills) or tool holder (lathe) after the cleanup.
- d. Return all machine axes and setups back to their home or parked positions. This is the condition the machine should be in when you enter the lab.
- e. Return all raw stock to the stock rack immediately after the desired piece has been cut.
- f. Keep the area around the machines clean. Keep the floor clear of all chips and waste pieces. Put them in the appropriate container. Scraps are tripping hazards, and chips may cut through the sole of a shoe.
- g. Recycling containers are provided for “steel” and “aluminum” chips. Dispose of chips taken from the machine (not from the floor) into the correctly marked container for the material. Do not mix materials in these containers. **DO NOT PLACE TRASH IN THESE RECYCLING CONTAINIERS.**
- h. Small amounts of chips mixed with dirt from sweeping the floor should be placed directly into the trash.
- i. All machines, work areas, and the entire shop should be kept clean for subsequent lab groups to use in a timely manner.

### **Use of Machines and Tools**

1. Become familiar with and know the machine you operate thoroughly. Be sure you understand the manipulation of all controls, on/off switches, stops, hand-wheels, levers, other switches, and all safety precautions of a machine before you attempt to operate it. If you are not sure, do not guess! Ask an instructor for help. There are no silly or stupid questions. **DO NOT HESITATE TO ASK YOUR INSTRUCTOR.**
2. Check to ensure that any machine that you are about to operate appears in good working order. Notify an instructor immediately if you detect or suspect a problem.
3. Check that machines have effective and properly working safety guards. Be sure that these safety guards are always in place when machines are operating.
4. Do not attempt to oil, clean, adjust or repair any machine especially while it is running. Stop the machine and turn off the machine’s main power switch. Notify an instructor immediately.
5. Do not operate any machine unless authorized to do so by the instructor, or under his or her supervision.
6. Even after the power has been turned off; do not leave the machine unattended until all moving parts have come to a full stop. Someone else may not notice that the machine is still in motion and may be injured. Use the brake to stop the spindle after turning off power.

7. Do not try to stop moving parts of the machine with your hands or body, or with any foreign object not intended to be used to stop the machine.
8. Prior to starting any machine:
  - a. Make certain that the cutting tool and all moving parts of the machine are clear for the entire length of the cut.
  - b. Always double check that the workpiece and cutting tool are securely clamped in their proper place and everything has been tightened properly.
  - c. When using the “quick change tooling system” on the milling machines, be sure to tighten the set screw for each tool before turning on the spindle. See your instructor if you are unclear on this requirement.
  - d. Make certain that all tools, keys, instruments, or other loose objects are clear of the working area of the machine.
9. When turning on the spindle, be sure that the cutter or workpiece is turning in the correct direction. When looking down the spindle, the cutter should be rotating in the clockwise direction.

Note: Often in low speed ranges, the spindle must be turned on in reverse for proper clockwise rotation. Be aware of proper cutting direction. Tools running backwards will be damaged.
10. Machine tools are designed so that the operator is normally in a standing position. Stand when operating a machine. Do not lean on the machine. Give the operation your full attention.
  - a. Concentrate on the work that you are doing and do not talk unnecessarily to others while operating the machine. Cell phones are not to be used and must be turned off while in the machine shop.
  - b. Do not talk to or distract someone else when they are operating a machine. Distraction can result in injury.
11. Never have more than one person operating the same machine. Do not try to assist another person by touching any of the machine controls. Only one person should be in control of a machine at all times.
12. Never leave a machine running unattended. If you must leave the area, stop the machine completely, all motion must be stopped, and turn the main power off.
13. Never reach across a rotating cutter or workpiece. Keep hands and fingers away from moving parts such as cutting tools, spindles, pulleys, blades, etc.
14. Stop the machine completely and turn the main power off before cleaning, making any adjustments, or inspecting the workpiece.

15. When starting or stopping the rotation of a cutting tool (mill) or the workpiece (lathe) use the spindle off switch or lever, not the main power switch.
16. Never use a cloth or rag near the working or moving parts of a machine.
17. Use a brush or appropriate tool, e.g. pliers, to remove chips. Do not use compressed air to remove chips. Never handle or remove chips with your hands at any time, even when the machine is off. Chips can still cut.
18. If a machine malfunctions, or if you think something may be wrong, stop spindle rotation, turn main power off, and report the problem to an instructor immediately.
19. Use cutting oil or cutting fluids sparingly and only as directed by the instructor.
20. Do not use dull, damaged, or chipped cutting tools. See instructor if in doubt. Notify the instructor if a tool breaks or becomes damaged during operation.
21. Do not use grinding wheels for anything other than the material that the wheel is designed for.
22. Do not use grinding wheels showing cracks or excessive wear. Ensure proper clearance (not more than 1/8") between the tool rest and grinding wheel on pedestal grinders.
23. Be sure that all hand tools such as files, saws, or chisels are clean, sharp, and have proper handles. Never use a file without a handle.
24. If you witness an unsafe situation, a dangerous condition, or a possible potential safety issue, please notify an instructor immediately.
  - a. Try to use common sense, often when something appears to be wrong, it may be true. Do not hesitate to ask your instructor questions or for help!

## **Rules for Extra-Curricular Use of the Machine Shop**

### **Student Qualifications**

1. No student may operate any machine or power tool in the machine shop while alone under any circumstance.
2. No student may use the machine shop or the machine shop equipment without having first completed the machine shop safety lab and passed the safety test.
3. Students who have successfully completed and passed either the MF111 or MP101 course may use machines when the following THREE conditions are satisfied:
  - a. An authorized full time department faculty member has approved the use of the facility.

- b. An authorized department faculty person but must be present in the lab. The faculty member does not have to directly supervise the student, e.g. he/she can be on another machine or in the machine shop office.
  - c. The project must be approved by a department faculty member.
4. Students who have not successfully completed either the MF111 or MP101 course may use machines only if an authorized member of the faculty is present and is supervising them and is the student is cleared by the department head.
  5. Exceptions to passing MF111 or MP101 may be considered for individuals with commensurate machining experience. Application must be made through the department head.

### **Other General Rules:**

1. All students are expected to clean the machine, tooling, and the work area used.
2. All projects must be approved by a department faculty member authorizing the use of the shop and machines.
3. All tools and equipment must be returned to their proper areas when finished.
4. Raw stock must be returned to the stock rack.
5. Cutting tools or workpiece setups are not to be left on machines unless permitted by a department faculty member.
6. No personal items or tools are to be stored in the shop or tool room cabinets or drawers. Storage space for parts or projects will be assigned upon request.
7. No unauthorized additional persons are permitted in the shop during extra-curricula use without permission from a department faculty member.
8. All Department Machine Shop Safety Regulations must be adhered to at all times. No exceptions.

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