

University of Pittsburgh Safety Manual	EH&S Guideline Number: 01-016	
Subject: MACHINE SHOP SAFETY	Effective Date: 01/27/2016 Reviewed & Revised: 07/02/2026	Page 1 of 9

SHOP SAFETY AND TRAINING IN ACADEMIC DEPARTMENTS

1. All students and employees (staff and faculty) are required to complete documented safety training prior to using any machines or power tools in a fabrication/repair shop. Training records must be maintained by the department. These records will be reviewed by the Department of Environmental Health and Safety (EH&S) upon request and during an annual inspection of each shop. The information covered in the shop training will include:
 - Tour of the shop
 - Review of all safety rules and practices
 - Injury and Illness Prevention Program
 - Building evacuation route, emergency procedures and emergency telephone location
 - Demonstration and practice on the proper use of machine tools, hand tools and welding equipment. (All machine tools, hand tools, and welding equipment have potential safety hazards. Machine tools and welding equipment can only be used if safety training on that machine has been completed and documented. Students may become authorized to use machine tools and welding equipment under the supervision of shop staff by successfully completing specific shop safety training delivered by the shop manager. The content of this training will be determined by the shop manager with the approval of EH&S. Infrequent shop users may be asked to repeat safety training at the discretion of the shop manager.)
2. Students and employees must be able to demonstrate to the satisfaction of the shop manager their proficiency in the use of a particular machine or power tool before they can operate that equipment in an unsupervised manner. This proficiency must be documented by the shop manager.
3. The shop manager is required to take the Pitt EH&S machine shop safety training to understand basic requirements of machine shop safety so that safety requirements may be adequately enforced among machine shop personnel. The training is available through the Pitt EH&S training webpage or can be given in person upon request.
4. Tools and equipment that produce sparks, such as cutting, welding, metal cut off saw, metal grinder must not be used by unsupervised students.
5. The shop manager may remove any student, employee or faculty member from the shop for unsafe practices or unsafe behavior.
6. Shop employees may require additional training on other topics including lock-out tag-out, hot work procedures, and hearing conservation, based on hazard assessments by the shop manager and/or EH&S.

University of Pittsburgh Safety Manual	EH&S Guideline Number: 01-016	
Subject: MACHINE SHOP SAFETY	Effective Date: 01/27/2016 Reviewed & Revised: 07/02/2026	Page 2 of 9

7. Chemical Hygiene training is required for any shop users prior to handling chemicals of any kind. This training is given by EH&S, and the training must be renewed every three years.
8. Use of certain chemicals or welding operations may require additional respiratory protection training and fit testing from EH&S.
9. No one should be allowed to work in any shop alone. There should be a minimum of two people in the shop at all times when machines or tools are in use. An individual working alone in the shop might not be able to get emergency help in the event of an accident.
10. Location of emergency phones as well as any safety equipment present in the shop should be well-marked, highly visible and access must be unobstructed.
11. The shop should remain locked when unattended, and access to the shop should be restricted to authorized persons. The shop should be unlocked while in use when possible.
12. Any faculty, staff or student that demonstrates habitual or egregious disregard for shop safety guidelines may lose privileges to operate shop equipment or tools, and/or access to the shop.

The following is required by all users of the Departmental shops.

Violation of these principles may result in loss of facility access or other disciplinary action.

1. Eye Protection

Eye protection [that meets American National Standards Institute (ANSI) Z-87.1-2025] must always be worn while in the shop, except for offices, restrooms, and break areas. Safety glasses with side shields should be made available for occasional users and visitors. Frequent users of these facilities are encouraged to obtain their own safety glasses from the departmental stockroom.

For individuals with corrective glasses, eye protection must be of the type that can be worn over glasses. Prescription-ground Z-87.1 safety lenses may be substituted if they provide equivalent protection and if side shields are firmly attached to the glasses frame.

All individuals who are welding or viewing welding activities must wear eye protection from the radiation produced by welding. Appropriate eye protection will be provided at the welding areas.

Arc welding or arc cutting operations require the use of welding helmets with an appropriate filter lens. Welding curtains should also be utilized to protect others who may not have welding eyewear in the vicinity and to control potential sparks.

University of Pittsburgh Safety Manual	EH&S Guideline Number: 01-016	
Subject: MACHINE SHOP SAFETY	Effective Date: 01/27/2016 Reviewed & Revised: 07/02/2026	Page 3 of 9

Goggles with filter plates or tinted glass are required for gas welding or oxygen cutting operations.

Full-face shields and safety glasses are required for portable hand grinding operations.

2. Hand and Body Protection

Neck Ties, hanging jewelry (necklaces, earrings, etc.) rings, watches, bracelets, unbuttoned long sleeves, dresses, or other loose clothing are prohibited from being worn while operating machinery.

Long hair must be tied back or covered by a cap while operating machinery.

Long pants must be worn when working with any machine tools or equipment, sheet metal or metal scraps, and welding equipment.

Gloves must NOT be worn when operating any rotating machinery. Gloves are recommended for handling sheet metal and sharp tools.

Machine guards provided for a machine must be in place whenever the machine is operated. Machines must be locked and tagged out when guards or shields are removed for maintenance or cleaning. The guards or shields must be replaced before the machine is returned to operational status.

Avoid skin contact with mill cutters, metal chips, and metal burrs.

Chemical resistant gloves must be worn whenever paints, epoxies, solvents, or other chemicals are used. Disposable nitrile gloves are provided that are effective barriers for most chemicals found in the shop areas. Other glove types will be provided if nitrile gloves are insufficient for a specific chemical needed in the shop areas.

3. Respiratory Protection

Occasional shop users do not need fitted respirators when welding carbon steel unless a significant amount of welding is planned. If galvanized or stainless steel is being welded, local exhaust ventilation is recommended.

Fitted respirators must be worn when welding stainless steel or galvanized metal, or when using uncured epoxies.

University of Pittsburgh Safety Manual	EH&S Guideline Number: 01-016	
Subject: MACHINE SHOP SAFETY	Effective Date: 01/27/2016 Reviewed & Revised: 07/02/2026	Page 4 of 9

Welding must be conducted with good ventilation. Portable welding fume extractors and auxiliary ventilation are strongly recommended whenever welding is occurring inside the shop areas.

4. Foot Protection

Closed-toe shoes must be worn when working with any machine tools or equipment, hand tools, sheet metal or metal scraps, and welding equipment. When handling or working with heavy materials or machinery the use of steel or composite toed shoes is encouraged.

5. Chemical Safety

All oil and other chemical waste are to be disposed properly. Absolutely no chemicals or oils are to be dumped into the sanitary system. The shop manager must be consulted for proper waste disposal procedures. All questions concerning disposal should be directed to EH&S.

Access to Safety Data Sheets (SDS) should be available in an area to anyone using chemicals. SDSs can be accessed via an electronic database or paper copies. Always consult the SDS when using a chemical for the first time, or when a review of safety considerations is needed. At least one form of additional SDS backups is recommended to be available if the main SDS catalogue is kept digitally.

The SDS catalogue should be reviewed once annually to ensure all chemicals being used are reflected in the catalogue

Any new chemical, cleaner, or solvent that is brought into the shop must have a copy of the SDS on file in the area in which the chemical is used and stored or provide internet access to this information.

Flammable chemicals must be stored in a designated flammable cabinet. Acids, bases, and strong oxidizing chemicals must be stored in separate, segregated cabinets.

6. Visitor Safety

A “visitor” is defined as a person who is not intending to use shop equipment or hand tools but must visit the facilities for a short time.

Staff must escort visitors around the Shop area. All visitors must wear long pants and closed-toed shoes if they will be in proximity to equipment or storage areas. Otherwise, their movement is restricted to aisle ways.

University of Pittsburgh Safety Manual	EH&S Guideline Number: 01-016	
Subject: MACHINE SHOP SAFETY	Effective Date: 01/27/2016 Reviewed & Revised: 07/02/2026	Page 5 of 9

7. Machine and Tool Safety Requirements

All machines and power tools must be operated with all guards and shields in place.

Equipment with open rotating or moving parts which material is shaped, cut, or formed manually with operator input are required to have point of operation guarding in place or personal restraining devices. Interlocks or deadman switches may also be acceptable in some cases.

All other machines with rotating or other moving parts are to be equipped with personal isolating machine guarding. This may include or use a combination of devices such as: barriers, physical guards, interlocks, light curtains, etc.. Machine guarding should always be installed in a way which is not easily disabled or bypassed and allows for ease of regular maintenance.

All fixed place machinery is to be securely anchored to the surface upon which it sits. If the surface it sits on is found to be unstable then this should also be subsequently anchored. Anchoring is recommended to be accomplished through physical adherence methods. In some cases “nonpermanent” anchoring methods such as using clamps may be acceptable.

All machinery is to be equipped with energy isolating emergency stop disconnect devices marked in red and be within close reach of the operator. Older machinery without emergency stop devices is to be retrofitted by a qualified electrician.

While not required, whole shop emergency disconnect systems are strongly encouraged to be installed. When starting up a new machine shop or during extensive renovations installation of these systems should be taken into consideration.

Abrasive wheel machinery is to be maintained in a state where the machine guarding requirements stated in OSHA Standard 29 CFR 1910.215 are fully observed.

Older machinery is not exempt from modern machine guarding requirements. Machines without guarding should be appropriately retrofitted.

University of Pittsburgh Safety Manual	EH&S Guideline Number: 01-016	
Subject: MACHINE SHOP SAFETY	Effective Date: 01/27/2016 Reviewed & Revised: 07/02/2026	Page 6 of 9

When working with materials which generate combustible or other respirable dusts, an appropriately sized duct collection system should be in place and operational. Dust collection systems should also be regularly serviced, inspected, and cleaned.

Never leave a machine or tool running unattended unless you have prior approval of the shop staff or manager.

Always remove any chuck key immediately after use and place the key in the holder before operating the machinery. Spring loaded chuck-keys are encouraged when possible

Personal entertainment devices (e.g. IPODS) with earpieces cannot be used while using machine tools and welding equipment.

Lathe chucks must be changed under direct supervision of shop staff. Machine tools and hand tools that are unsafe should not be used and should be reported immediately to a staff member. Red “Out of Service” tags should be attached to a machine tool or hand tool that needs repair. Shop staff will then lock the machine out until repairs can be made.

Students are not permitted to repair any machinery

Check the condition of power cords and plugs on portable tools before using them. Do not use a tool that has a worn or damaged power cord/plug.

All portable corded power tools must be powered through either a GFCI protected circuit or extension cord.

Cordless power tools should always have the battery checked before and after use. If the battery displays cracks, bulging, or leaking then it should be discarded through the University’s battery recycling program.

Pneumatic tools should always be inspected before use for loose parts, components, and connections. The air supply should also be checked to ensure the PSI is adjusted correctly for tool manufacturer recommendations.

Machines must be shut off and locked-out before servicing.

University of Pittsburgh Safety Manual	EH&S Guideline Number: 01-016	
Subject: MACHINE SHOP SAFETY	Effective Date: 01/27/2016 Reviewed & Revised: 07/02/2026	Page 7 of 9

Manual hand tools should always be inspected for cracks, excessive wear, and damage before use. Damaged tools should be taken out of use and replaced.

8. General Safety Practices

Electrical panels must be kept clear (36 inches) of obstructions so that emergency personnel can access if needed.

All machines and the surrounding work area must be cleaned and wiped down after use, including sweeping the floor.

Injuries, no matter how small, must be reported to the shop manager immediately. Anyone who is injured, other than superficial cuts and abrasions, should be seen by a medical professional as soon as possible.

In the event of fire or building evacuation, everyone must turn off equipment and leave the shop areas immediately.

Students are not permitted to operate electrical disconnect switches or breakers.

Shop staff may reset a breaker one time. If the same breaker trips again, an electrician must be called to determine the source of the overload or short.

Clean up area before you leave. Use vacuum to clean up chips and filings. Do NOT use compressed air.

A plumbed in eyewash station is required to be in the shop area or close by with free and open access. If it is not possible to install a plumbed eyewash then a portable station with a run time of at least 15 minutes may be used. Portable stations must be maintained in accordance with manufacturer recommendations.

Plumbed eyewashes are to be flushed at least weekly for 15 minutes to ensure functionality and clear potential debris in water lines. A check sheet should be kept adjacent to the eyewash station.

A fully stocked first aid kit meeting the minimum material requirements stated in OSHA Standard 29 CFR 1910.266 Appendix A is to be always kept in the shop.

University of Pittsburgh Safety Manual	EH&S Guideline Number: 01-016	
Subject: MACHINE SHOP SAFETY	Effective Date: 01/27/2016 Reviewed & Revised: 07/02/2026	Page 8 of 9

The machine shop should be equipped with both an exterior Pitt EH&S laboratory sign and an EH&S emergency response guide within the shop.

University of Pittsburgh Safety Manual		EH&S Guideline Number: 01-016	
Subject: MACHINE SHOP SAFETY		Effective Date: 01/27/2016 Reviewed & Revised: 07/02/2026	Page 9 of 9

TRAINING DOCUMENTATION SHEET

Departmental Shop Safety Training

Shop Manager Signature _____

Student Name _____

Student Signature _____

Subject	Manager's Initials	Date
Shop Orientation		
Reviewed Safety Rules and Practices		
Equipment demonstration		
Reviewed Applicable Injury and Illness Prevention Program		
Reviewed building evacuation & emergency procedures		
Demonstrated competency in using:	Manager's Initials	Date
Horizontal band saw		
Vertical band saw		
Grinder		
Sander		
Drill press		
Lathe		
Abrasive saw		
Shear		
Table saw		
Router		
Jointer		
Planer		
Powered hand tools		
Other		

Comments: _____
