

1.0 Purpose

The purpose of the Machine Shop Safety Guidelines for Academic Departments is to provide a University Standard for safety and administrative controls for individuals who work with machining tools and equipment in these machine shops. This program is derived from government regulations and best practices from research studies.

This program provides guidance for safe handling of machines and how to develop a shop-specific policy addressing training and oversight for specific pieces of equipment; room and equipment access requirements; and general rules and responsibilities of shop users.

2.0 Scope

This Program applies to all employees/staff, faculty, students, visitors, vendors and contractors using machinery in academic departments at the University of North Carolina - Asheville and its associated off-campus facilities.

3.0 Terms & Definitions

Adequate Facility	A facility that provides satisfactory clearances, power, light, and ventilation according to applicable regulations.
Authorized Machine Tool User	An employee or non-employee who has received both Machine Shop Orientation Training and specific machine tool & equipment training by the Machine Shop Manager and is thus authorized to access and use the specific machining tools and equipment using established procedures.
Buddy System	A system designed to protect the machine tool user in case of injury or other incident. A “buddy” is another Authorized Machine Tool User or Machine Shop Manager that is required to be present so that, in the event of an incident, emergency assistance is not delayed.
Guard	An enclosure designed to restrain moving parts or working stock that protects the user in the event of breakage or accidental contact with the moving parts.
Lockout	To secure by use of lock.
Lock-out/Tag-out (LOTO)	The placement of a lock/tag on an energy-isolating device in accordance with an established procedure ensuring that the energy-isolating device cannot be operated until removal of the lock/tag.

Machine Shop	Any location where metal, wood, plastic or other material is cut, drilled, shaped or otherwise transformed using power-driven machine tools or equipment.
Machine Shop Manager	An employee who is empowered to develop, implement, and enforce departmental policy and administrative controls for a machine shop.

4.0 Responsibilities

Everyone working at UNC Asheville has the right to expect a safe and healthy work environment. They also have a responsibility to help assure a safe and healthy environment for themselves and others.

Deans, Directors, and Department Chairs

- Ensure that machine shops are located in adequate facilities to allow for the safe operation and layout of equipment.
- Designate and authorize individual/individuals who have a thorough knowledge of proper machine operation and safe working procedures as the Shop Managers.
- Implement a unit-specific Machine Shop Safety Program that incorporates all the quality elements of the University Standard provided in this document.
- Actively support and enforce their unit-specific Machine Shop Safety Program.
- Ensure an environment where supervisors and other personnel are encouraged to follow this Guideline.
- Inform the EH&S Professional of the designated Shop Manager.

Machine Shop Manager

- Prepare and implement a unit-specific Machine Shop Safety Program.
- Manage and enforce all aspects of the unit-specific Machine Shop Safety Program and activities that affect machine shop safety. Examples include user training, proper use of PPE, project review, removal of unsafe machines from service, posting of appropriate signage at work areas, access controls, and approval of users.
- Train and credential all machine tool users in the proper and safe machining tool and equipment use.
- Maintain training documentation on all authorized machine tool users.
- Limit access to tools, equipment and the shop. Individuals using machining tools and equipment beyond established working hours and during weekends shall be prohibited unless the Shop Supervisor/Manager gives prior written approval and use complies with the “buddy system”.
- Conduct self-inspections and preventative maintenance (PM) of machining tools, equipment, and facilities in accordance with manufacturer’s recommendations or at a minimum of once per year.
- Develop a Lock-out/Tag-out (LOTO) procedure for all equipment as needed and follow the procedures prior to servicing or repairing any piece of machinery or equipment. [UNCA LO/TO procedure](#)

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- Provide eye protection and enforce its use to authorized machine tool users and visitors upon entry into the machine shop.
- Post, provide, or maintain in an accessible location the Standard Operating procedures (SOPs) and manuals for each piece of equipment as appropriate.
- Act as a liaison between the individual department and the EH&S Professional with the implementation of this Guideline and all other aspects of machine shop safety.
- Establish allowable material use specific for the type of machine, application and environment.
- Consider a policy regarding the consumption, storage and preparation of food and drink within shop areas.
- Report all work related injuries and illnesses to the EH&S Office within 24 hours. [Incident report](#)

Authorized Machine Tool Users

- Comply with unit-specific machine shop programs and any further recommendations initiated by the Machine Shop Manager.
- Conduct assigned tasks in a safe manner, wear appropriate personal protective equipment (PPE), and only use equipment for which they have been formally trained.
- Report any job related injuries or illnesses, unsafe or unhealthy working or equipment conditions to the Machine Shop Manager.
- Operate only the specific machines, tools and equipment they have been trained to use, in the manner in which they were trained and the manner in which the equipment was intended to be used.
- Must not wear loose clothing or exposed jewelry while using any machining tool or piece of equipment. Pull back and secure long hair prior to using machining tools and equipment.
- Do not remove or deactivate guards or other safety devices including safety signage or other postings from machinery and equipment except when necessary for servicing.
- Do not change blades, bits, abrasive wheels/belts/discs or other similar tools at the point of operation unless specifically trained to do so and all applicable LOTO and other procedures are followed.

EH&S Professional

- Monitor conformance with this Guideline, and performance of unit-specific program.
- Provide Machine Shop Manager training and maintain documentation of training.
- Conduct machining equipment and facility inspections periodically.
- Provide copies of state regulations and EH&S guidelines upon request.
- Review and revise the Machine Shop Safety Guidelines for Academic Departments as needed.
- Conduct incident investigations as appropriate.

5.0 Program (PRG)

Shop-Specific Safety Program Development

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Each machine shop must develop a program regarding training requirements and oversight necessary for specific pieces of equipment; room and equipment access requirements; and general rules and responsibilities of shop users. This program should be made available for review or reference in the machine shop.

Potential Hazards

A Machine Shop contains the same hazards that can be found in all laboratories.

POTENTIAL HAZARD	EXAMPLES
Physical	Injuries from compressed gas, flying debris, noise, pinching, cutting, and falling.
Electrical	Fire and shock
Fire	Flammable chemicals and sparks
Chemical	Toxic liquids, fumes, gas, and dust

Training Requirements

Only authorized machine tool users as defined by this guideline are permitted to operate machining tools at UNC Asheville facilities. To become an authorized machine tool user, individuals must complete the following training prior to using the machinery and associated equipment.

PERSONNEL	TRAINING REQUIRED	PROVIDED BY
Machine Shop Manager	Machine Shop Safety Guidelines for Academic Shops	EH&S Professional
Authorized Machine Tool Users	- Machine Shop Orientation - Specific machine tool and equipment	Machine Shop Manager/Supervisor

Developing a Basic Machine Shop Safety Training Program

The Machine Shop Supervisor/Manager must train the authorized machine tool users. The Manager must have thorough knowledge about and experience with the following topics:

- How the individual machining tools and equipment operate
- The safety hazards associated with the machining tools and equipment
- Specific actions to take in case of an emergency

The training should include the following topics at a minimum.

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- Unit-specific Machine Shop Policy
- Hazard Communication (online)
- Use of personal protective equipment
- Applicable prohibitions (loose clothing, hair, gloves, jewelry, etc.)
- Guard use/position
- Machining tool and bit maintenance
- Hand tool and facility safety
- Machine shop general safety rules and equipment specific guidelines

Shop equipment will require tool specific training that should include instruction and hands-on demonstration of the following topics:

- Description and identification of the hazards associated with a particular machine
- Proper safety precautions when working with a particular machine
- Limitations of the tools/equipment/materials and when and what not to use
- Safeguards, protection they provide, and ensuring their presence before using a machine
- What to do if a damaged guard, missing part, unusual noise, etc. is observed
- How to use the emergency buttons and other measures, when necessary.
- Maintenance and cleaning procedures

Proficiency Testing

Based on the unit-specific Machine Shop Policy, certain tools or machines may also require proficiency testing prior to being deemed an “authorized machine tool user” on that tool. Proficiency determinations may be evaluated through completion of a shop project or through extensive hands-on training/oversight as determined by the Shop Manager

Recordkeeping

Individual departments must maintain training records on authorized machine tool users. Training records must include the specific machining tool or other equipment the individual was trained on, date of training, and the signature of trainee and trainer.

Individuals will be classified as “Authorized Machine Tool users” upon completion of training and documented departmental training records. The Shop Manager will determine what method of identification will be used to distinguish between authorized users and those who have not been authorized.

Emergency Response Training

First Aid training is recommended but not a requirement for the Shop Manager. At a minimum, a stocked first aid kit should be available in or near the shop area.

Each Shop Manager is also encouraged to obtain Fire Extinguisher training by contacting the EH&S Professional.

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Shop Access

All University students and employees must have received formal machine shop safety training and be a designated "Authorized Machine Tool User" prior to access and use of machining tools and machining equipment in machine shops.

Buddy System

In accordance with this Guideline, the Shop Manager shall implement a mandatory buddy system for all Authorized Machine Tool Users. No one is to work in a machine shop alone.

Establish Hours of Operation

Employee and student use of machine shops and facilities with machining tools and equipment shall be limited to established hours of operation. Using machining tools and equipment beyond established working hours and during weekends by Authorized Machine Tool Users is prohibited unless the Shop Manager has issued prior written approval.

Departments are strongly encouraged to limit after-hours usage of power equipment after midnight due to increased fatigue factors associated with working late at night.

Shop Inspections

In addition to normal oversight and review of the shop area on a continual basis, the Shop Manager in conjunction with the EH&S Professional shall conduct annual facility safety inspections. Facility inspections shall be documented to include violation and corrective action.

Recordkeeping

Documentation of these inspections shall be maintained by both the department and the EH&S Professional.

6.0 References

[OSHA Safeguarding Equipment and Protecting Employees from Amputations](#)

[OSHA Guide to Protecting Workers from Woodworking Hazards](#)

[OSHA Machine Guarding eTool](#)

[UNC Asheville Electrical Safety Program](#)

[UNC Asheville Lockout/Tagout-Control of Hazardous Energy Sources](#)

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