

Lassonde School of Engineering Machine Shop Manual



Version History

Version Number	Change Details	Date
1.0	New Document	19-Nov-2021
1.1	Document formatting	07-Dec-2021
1.2	Revised Appendix A to include Dress Code rules and updating PPE requirements	24-Aug-2022

Table of Contents

Acronyms.....	5
Introduction	6
Purpose.....	6
Scope.....	6
Regulations & Policies.....	6
Definitions	7
Roles & Responsibilities.....	8
Senior Administration	8
Faculty Members, Teaching Assistants and Course Instructors.....	8
Machine Shop Staff	8
Authorized Shop Users (Shop Users).....	9
Health and Safety Employee and Well Being	9
Joint Health and Safety Committee	9
Project Spaces Operation & Access	10
Shop Access	10
After Hours Access & Working Alone	10
Storage of Personal Belongings	10
Eating and Drinking	10
Project Spaces Rules	10
Materials Storage	11
Housekeeping	11
Non-Compliances.....	11
Safety Controls in the Machine Shop	12
Engineering Controls.....	12
Administrative Controls.....	12
Personal Protective Equipment	13
Training Requirements.....	14
Basic Training Requirements.....	14
Retraining.....	14
Refresher Training & Quiz	14

First Aid & Safety Equipment in the Machine Shop	15
Management of Hazardous Materials.....	16
Hazard Communication	16
Storage	16
Disposal	16
Spills	16
Emergency Planning & Reporting	17
Fire Procedures.....	17
Injury Management.....	17
Near Misses and Hazard Reporting.....	17
Inspections & Record Keeping	18
References	19
Appendix A - Machine Shop Safety Rules.....	20

Acronyms

JHSC – Joint Health & Safety Committee

HSEWB – Health, Safety and Employee Well Being

OHSa – Occupational Health & Safety Act

LSE – Lassonde School of Engineering

LOTO – Lock out Tag out

SOP – Standard Operating Procedures

TA – Teaching Assistant

Introduction

Purpose

Unique hazards exist in the machine shop. This manual serves as a guide and training resource for all workers, users and visitors of the facility. It lays out the health and safety practices and procedures that are established in the Lassonde School of Engineering (LSE) Machine Shop as well as general operations information.

Users of the LSE Machine Shop are required to read the entirety of this manual, demonstrate an understanding of the content, and abide all the rules set forth in this document.

Scope

The content in this manual is applicable to all members of the LSE community (Faculty, staff, course instructors, teaching assistants, volunteers, students, contractors, volunteers) who use, access and/or oversee the LSE Machine Shop.

The content in this manual applies only to the machine shop space and not the garage spaces.

Regulations & Policies

Under the Ontario Occupational Health & Safety Act (OHSA), employers have the duty to take all precautions reasonable to protect worker health and Safety. To this end, the University has a number of health and safety policies and programs put in place that all York University community members are required to follow. Please review the [University's Health & Safety webpage](#) for details.

In addition to the OHSA, there are several regulations under the Act that applies to the LSE Machine Shop and those working within. Some of which includes:

O. Reg. 297/13 – Occupational Health & Safety Awareness and Training

O. Reg. 381/15 - Noise

R.R.O. 1990, Reg. 860. – Workplace Hazardous Materials Information System (WHMIS)

R.R.O. 1990, Reg. 851 – Industrial Establishments

It is the expectation that all users of the facility comply with the requirements prescribed in these regulations.

Document Title:	Lassonde School of Engineering Machine Shop Manual	
Version:	1.2	Page: 6 of 22

Definitions

Authorized Shop User Any person who has been trained, certified as being competent and given permission by the Machine Shop Staff to work safely in the machine shop

Competent Person As defined under the OHSA, a competent person is one who:

- (a) is qualified because of knowledge, training and experience to organize the work and its performance,
- (b) is familiar with the OHSA and the regulations that apply to the work, and
- (c) has knowledge of any potential or actual danger to health or safety in the workplace

Critical Injury As defined under the OHSA and O. Reg 834, Critical injury means an injury of a serious nature that,

- (a) places life in jeopardy,
- (b) produces unconsciousness,
- (c) results in substantial loss of blood,
- (d) involves the fracture of a leg or arm but not a finger or toe,
- (e) involves the amputation of a leg, arm, hand or foot but not a finger or toe,
- (f) consists of burns to a major portion of the body, or
- (g) causes the loss of sight in an eye.

Employer As defined under the OHSA, an employer is a person who employs one or more workers or contracts for the services of one or more workers and includes a contractor or subcontractor who performs work or supplies services and a contractor or subcontractor who undertakes with an owner, constructor, contractor or subcontractor to perform work or supply services.

Supervisor As defined under the OHSA, a supervisor is a person who has charge of a workplace or authority over a worker.

Worker As defined under the OHSA, a worker is a person who performs work or supplies services for monetary compensation.

Roles & Responsibilities

Senior Administration (Dean, Chairs, Directors and Facility Management)

- Provide the resources and direction required to support undergraduate and graduate activities within the LSE Machine Shop
- Appoint a competent person to supervise the activities in the LSE Machine Shop
- Support granting authorized shop users access to the LSE Machine Shop

Faculty Members, Teaching Assistants and Course Instructors

- Ensure students comply with the requirements and shop-specific protocols & practices outlined in this manual and in the LSE Machine Shop Training
- Be aware of all safety concerns raised by students in the LSE Machine Shop
- Be aware of the shop activities that students are engaged in
- Work with Machine Shop Staff to address/resolve any student-related incidents or concerns that come up in the LSE Machine Shop

Machine Shop Staff

- Inform the Authorized Shop Users of the LSE Machine Shop Manual and where it can be accessed
- Deliver the Machine Shop Training to Authorized Shop Users
- Ensure Authorized Shop Users have completed all required training and sign off on the Machine Shop Acknowledgement Form prior to providing approval to access to the LSE Machine Shop
- Grants Authorized Shop Users with access to the LSE Machine Shop
- Ensure Authorized Shop Users follow the requirements and shop-specific protocols & practices outlined in this manual and in the LSE Machine Shop Training
- Ensure machinery and tools are used only by Authorized Shop Users
- Ensure proper safety controls are implemented in the machine shop to prevent/minimize exposure to hazards
- Lockout and tagout machines and tools per [University's LOTO program](#)
- Ensure safety inspections are carried out on the prescribed time period
- Ensure machines, equipment and tools are regularly serviced, inspected and in good working condition
- Ensure shop supplied personal protective equipment (PPE) is the appropriate standard and in good condition
- Maintain, properly record and store all training records
- Maintain the shop's chemical safety data sheets
- Maintain a record of all inventories of material stock, hazardous chemicals and tooling
- Has the authority to stop work that poses an imminent hazard
- Ensure safe work procedures (ex. Standard Operating Procedures) are in place
- Complete and submits incident report forms as needed and notify relevant stakeholders of the incident

Authorized Shop Users (Shop Users)

- Complete all required health & safety training, as provided by HSEWB and the LSE Machine Shop
- Report any hazards and health and safety concerns to Machine Shop Staff
- Read and follow requirements and shop-specific protocols & practices outlined in this manual and in the LSE Machine Shop Training
- Wear all appropriate personal protective equipment when in the LSE Machine Shop
- Provide proof of training certification to the LSE Machine Shop upon request

Health and Safety Employee and Well Being

- Provide support and guidance on health & safety concerns that come up in the LSE Machine Shop

Joint Health and Safety Committee

- Advise on health & safety matters in the machine shop as needed, to ensure continuous improvements in health & safety

Machine Shop Operation & Access

Shop Access

The LSE Machine Shop is open Monday to Friday, closed on the weekend, on statutory holidays, and the winter break. A weekly or term schedule is posted outside of the Machine Shop, to provide shop users with information on hours of operation.

Access to the LSE Machine Shop is by ID-badge card access only and must be requested through the course instructor or Lassonde Facilities. Guests and visitors wishing to access the facility must seek permission from the Machine Shop Staff. All unauthorized individuals found in the LSE Machine Shop will be asked to leave immediately.

After Hours Access & Working Alone

Machinery and tools can only be used when Machine Shop Staff are present in the shop. Therefore, unless approved by the Machine Shop Staff or faculty member, no one will be permitted to access the shop after operation hours or work alone in the LSE Machine Shop.

Shop Users are encouraged to use a 'buddy system', working together with at least one other person while in the shop. This is to ensure in the event of emergency situations, immediate assistance can be provided or summoned.

Storage of Personal Belongings

Personal belongings such as book bags and notepads may be brought into the LSE Machine Shop. Coats and large items should be kept outside. There are shelving units available in the corridor outside of the LSE Machine Shop where Shop Users may keep these items. Please note however, that the LSE Machine Shop will not be responsible for any lost or stolen items.



Eating and Drinking

Eating and drinking is not allowed inside the LSE Machine Shop. Shop Users who would like to consume food or beverage must do so outside of the LSE Machine Shop.

Work Requests

Please submit all work request to the LSE Machine Shop. Machine Shop Staff will review the request to determine its feasibility and then work with the requester on a mutually agreeable timeline to completing the task.

Shop Rules

Please review Appendix A for shop rules.

Materials Storage

There is limited space in the LSE Machine Shop for storage of raw materials and class project related items. Shop Users must make arrangements and get approval from the LSE Machine Shop if he/she would like to have items temporarily stored inside the shop.

Housekeeping

Shop Users are expected to follow good housekeeping when working in the LSE Machine Shop, including but not limited to:

- Keeping floors, walkways, workstations and access to emergency equipment and exits dry and free of obstructions (i.e. no scrap materials, clutter, trash and debris)
- Cleaning up the work area after use or at the end of each day before leaving the shop (ex. Removing scrap materials, brushing off debris and wiping down machines as needed, etc.)
- Cleaning up spills immediately
- Disposing of waste appropriately
- Returning tools to their storage location promptly after use

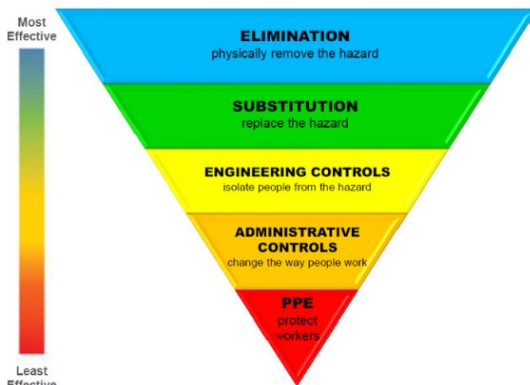
Non-Compliances

Shop Users are required to follow the protocols, procedures and practices outlined in this manual and in the Machine Shop Training. Failure to comply will result in the following progressive disciplinary actions, at the discretion of the Machine Shop Staff that commensurate with the level of the offense:

- **First Time Non-Compliance:** Verbal warning (to be recorded and filed) and removal from the machine shop for the remainder of the day.
- **First Repeat Offence:** Written formal warning letter, removal from the machine shop for one week and retraining of the online training.
- **Second Repeat Offence:** Loss of LSE Machine Shop privileges for a set duration (to be determined by the Machine Shop Staff in consultation with faculty member/course instructor) and completion of full training again.

Safety Controls in the Machine Shop

Hierarchy of Controls (Elimination, Substitution Engineering Controls, Administrative Controls, and then Personal Protective Equipment (PPE)) is a recognized approach to hazard containment, where the levels of control at the highest level (Elimination and Substitution) are considered the most effective at mitigating risk of exposure, compared to the lowest level of control (Administrative Controls and PPE). In the LSE Machine Shop, a combination of the control methods is utilized to protect everyone in the space.



Engineering Controls

Machine guards are physical barriers that prevent the operator from having any part of his/her body in the “danger zone” during the machine’s operating cycle. They can be fixed, interlocked, adjustable, or self-adjusting. When operating machineries in the LSE Machine Shop, Shop Users are to ensure machine guards are secure in place and under no circumstances, remove or operate a machine without any kind of safeguarding.

Emergency stop button, or e-stop, is a red mushroom-headed button that, when activated, will immediately start the emergency stop sequence. This safety mechanism is typically found in heavy machinery or in equipment/spaces that are hazardous in nature or inherently poses a high risk of injury to users during operation. The intention of the e-stop is to avert harm or to reduce existing hazards to persons, machinery, or work in progress.



In the LSE Machine Shop, there are three e-stops (two in the corridor and one in the machine staff office) wired to the shop’s main electrical panel. When any one of the e-stops are pressed, it will break the circuit of all machinery in the shop, i.e. cutting the power supply to all of the equipment. The button is intended to be used in unforeseen hazardous/emergency situations, i.e. when there is an immediately hazardous situation that needs to be ended or averted quickly in order to prevent injury or damage.

Administrative Controls

Training: Please review Training Requirements section.

Standard Operating Procedures (SOPs) for Machines / Equipment / Tools: SOPs for machineries and tools provide detail information on how to operate the equipment safely. They are available for review in a binder in the Machine Shop Staff office.

Lockout Tagout: Various forms of energy associated with machinery and equipment have the potential for causing severe injuries. As such, any machines, power equipment and tools that are under maintenance/servicing, or are found to be damaged/ defective must be properly taken out of service immediately, following the procedures as outlined in the University's [Lockout Tagout Program](#).

Occupancy Limit: Capacity limit is enforced in the machine shop to avoid congestion, and to ensure adequate clearance can be provided for movement and maneuvering of materials.

Personal Protective Equipment

Shop Users must wear appropriate eye protection (i.e. safety goggles) when inside the LSE Machine Shop. Shop Users may bring their own set of eye protection or use the ones provided by the shop. Please note that the eyewear must meet CSA standard (CSA Z94.3). Regular prescription glasses are not considered appropriate eye protection.

Appropriate footwear must also be worn while in the shop. Anyone entering the machine shop must at minimum wear shoes that are closed toe, closed heel, slip resistant, and of durable nature (i.e., made of material not easily punctured). Those who are performing work in the machine shop will be required to wear safety shoes/ toe caps that meet CSA standard (CSA Z195). The machine shop will provide slip-on toe covers for those who do not have safety shoes. However, it is strongly recommended that regular Shop Users have their own pair of safety shoes to ensure good fit.

Hearing protection will be required on an as need basis, depending on which machine/equipment is in use.

Training Requirements

Basic Training Requirements

Shop Users must complete all required training before operating any machines in the shop. This includes completion of the WHMIS 2 training, the LSE Machine Shop Training, and any machine specific training.

The LSE Machine Shop Training has 2 components, an online portion that is hosted on Moodle/e-Class and an in-person hands-on portion. Shop Users must complete and pass the online portion before registering for of the hands-on training. Enrollment for both training can be arranged through the course instructor or by direct request to LSE Machine Shop Staff.

The hands-on portion of the LSE Machine Shop Training will provide Shop Users with an orientation to the Machine Shop and an introduction to the machineries and tools (mill, lathe, drill press, etc.) that Shop Users will be using most frequently. The focus of the training will be around operations, safe practices and procedures that users need to know and follow.

Retraining

Machine Shop Staff may require Shop Users to be retrained if an individual demonstrates deficiencies or inadequacies in their knowledge or actions, if there is a major operation change in the LSE Machine Shop that affects the users or at the request of the shop user.

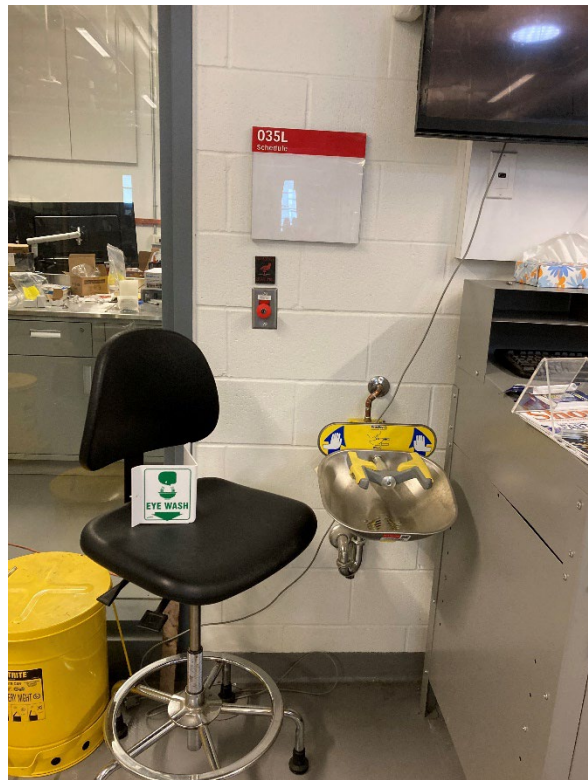
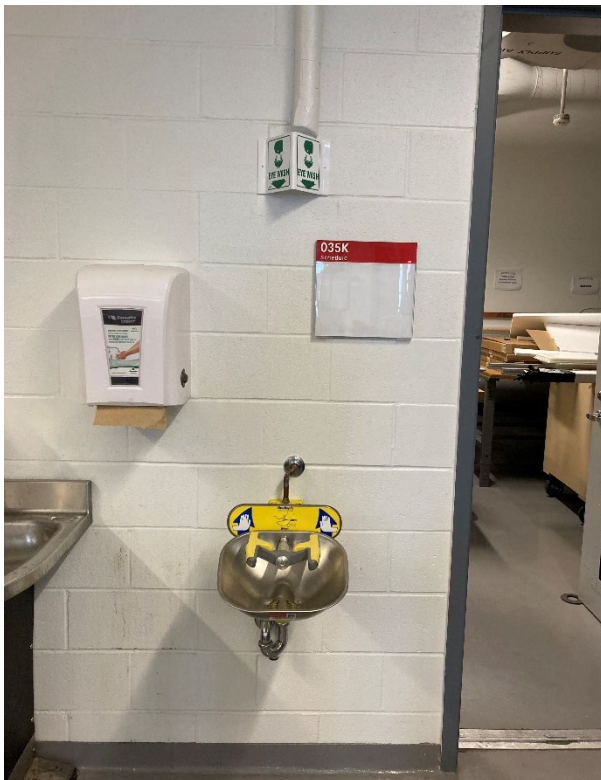
Refresher Training & Quiz

Shop Users will be required to complete an annual refresher training/ quiz, to ensure competency.

First Aid & Safety Equipment in the Machine Shop

The first aid kit is located in the corridor, just outside of room 035B, and is available for shop users to use, to treat cuts and bruises and minor injuries.

There are two eyewash stations in the LSE Machine Shop. One is located outside of the Machine Shop Staff office (room 035L) and the other is next to the hand washing sink, outside of room 035K. This equipment is maintained and checked regularly by the Machine Shop Staff to ensure proper functioning.



There are two class ABC fire extinguishers in the LSE Machine Shop. One is located in the fire hose cabinet adjacent to the Machine Shop Staff office. The second one is located in the hallway corridor outside of the shop. The extinguishers may be used for small manageable fires, or in emergency situations where evacuation is required and an egress path need to be cleared. Class ABC extinguishers can be used to put out fires caused by burning trash, wood and paper (class A), liquids and gases (class B), and energized electrical sources (class C).

Please note that the hose in the fire cabinet is for use by trained personnel only (i.e. fire department).

Management of Hazardous Materials

Hazard Communication

All hazardous materials used in the LSE Machine Shop must have safety data sheet (SDS) supplied. SDS may be accessed via the University's SDS database, [ChemWATCH](#). Hard copies are also available in the LSE Machine Shop SDS binder, located by the health & safety board.

All of the bottles containing hazardous chemicals must be appropriately labeled, following WHMIS labeling requirements. Please notify Machine Shop Staff if a chemical bottle is not labeled or if the label is not properly affixed.

Chemicals that are brought in from outside of the Machine Shop must first be reviewed and receive approval for use by the LSE Machine Shop Staff. Shop Users are advised to contact Machine Shop Staff in advance to determine whether the chemicals can be used in the shop.

Storage

Hazardous materials must be stored inside the chemical storage room located in room 035G, according to the guidelines from the chemical's safety data sheet.

Disposal

Hazardous wastes must be disposed of appropriately according to York University waste disposal protocols. Please speak with Machine Shop Staff to ensure proper disposal.

Spills

Spills must be cleaned up immediately to avoid exposure to hazardous chemical and slip, trip and fall incidents. For manageable spills, wipe up and then use appropriate cleaning agent to clean up the area. For large and/or unmanageable spills, please follow the [University's Emergency Chemical Spill and/or Odour Procedure](#).

A spill is considered manageable if the volume is small, the chemical is known and can be cleaned up safely without the use of a respirator.

Emergency Planning & Reporting

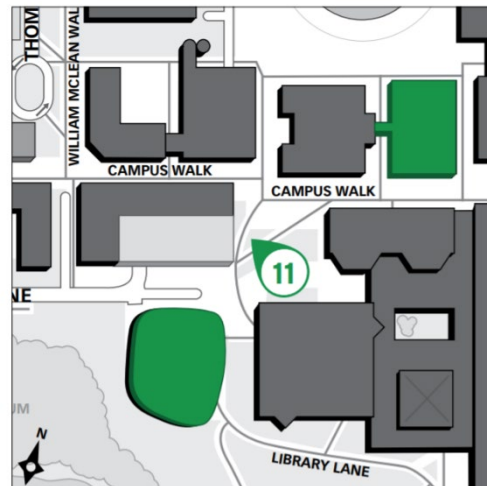
Fire Procedures

In Case of Fire,

- Stop what you are doing
- Turn equipment off (de-energize)
- Leave the area immediately and close doors behind you
- Call 911 from a safe location
- Activate nearest fire alarm

In response to a fire alarm,

- All persons are required to exit the building upon hearing a fire alarm.
- Upon evacuation, head to **assembly point #11**, located between from the Arboretum Lane Parking Garage and Scott Library.



Injury Management

For injuries that require professional medical attention, call 911 and then campus security at (416)736-5333. Security Services personnel are trained in First Aid and CPR and have access to First Aid Kits, Automated External Defibrillators (AEDs), Oxygen and Naloxone kits. They will attend the scene and provide assistance to persons experiencing medical emergencies until emergency responders arrive.

For instances involving critical injury, call 911 and then campus security at (416)736-5333. Please note that critical injuries requires following a [specific protocol](#). Therefore, it is very important to not disturb the scene and that the incident is reported immediately to the Machine Shop Staff, Course Instructor or Teaching Assistant (TA) present.

In all cases, all injuries, regardless of big or small, should be reported to the Machine Shop Staff, Course Instructor or TA present to ensure proper treatment can be given. The incident will be documented and submitted to the appropriate parties for follow up.

Near Misses and Hazard Reporting

It is important to report all incidents/hazards encountered in the shop to Machine Shop Staff, Course Instructors/TA, regardless of the event being big or small. Reporting an incident allows for an investigation to take place so that the contributing factors and root cause to the incident could be identified, allowing for corrective actions to happen, to prevent the incident from happening again in the future or the hazard leading to an injury.

Inspections & Record Keeping

All machinery, equipment and tools in the LSE Machine Shop are inspected regularly and undergo regular maintenance to ensure proper functioning and that they are in good condition. The physical condition of the shop is also inspected for hazards/safety on an annual basis by Lassonde's Safety Manager.

Inspection reports as well as maintenance services records are kept on file and may be requested to be reviewed.

References

Legislation

[Occupational Health and Safety Act, R.S.O. 1990, c. O.1](#)

[O. Reg. 297/13 – Occupational Health & Safety Awareness and Training](#)

[O. Reg. 381/15 - Noise](#)

[R.R.O. 1990, Reg. 860. – Workplace Hazardous Materials Information System \(WHMIS\)](#)

[R.R.O. 1990, Reg. 851 – Industrial Establishments](#)

York University Health & Safety Policies & Programs

[Eyewash & Emergency Showers Guidelines](#)

[Health & Safety Policies](#)

[Incident Investigation Program](#)

[Lockout/Tagout Program](#)

[WHMIS](#)

Standards

CSA Standard Z94.3 - Guideline for selection, use and care of eye and face protectors

CSA Standard Z195 – Protective Footwear

CSA Standard Z432 - Safeguarding of Machinery

Appendix A - Machine Shop Safety Rules

RESPONSIBILITIES

Machine Shop Staff have authority over shop operations and safety. This includes but is not limited to the responsibility, authority, and obligation to authorize or prohibit access for the safety of an individual.

Students, faculty, and staff working in shops are expected to comply with all applicable health and safety regulations, York University policies, and work practices outlined in the LSE Machine Shop Manual and Training.

All machine shop users must obtain approval from Machine Shop Staff to operate machinery, power tools and/or hand tools prior to use.

SAFE WORK PRACTICES

General Safety Rules

1. Horseplay or any activities that would cause distractions are prohibited in the machine shop.
2. DO NOT allow unauthorized persons enter the machine shop.
3. NEVER remove cuttings and chips by hands; use brushes or pliers instead.
4. DO NOT use compressed air to clean tools, machines, or persons.
5. DO NOT clean hands with solvents.
6. Shop users are only allowed to operate machines and power tools when Machine Shop staff are present in the shop.
7. Always maintain awareness of activities happening around in the shop.
8. Only authorized users who have up-to-date training are allowed working in the Machine Shop.

Housekeeping

9. Machines and tools shall be cleaned after each use.
10. Return tools to the appropriate storage area in clean and good condition.
11. Keep the work area and floors clear of scrap and excessive litter.
12. Clean up and report spills promptly.
13. Keep aisle and walking paths clear.
14. Hazardous chemicals (including wastes) must be stored in appropriate containers and storage unit/location.

Machine Safety

15. DO NOT use machines/equipment/tools that are damaged or found to be defective.
16. Use machines and tools only for its designated purpose.
17. NEVER leave machines and tools running unattended.
18. NEVER temper with, defeat, bypass or disengage safety mechanisms on machines/tools.
19. DO NOT manually adjust work pieces or attempt to measure a work piece while the machine is running.
20. Machine controls must be accessible and unobstructed at all times.

Reporting

21. Report any damaged or defective equipment/tools to Machine Shop Staff immediately.

Document Title:	Lassonde School of Engineering Machine Shop Manual	
Version:	1.2	Page: 20 of 22

22. Report all injuries and "near misses" immediately to Machine Shop Staff.

Dress Code

23. Tie up long hair.

24. Wear short sleeves or roll up long sleeves to above elbow when working to prevent material from getting caught by machines/tools.

25. Shorts and cut-off pants are NOT allowed in the machine shop.

26. Shoes must be close-toed, closed-heel and slip resistant. Sandals and open-toed shoes are NOT allowed in the machine shop.

27. DO NOT wear jewellery, watches, or bracelets when operating machines.

28. DO NOT wear loose clothing when operating machines.

Personal Protection & Safety

1. Eye protection (conforming to CSA Z94.3) must be worn at all times in the machine shop.

2. Safety shoes/ toe caps (conforming to CSA Z195) must be worn when performing work in the machine shop.

3. Hearing protection are to be worn when loud equipment/machinery are under operation in the machine shop.

4. Use suitable gloves when handling hot objects, glass or sharp-edged items, but DO NOT wear gloves when operating machines.

NON-COMPLIANCES

Safety is everyone's responsibility. Unsafe behaviours/actions will not be tolerated in the LSE Machine Shop. Shop Users who choose to practice unsafe behaviours or create unsafe conditions that puts other at risk will be subjected to immediate work stoppage, removal from the shop and other disciplinary actions, at the discretion of the Machine Shop Staff.

