Machine Shop Policy

Policy Number: 2.7
Supersedes: Policy of December 12, 2011
Implementation Date: January 18, 2017

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Introduction:

The Machine Shop Policy outlined here describes the functions, terms of use, procedures, forms and responsibilities of the Mechanical Engineering Machine Shop. Anyone (i.e. Students, Faculty and Clients) making use of the machine shop, or the staff of the Machine Shop, are covered by this policy and should be familiar with it.

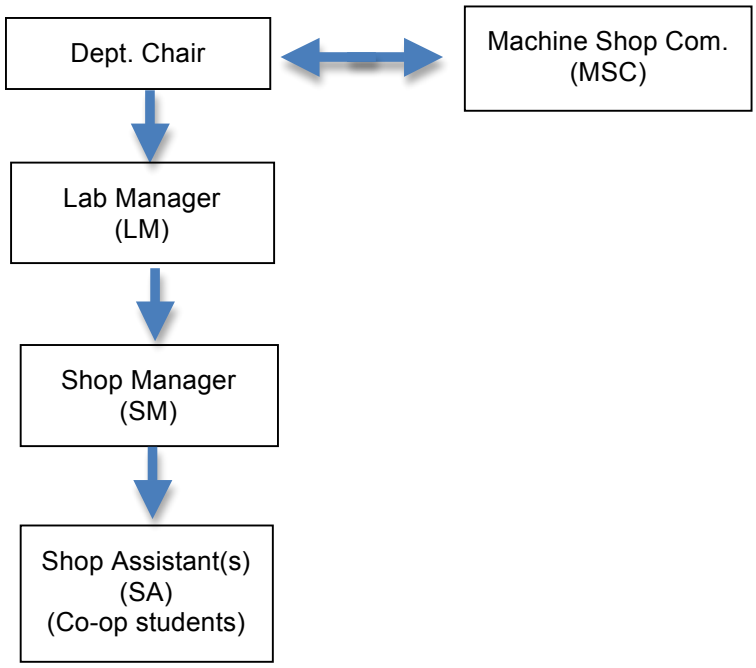
The primary goal of the Mechanical Engineering Machine Shop is to support and provide in order of priority:

1) Learning and Laboratory Support for Undergraduate ME Students
2) Research Activities of ME Faculty
3) Learning and Research Activities for Graduate ME Students
4) Other Machining Activities, where they do not conflict with (1), (2) or (3).

The policy also outlines the roles and responsibilities of the Machine Shop staff, and strives to create a productive and safe working environment in the machine shop for all staff and users. It also outlines work flow of jobs, and annual maintenance of UG laboratory equipment.

Section A: Shop Organization and Current Resources

Senior Scientific Assistant (SM): Rodney Katz
Shop Assistants (SA): Co-op students
Lab Manager (LM): Art Makosinski
Machine Shop Committee (MSC)



1.0 Personnel Functions (Common to Shop Staff)

1. Total commitment to safety in the Machine Shop by adherence to safety rules and established shop operating procedures.
2. Observing and assisting students in the correct and safe operation of equipment in the B103 Machine Shop.
3. Observance and empathy towards student's needs.
4. SM to have First Aid proficiency through OHS courses taken within not less than 5 years.
5. High level of proficiency in CAD (SolidWorks or other package) and MasterCam software (Ability to turn 2D drawings, into G code for the CNC mill.)
6. Responsible for the use and maintenance (including repairs) of equipment in assigned rooms and labs outlined in Section D. Keeping them in clean and safe working order through regular inspections and repair.
7. Ensuring that students cleanup their respective working area

1.1 Functions of Shop Manager (SM)

1. General operations, infrastructure, and work assignment in the Machining Facility.
2. Project management through acceptance and approval of Project Request Form (F2), cost quotations, work distribution, maintenance of the queue, communication with the client and submitting completed Project Request and Charge Back Form (F8) to LM.
3. Acting as the Machine Shop Safety Coordinator, providing training sessions to students on safe and correct use of (equipment in) the Shop, and on avoiding hazards.
4. Updating a set of written Mech Engineering "Safe and Efficient Shop Operating Procedures" (SESOP) for the use of tools and machinery, and observing that the work in the Shop is done according to them.
5. Consultation with grad students and faculty on project design issues.
6. Initiating regular seminars/demonstration of new equipment, design, and machining techniques for grad students, faculty and staff.
7. Authoring, updating the "Prototype Design and Manufacturing Manual" used in MECH/BME 350 and making it available to all shop users.
8. Assisting students in undergrad lab sessions in B103 for MECH 200/350/400, and BME 350 when needed.
9. Providing instructions in the use of the CNC equipment in B111, B103, and B119, when requested by the course instructor.
10. Providing instructions on how to integrate CAD software into MasterCam, CNC controller, and the Laser Cutter.
11. Providing laser welding service to the department.
12. Participation in the design and construction of new undergrad lab equipment as requested by the LM.
13. Representation at the Faculty Safety Committee.
14. Approvals of SuperUser Status.
15. Procurement of supplies, tools, and equipment (with LM), for ELW B103, B111, B123, A127.
16. Initial setup and tooling of machines in the areas listed above.
17. General administrative work which includes:
    - Submitting charge back's for all work in the Shop to LM.
    - Maintaining a shop user logbook, for signing in before Shop use.
    - Distributing and collecting Shop Use and Charge Back Form (F6)
    - Maintaining a Consumables Charge-Back Log (F8).

1.2 Functions of Shop Assistant(s) (SA)

1. Under the supervision of the Shop Manager, responsible for the use and maintenance (including repairs) of the Machine Shop in ELW B103 and B111.
2. Daily check and maintenance of 3D printers in ELW A127, including distribution of filaments to students, and implementing charges according to the "Mech Eng 3D Printer Use Policy" on the Machine Shop website.
3. Assisting the Shop Manager, in delivering in-shop safety talks to students on safe use of the Shop, its equipment, and on protecting themselves from Shop hazards.
4. Assisting UG students during course laboratory sessions.
5. Assisting students in the Machine Shop in the absence of the SM and when requested.
6. Maintaining an inventory of fasteners, taps and cutters in B103.

7. Preparing undergrad lab samples to given tolerances and servicing undergrad lab equipment as designated in Appendix A, and when requested by SM.
8. Notifying SM when there is less than a day's work in the Work Queue.

1.3 Functions of Lab Manager (LM)

1. Provides workflow management and reporting to the committee.
2. Responsible for approval of shop layout, flooring, electrical, and machine configuration.
3. Makes periodical inspection of the shop for order and cleanliness.
4. Approves of equipment purchase for the facility.
5. Meets regularly with SM to discuss safety and technical shop issues.
6. Receives and approves completed Work Request Forms (F2).
7. Approval of projects using CNC equipment that is outside of the Machine Shop, such as the HAAS mill in B123.

1.4 Machine Shop Committee (MSC)

1. MSC reviews, discusses and sets the Machine Shop Policy.
2. Collects feedback on the Machine Shop operation from students and faculty.
3. Meets to review proposed policy changes, and consults with faculty as required regarding changes.

1.5 SuperUser Status

1. Where there is proof of sufficient skill/competency and experience, students may qualify for SuperUser status. This allows them to utilize the machining facility without SA/SM supervision. (Forms; F3, F4).
2. A SuperUser cannot work alone. There always needs to be a second person in the room as a 'safety backup' to help, or call for help in the event of an accident or a difficult situation.
3. The Department does NOT give the SuperUser the authority to supervise other students.

2.0 Machining Facility

The Mechanical Engineering Machining Facility includes:
ELW B103/B111 - Machine Shop
ELW B119 - CNC Undergraduate Lab
ELW A127 - Undergraduate Design Studio
ELW B123 - Woodworking Shop.

Section B: Shop Use

3.0 Shop Hours

ELW B103 - Machine Shop (1) – Student Use
Equipment Available: Three manual milling machines, three lathes, drill press, band saw, metal bender, metal grinder, clamps, worktables. The Shop hours are:

- Undergraduate students: **1:00 pm - 6:00 pm,** which includes designated Lab sessions
- Graduate students: **9:30 am – 5:30 pm**, except during undergrad Lab sessions
- SuperUsers: **5:30 pm – 10:30 pm**, under conditions of Section 3.4

ELW B111 - Machine Shop (2) – Staff Use Only
Equipment: CNC lathe, CNC mills (B111/103), laser welder, cutter, MTS, Colchester lathe.

- Work hours: 9:30 am - 12:30 pm, and 1:00 pm - 5:30 pm.

ELW A127 - Undergraduate Design Studio – Student Courses (MECH/BME350, MECH400).
Equipment: 3D printers, drill press, hand tools, clamps, sander, worktables, materials.

- Student access hours: 7:00 am – midnight during 350/400 Design courses.

ELW B119 - CNC Undergraduate Lab – Laboratory and Staff Access Only
Equipment: HAAS CNC Milling Machine

ELW B123 - Woodworking Shop – Staff or SuperUser Access Only
Equipment: Table saw – Staff use only.

3.1 Submitting Research Projects

1. Clients (researchers) must submit a Mech Project Request form (F2) along with job drawings to SM. Drawings must adhere to basic Shop standards. Example in Appendix A. SM will review F2 and drawings, provide a job cost quote, allocate the job, and place the job in the Shop work queue.
2. Work is started only after client approves the quote and provides their account number.
3. Upon completion of the project, SM informs the client and submits the completed Mech Project Request form to LM.
4. All machining time must be accurately represented in the invoices.

3.2 Graduate and Mech 499 Student Shop Use

1. Grad student's use of the Machine Shop B103 is permitted under the following conditions.
    a. SM and SA have been notified of the use, and have given their approval.
    b. The work is conducted during regular shop hours (Section 3.0).
    c. MECH 200, 350, 400, BME 350 labs are not running concurrently during the week
    d. There are at least two people present in the Machine Shop.
    e. The user fills out the Shop Use Form (#5) and keeps track of his/her time.
    f. Shop's safety and cleanup procedures are followed.
    g. The user or his/her supervisor accepts the financial responsibility for damaging any parts of machines or tools.

3.3 Undergraduate Course Work: MECH 200, 350, 400, and BME 350

1. Undergraduate students can use the B103 Machine Shop in order to complete course work as required in their course outline, for MECH 200, 350, 400, and BME 350.
2. In order to carry out such work, the Machine Shop is available at the following times:

Terms	Date:	Courses	Session A	Session B
Spring	Feb (weeks: 2, 3 & 4)	350, 400	**1:00 - 3:30 pm**	**3:30 - 6:00 pm**
Spring	March (weeks: 1, 2, 3, & 4)	350, 400		
Summer	June (weeks: 2, 3 & 4)	400		
Summer	July (weeks: 1, 2, 3, & 4)	400		
Fall	Nov (weeks: 2, 3 & 4)	200		

3. During a UG Session, a maximum of three (3) student groups are permitted in the shop. Only 3-4 students from each group may be present.

4. In order to provide equal access, each UG Team is allocated eight to ten, 2.5 hour shop sessions per term, depending on the size of the class.

5. In total, there are about 180-210 UG sessions available per term in the Machine Shop. The number of sessions is determined & posted by LM and SM, at the start of each term.
   Example: 6-7 weeks x 5 days/week x 2 sessions/day x 3 Teams/session = 180-210.
   These sessions represent class numbers during the periods indicated in the table above, and are shared by all UG Teams enrolled in courses using the shop during that term.

6. A "UG Session Sign-up Sheet" is available in the Machine Shop. UG student Teams can sign up for a maximum of two sessions in advance, provided that:
   a. Students are enrolled in courses indicated in the table above.
   b. Students have gone through safety training course.
   c. Students are encouraged to prepare Shop Drawings. SM will them advise them on their feasibility for manufacturing. Examples are available through Appendix A.

7. NOTE: The Machine Shop becomes very busy in the final weeks of a course. Student Teams are strongly encouraged to effectively manage their time by spreading their use of the UG Sessions over the term. In the final weeks, there is no guarantee all student teams will have sufficient shop access.

8. Students are allowed to implement their designs in their own way, as long as it is safe to do so, and does not damage the Shop equipment.

9. Shop schedule of 1:00pm to 6:00pm is at the discretion of the LM and SM.

3.4 After-Hours Shop Use

The Machine Shop (1) in B103 can be used after regular working hours until 10:30 pm, by designated students (SuperUsers) working with student initiative groups (SIG) such as FSAE, AUV, EcoCar, and others, provided that the following conditions are met:

1. The SM has approved the student as a SuperUser, and the student has completed the required forms (F3 and F8). Section 1.6 describes SuperUser Status.
2. The Chair or SM has approved the requested project as suitable for after-hours.
3. Superusers intending to use the Shop after hours must first email the SM (rkatz@uvic.ca) of their intention and briefly describe work to be performed, and report other personnel in attendance.
4. Student's name is listed on the approved SuperUsers list posted in B103.
5. At least two people are present in the shop at all times, and one must be a Super-User.
6. The facility and tools are cleaned, and left in the condition found prior to use.
7. Shop Safety policies (5.0 or later) are adhered to.
8. SuperUsers account for supplies used and provide the list to SM with an account number.
9. Any damage to the equipment must be noted on the equipment with a visible sign, and reported to the SM.

The party involved in the damage to the machine/facility will be charged a fair price for the repair or replacement. The Department reserves the right to suspend after-hour use of the facility at any time, and suspend use of the facility to individuals who have shown a disregard for personal safety, equipment, and/or displayed disrespect for others.

3.5 Shop Cleanup and Borrowing of Tools

1. Every user is responsible for daily cleaning in their respective areas. Ex: After every use of a lather or mill, the machine should be cleaned and the ways and chucks should be wiped and oiled by the user. Either SM or SA can remind users of their cleanup responsibilities.
2. Hand tools can be borrowed for short periods of time, provided the SM or SA are informed and they are signed out in the Log Book in B111. The borrower must provide their name and email address. If the tools are damaged or not returned in a reasonable time, the Machine Shop reserves the right to charge borrowers for the replacement cost of tools.

4.0 Machine Shop Usage Charges

1. Undergraduate student projects, regular and after hours use of ELW B103, is at no charge.
2. Research projects submitted to Machine Shop are billed at $30/hour plus materials.
3. Starting January 1 of every year, each SIG team starts with an annual credit of 12 free hours of Machine Shop personnel time. After the credit is used up, the teams are billed $30/hr for personnel time.
4. Any damage to the Shop and tools by a SIG member, or a graduate student, will be billed separately to the SIG or the researcher.

4.1 Machine Shop Material Charge-Backs

1. Researchers and graduate students using consumable shop materials such as sheet metals, solid stock, fasteners, etc, must enter the material, the amount being taken, its cost, and their account number in the Consumables Charge-Back Log (form F8).
2. It's the responsibility of the user to obtain cost of the materials taken, from the McMaster-Carr website: http://www.mcmaster.com.
3. Accounts will be charged monthly. The charge-back will include the entered cost of materials, plus 20% to cover taxes, shipping and handling.

5.0 Safety

The following fundamental safety rules apply to all users**,** at all times:

1. Anyone working in the Shop or using equipment in other shop labs, must have gone through safety training with the Shop Manager or his/her designate.
2. All work in those areas is approached and done according to the "Safe and Efficient Shop Operating Procedures" (to be posted).
3. If at any time SA or SM feels or notices that the equipment is unsafe to use, he should stop work and report it to SM, (LM in case of the SM), who will then decide on the necessary action.
4. A minimum of two people must always be present in the Machine Shop. No-one is permitted to use the Machine Shop alone!
5. All Shop Users must sign-in on the Shop Log (Name, Time In/Out, Machine Used)
6. All Shop Users and Visitors must wear approved Safety Glasses at all times, while in the Machine Shop.
7. Any equipment, situation or area that may be hazardous, must be immediately reported to the Machine Shop Supervisor.
8. Familiarity with procedures listed in: "Safety First!" available at the Shop website.
9. The following items/dress/conduct are not allowed in the Machine Shop:
   - Open-toe footwear, sandals, sleeve-less tops. Tee shirt is minimum.
   - Ties, scarves. Long hair must be securely tied back and constrained above the shoulders.
   - Rings and jewelry. Must be removed before using the Machine Shop.
   - Audio distractions such as playing of music through speakers, or earphones.
   - Food or beverages.
   - Sitting or standing on lab workbenches and tables.

6.0 Shop Conduct

1. Working within policies and procedures as set by the University of Victoria and listed at: http://web.uvic.ca/eqhr/policies.htm
2. Student and worker safety is always priority one. Shop personnel sets an example.
3. All effort must be made for maintenance of professional behavior, respect, and civility between staff members, and between staff members and students.
4. The term "professional" as defined by UVic policy is: "respect for others, commitment to quality, responsibility, and personal integrity. "
5. Use of slang and foul language is not acceptable.
6. Technical, safety, work scheduling, or policy related issues are directly addressed with the immediate supervisor.

7. Personal confrontation should be avoided at all times. Inter-personal issues must be documented in writing and submitted to the Chair, who may at his/her discretion direct them to HR.

Section C: Forms & Appendices

F2) Mech Project Request/Charge Form

F3) After-Hours Mech Shop SuperUser

F4) SuperUser Experience Form

F8) Consumables Charge-Back Log

F1) Mech Shop Equipment Sign-Out Log (Internal)

F5) Mech Shop Work Log (Internal)

F6) Mech Shop Use Form (Internal)

F7) Mech Shop Work Queue Sheet (Internal)

Appendix A: Sample Shop drawing (See link on Shop website)

Mech Project Request / Charge Form

Dept. of Mechanical Engineering Machining Facility

	Date Submitted
Client	Project #
Acct. #	Tech.
Project Description	
Contact Person	Email

Cost Estimate	Hrs.	Mat'l	Est.Total

Start Date		Completion Date		
Labour Hrs.	**X**	Rate: $30/hr	=	**$**

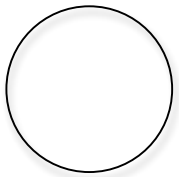
Material and Subcontract Costs	**$**
Total Material Costs	**$**

Rec'd upon completion by:	Date	**Total Cost (Labour & Mat'l)**	**$**

Account Holders Signature	Acct. Charged Date

After-Hours Mech Shop SuperUser F3

Department of Mechanical Engineering



Applicant: _____ Circle: Graduate Undergrad

	Minimal Qualifications A, (B or C)	Check
A	Successfully completed Mech Eng. Shop course (Mech 200, or Mech 350, or Mech 400)	
B	Has demonstrated at least 50 hours of supervised work at the Mech Eng Machine Shop. Attach Experience Form (F4) specifying dates and projects worked on.	
C	Possesses a Recognized Machining Education Certificate (must provide copy)	

Past equipment training / Request for Mech Shop use	Check training	Permission to use given by:
Lathe		
Mill		
Drill, band saw		
Sheet metal shears, benders		
Welding		
Other		

Signature of Applicant: _____ Date: _____

Has been instructed and tested by:	Name	Check
Handling of tools and equipment in the Mech Machine Shop		
Basic safety rules specific to the Mech Machine Shop		
Basic UVIC Emergency Procedures		

Rodney Katz (initial): _____

Date: _____

SuperUser privileges may be revoked at any time.

SuperUser Experience Form F4

Department of Mechanical Engineering Machine Facility
University of Victoria

Applicant: _____ Location: _____ Phone: _____

Supervisor _____

Approx Date d/m/y	Work/Project Description	Instructor /Shop Supervisor	Hours
		Total hours	

This is to certify that the information I here provide is true to the best of my knowledge.

Signature _____ Date _____

F8 - Consumables Charge-Back Log

DEPT. MECHANICAL ENGINEERING.
MACHINE SHOP CONSUMABLES CHARGE-BACK LOG

DATE			MATERIAL DESCRIPTION (USE ONE LINE PER ITEM)	NAME & SUPERVISOR	ACCOUNT #	$ VALUE	CHARGED CHECK
D	MONTH	YR					