

Machine Shop Policy

Policy Number: 2.4

Presentation Date: June 5, 2012

Supersedes: Policy of December 12, 2011

Implementation Date: June 13, 2012

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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:

- (a) Learning and Laboratory Support for Undergraduate ME Students
- (b) Research Activities of ME Faculty
- (c) Learning and Research Activities for Graduate ME Students
- (d) Other Machining Activities, where they do not conflict with (a), (b) or (c).

The policy also outlines the roles and responsibilities of the Machine Shop staff, and strives to create a good 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.

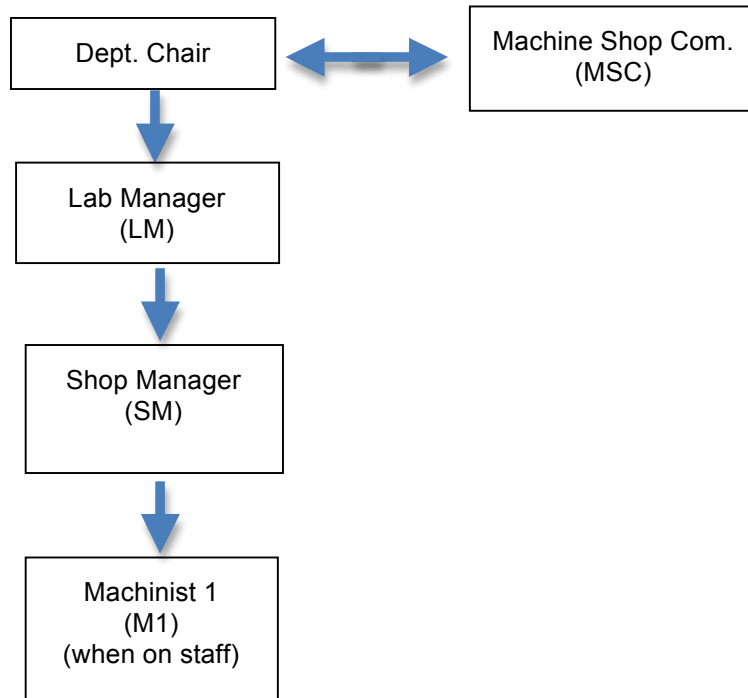
Section A: Shop Organization and Current Resources

Senior Scientific Assistant (SM): Rodney Katz

Machinist 1 (M1): Ken Begley

Lab Manager (LM): Art Makosinski

Machine Shop Committee (MSC)



1.0 Personnel Functions (Common to All Shop Staff)

1. Total commitment to safety in the Machine Shop by exemplary adherence to safety rules and established shop operating procedures.
2. Observing and assisting students in the safe operation of equipment in the B103 Machine Shop.
3. Patience when working with students, and empathy towards their needs.
4. First Aid proficiency through OHS courses taken within not less than 5 years.
5. High level of proficiency in CAD (Graphite 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, and keeping them in clean and safe working order through daily inspections and repair.
7. Having a common work schedule, which is posted on the bulletin boards outside the Shop.
8. Regular and independent evaluation of skills and efficiency.
9. Checking off students for their respective area clean-up.

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 Work Request Form(s) (F2), cost quotations, work distribution, maintenance of the queue, communication with the client and submitting completed Work Request Form (F2) to LM.
3. Acting as the Machine Shop Safety Coordinator, providing training sessions to students on safe use of the Shop and on how to protect themselves from Shop and machine hazards.
4. Authoring a set of written Mech Engineering "Safe and Efficient Shop Operating Procedures" (SESOP) for the use of tools and machinery, and making sure 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 350 and making it available to all shop users.
8. Assisting students in undergrad lab sessions in B103 for MECH 200/350/400, 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 use CAD software (Graphite), and its integration with MasterCam and the CNC controller when requested by the LM.
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. Approvals of SuperUser Status.
14. Procurement of supplies, tools, and equipment (with LM), for ELW B103, B111, B123, A127.
15. Initial setup and tooling of machines in the areas listed above.
16. General administrative work which includes:
 - Managing P-card accounting and charge back's for all work in the Shop.
 - Maintaining a shop user logbook, for signing in before Shop use.
 - Distributing and collecting Shop Use Form (F6)
 - Maintaining the Consumables Charge-Back Log (F8).
17. Notifying LM when there is less than a day's work in the Work Queue.

1.2 Functions of Machinist (M1)

1. Accepting WRF (Work Request Forms – F2) from the SM, producing time quotes, and providing machining services within his/her capabilities without picking or choosing jobs. Upon completion of work, entering the final count of time spent on the project on the WRF.
2. Under the supervision of the Shop Manager, responsible for the use and maintenance (including repairs) of the Machine Shop in ELW B103.
3. Providing input to SM when SM is authoring Mech Engineering "Safe and Efficient Shop Operating Procedures" and then making sure the work in the shop is done according to them.
4. 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 and machine hazards.
5. Assisting UG students during course laboratory sessions.

6. Assisting students in the Machine Shop in the absence of the SM and when requested.
7. Maintaining an inventory of fasteners, taps and cutters in B103.
8. Preparing undergrad lab samples to given tolerances and servicing undergrad lab equipment as designated in Appendix A, and when requested by SM.
9. Notifying SM when there is less than a day's work in the Work Queue.
10. Submitting monthly Work Logs and Timesheets to supervisor (SM).

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 M1, and SM to discuss safety and technical shop issues.
6. Receives and approves time sheets and 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 and suggestions 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 Course Instructors

1. Provide specific course supervision instructions to M1 before the start of labs.
2. In consultation with M1, set up student schedule for Shop use during peak-use. For example, suggest maximum of 3 groups (3-4 students per group) using B103 at any one time, or as appropriate.
3. Query students weekly during the on-going lab sessions about their experience using the Machining Facility.

1.6 SuperUser Status

1. Where there is proof of sufficient skill/competency and experience, students may qualify for SuperUser status. This allows them to do machining without M1/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 out, or call for help, in the event of an accident or situation.
3. If the safety backup person is not a SuperUser himself, that person cannot use any shop equipment.
4. 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.

Staff hours in **ELW B103/111** are: **9:30-12:30**, and **1:00-5:30pm**, or till 5:00pm, if a 30 minute lunch break is taken. Two, 15 minute breaks are included, but can be consolidated.

Section B: Shop Use

3.0 Regular Shop Hours

ELW B103 - Machine Shop (1) – Student Use

Equipment Available: Three milling machines, three lathes, drill press, band saw, metal bender, metal grinder, clamps, worktables.

- Open for UG and Grad student use: **11:15 am - 12:30 pm, and 1:00 pm - 5:30 pm.**
- Additionally available for SuperUsers between **5:30 pm - 10pm**, under strict conditions of Section 3.4.

ELW B111 - Machine Shop (2) – Staff Use Only

Equipment: CNC lathe, CNC mill (B111), CNC mill (B103), laser welder, MTS, Colchester lathe.

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

ELW B119 - CNC Undergraduate Lab – Laboratory and Staff Access Only

Equipment: HAAS CNC Milling Machine

ELW A127 - Undergraduate Design Studio – Student Courses Only (MECH 350, MECH400).

Equipment Available: Drill press, scroll saw, hand drills, clamps, sander, worktables.

- Student access hours: 9:00 am – 9:00 pm during Design courses.

ELW B123 - Woodworking Shop – Staff or SuperUser Access Only

Equipment: Table saw.

3.1 Submitting Projects

1. Clients must submit a Mech Work Request Form (F2) along with job drawings to SM. 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 cost quote and provides their account number.
3. When the project is complete, SM informs the client and submits the completed Work Requisition Form to LM.
4. All machining time must be accurately represented in the invoices.

3.2 Graduate Student Shop Use

1. Grad student's use of the Machine Shop B103 is permitted under the following conditions.
 - a. SM and M1 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 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, 464, 499

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, 464, and 499.
2. In order to carry out such work, the machine shop is available at the following times:

Spring Term	Date:	Courses	UG Session A	UG Session B
	Feb (weeks: 3 & 4)	350	12:30 to 3:00 pm	3:00 pm to 6:00 pm
	March (weeks: 1, 2, 3, & 4)	350	12:30 to 3:00 pm	3:00 pm to 6:00 pm
Summer Term				
	June (weeks: 3 & 4)	400, 466	12:30 to 3:00 pm	3:00 pm to 6:00 pm
	July (weeks: 1, 2, 3, & 4)	400, 466	12:30 to 3:00 pm	3:00 pm to 6:00 pm
Fall Term				
	Nov (weeks: 2, 3 & 4)	200	12:30 to 3:00 pm	3:00 pm to 6:00 pm

3. A maximum of three(3) student groups are permitted to use the shop during a UG Session.
4. There are approximately 180-210 UG Sessions available per term in the machine shop. The number of available Sessions is determined & posted by SM, at the start of each term.

For example:

$6-7 \text{ weeks} \times 5 \text{ days/week} \times 2 \text{ sessions/day} \times 3 \text{ Teams/session} = 180 - 210 \text{ UG Sessions.}$

5. These sessions represent the "maximum capacity of the machine shop for UG Course work" during the periods indicated in the table. Therefore, these sessions must be shared by all UG Teams enrolled in courses using the shop, that occur during that term.
6. In order to provide equal access, each UG Team is only allowed 9-10 Sessions per term. **The total number of teams is determined & posted by SM, at the start of each term.**

For example:

$(180-210 \text{ UG Sessions}) / (20 \text{ UG Team in a term}) = 9-10 \text{ Sessions per Team, per term.}$

Given that each session has 2.5 hours, this is approximately 25 hours of shop time/team

7. 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 and provide project drawings to SM, who can advise on the feasibility of manufacturing, and may offer suggestions.
8. 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.

9. Students are allowed to implement their designs in their own way, as long as it is safe to do so, does not damage the Shop equipment, and is within cost limits of a project.
10. Use of the Shop in the morning (11:15 am and onwards) is at the discretion of the SM.

3.4 After-Hours Shop Use

The Machine Shop (1) in room B103) can be used after regular working hours until 9:00 pm, by designated students (SuperUsers) who are working on their course projects, or with the FSAE, AUV, and EcoCar teams, 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. Student's name is listed on the Approved SuperUsers list posted in B103.
4. At least two people are present in the shop at all times, at least one of which is a Super-User.
 - a. A SuperUser cannot work alone. There always needs to be a second person in the room as a 'safety backup' to help out, or call for help, in the event of an accident or situation.
 - b. If the second person is not a SuperUser himself, that person cannot use any shop equipment.
 - a) The Department does not give the SuperUser the authority to supervise other students.
5. The facility and tools are cleaned, and left in the condition found prior to use.
6. Shop Safety policies (5.0) are adhered to.
7. SuperUsers keep track of supplies used and provide the list to SM with an account number.
8. Any damage to the equipment should be noted on the machine with a visible sign, and reported to SM immediately.

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 lathe or mill, the machine should be cleaned and the ways and chucks should be wiped and oiled by the user. Either SM or M1 remind users of their cleanup responsibilities.
2. Hand tools can be borrowed for short periods of time, provided the SM or M1 are informed and they are signed out in the Log Book in B111. The borrower must give their name and email address. The machine shop reserves the right to charge borrowers for the replacement cost of tools, if the tools are damaged or not returned in a reasonable time.

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. Team FSAE, Aero, AUVic, and EcoCar, ECOsat - Annual credit of 12 hrs/year at no charge. Teams are billed at \$30/hr after the credit, plus materials.

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 catalog or 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 M1 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 repairs.
4. Users follow at least 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.
 - Long hair, ties, or scarves. Long hair must be 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 listening to iPods.
 - Food or beverages.
 - Sitting or standing on lab workbenches and tables.

6.0 Shop Conduct

1. Working within the UVic policies as listed in Section 10, UVic Policy Resources.
2. Student and worker safety is always priority one. Machinists set 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. Make an effort to address students in non-gender specific terms.
6. Avoid the use of slang while instructing.
7. Technical, safety, work scheduling, or policy related issues are directly addressed with the immediate supervisor.
8. 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.
9. Showering during work hours is only allowed if on-the-job soiling occurred.
10. Gossip and back-talk has a negative impact on everybody.

7.0 Additional Resources

UVic Policies and Procedures

<http://web.uvic.ca/eqhr/policies.htm>

Policy SS9105: Violence and Threatening Behavior

[http://www.uvic.ca/shared/shared_usec/docs/policies/SS9105_1125 .pdf](http://www.uvic.ca/shared/shared_usec/docs/policies/SS9105_1125.pdf)

Policy GV0205: Discrimination and Harassment Policy

http://www.uvic.ca/shared/shared_usec/docs/policies/GV0205_1150 .pdf

Discrimination and Harassment Complaint Procedure

http://www.uvic.ca/shared/shared_usec/docs/policies/GV0205_1150 .pdf

Auto Vehicle and Bicycle Regulations

http://www.uvic.ca/shared/shared_usec/docs/policies/BP3205_6800 .pdf

Section C: Forms

- F1) Mech Shop Equipment Sign-Out Log
- F2) Mech Work Request Form
- F3) After-Hours Mech Shop SuperUser
- F4) SuperUser Experience Form
- F5) Mech Shop Work Log
- F6) Mech Shop Use Form
- F7) Mech Shop Work Queue Sheet
- F8) Consumables Charge-Back Log

Mech Shop Equipment Sign-Out Log

F1

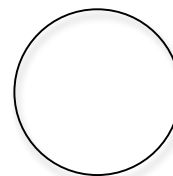
Department of Mechanical Engineering

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Mech Work Request Form

Department of Mechanical Engineering Machine Facility
University of Victoria

F2



Project Description: _____

Project Number _____

Client: _____ Account # _____ Date Submitted: _____

Contact Person: _____ Location _____ Phone _____

Please attach appropriate drawings

Cost/Time Estimate

Rodney Katz



Ken Begley



Labour _____ hours at \$ 30 /hour = \$ _____ + Materials \$ _____ Total \$ _____

Approval to go head given on date: _____ By _____

Date Started (MM/DD/YY) _____ Date Completed (MM/DD/YY): _____

List of materials	\$\$
Hours of labour spent on the project: _____	x \$30
TOTAL	

Project completed form received

by Lab Manager (MM/DD/YY) _____ Account 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
Department of Mechanical Engineering Machine Facility
University of Victoria

F4

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 _____

Mech Shop Work Log

(Hours or parts of)

F5

Month/year:		Undergr. Lab Maint.	Grad/ Co-op Assist.	Undergr. Assist.	Shop Maint.	Admin	Research Project #
Week 1	Monday						
	Tuesday						
	Wednesday						
	Thursday						
	Friday						
Week 2	Monday						
	Tuesday						
	Wednesday						
	Thursday						
	Friday						
Week 3	Monday						
	Tuesday						
	Wednesday						
	Thursday						
	Friday						
Week 4	Monday						
	Tuesday						
	Wednesday						
	Thursday						
	Friday						
Week 5	Monday						
	Tuesday						
	Wednesday						
	Thursday						
	Friday						

Signed

Mech Shop Use Form

Department of Mechanical Engineering Machine Facility
University of Victoria

F6

Project Description: _____

User: _____ Account # _____

Contact Person: _____ Location _____ Phone _____

Date Started (MM/DD/YY) _____ Date Completed (MM/DD/YY): _____

List materials used (size and thickness if sheets)	\$\$

Chargeable Hours/Day (Example: 3hr / Day1)	
Total hours spent on the project:	x \$10
TOTAL	

Approved: _____

 Project completed form received
 by Lab Manager (MM/DD/YY) _____ Account charged date _____

Mech Shop Work Queue for _____							Est. Start Date	Est. Hours	Start Date	Compl. Date
Proj. #	Client, email	Detailed Project Description								

F7

F8 - Consumables Charge-Back Log

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