

**University of Saskatchewan
Department of Mechanical Engineering
Standard Operating Procedure # ME0001**

Procedure Title: Department of Mechanical Engineering General Requirements

Creation Date: January 27, 2011

Date of Last Review: May 15, 2023

Supervisor of Procedure: James Bugg, Ph.D., P. Eng., Department Head

Authorized by: James Bugg, Ph.D., P. Eng., Department Head 2015

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1. Version History

Version #: .2
Supersedes: .1

The signatures below indicate that the person(s) responsible to administer and supervise this procedure have read and agree to abide by this SOP.	Date

Handwritten amendments to the official procedures can be made by a single line through the text, along with the date, and initialed by the authorized individual making the correction. Changes are to be noted below. Formal changes to this SOP are made on the date of revision or sooner, where required.

Section	Changes made to official copy	Date	Initials
Title	Changed review date and requirements, Change Supervisor of the SOP to David Torvi	Sept. 2, 2016	R.P.
4	Issued under authority of: change to David Torvi Deleted the signature section and added that the signatures need to be present on the signature pages (which are with the SOP, but at the end)	Sept. 2, 2016	R.P.
5	Updated Flow Chart to have new room numbers for SOPs, reflect the most areas have or will have a general area SOP, and separated Biomedical from Biomechanical engineering.	Sept. 2, 2016	R.P.
5	Updated link to the workplace responsibilities form	Sept. 2, 2016	R.P.
6	Changed references to WSEP to Safety Resources	Sept. 2, 2016	R.P.
6	Updated training courses to reflect what is now offered and edited to reflect what is now required or not.	Sept. 2, 2016	R.P.
6	Removed Table 2 and replaced it with text referring to safety codes and standards, as well as an outline of safety orientation.	Sept. 2, 2016	R.P.

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6	Renamed it to reflect that the section also covered codes and standards	Sept. 2, 2016	R.P.
8	Reworded the inspection to indicate each area of the department was done 2 times per year by the mechanical safety committee, rather than departmental assistants	Sept. 2, 2016	R.P.
11, 12 and 13	Updated links and changed WSEP to Safety Resources	Sept. 2, 2016	R.P.
6	Added a section for orientation form and exit form	Sept. 2, 2016	R.P.
5	Added orientation checklist to the examples	Sept. 2, 2016	R.P.
8	Updated the location of the New Employee and Graduate Student Orientation Checklist	Jan. 21, 2019	R.P.
8	Modification to wording of the instructions for the New Employee and Graduate Student Orientation Checklist, also added that parts A, B and C could be done with the faculty Supervisor or designate.	Jan. 21, 2019	R.P.
8	Deleted invalid link to exit form	Jan. 21, 2019	R.P.
10	Deleted campus wide codes and standards that were no longer available on the link (most still were)	Jan. 21, 2019	R.P.
10	Updated the links to the college specific safety information, and the wording to reflect what was at each link	Jan. 21, 2019	R.P.
12	Updated website URL	Jan. 21, 2019	R.P.
12	Deleted hyperlink for working alone policy	Jan. 21, 2019	R.P.
13	Updated the Mechanical Engineering Safety Site URL	Jan. 21, 2019	R.P.
5	Updated U of S Workplace Responsibilities URL	Jan. 21, 2019	R. P.
5	Updated URL to Mechanical Engineering Safety Site	Jan. 21, 2019	R.P.
14	Updated all 4 hyperlinks to the currently active locations	Jan. 21, 2019	R.P.
12	Changed the location of WHMIS labelling info to only the online WHMIS course, as the materials area SOP may not be up to date with WHMIS 2015	Jan. 21, 2019	R.P.
13	Added a chemical inventory section with requirements	Jan. 21, 2019	R.P.
7	Added the requirement that faculty also forward permits to the department office	May 13, 2019	R.P.

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5	Removed portion about individual lab ERP's as this is covered in the ESMS	June 6, 2022	R.P.
5	Altered reference to Orientation form to reflect current practices (2 places)	June 6, 2022	R.P.
6	Removed a large portion of this section as it is covered by the orientation form	June 6, 2022	R.P.
6	Added a reference to the ESMS in this section	June 6, 2022	R.P.
9	Removed the working alone/after-hours policy reference as it is now working alone and covered by the orientation form	June 6, 2022	R.P.
9	Changed a sub-heading from "Chemical Inventory" to "Chemical Inventory and Equipment" to better reflect the contents of the sub section	June 6, 2022	R.P.
9	Updated incident reporting to the Safety Resources PAWS channel	June 6, 2022	R.P.
9	Corrected regular business hours to 8:00am-5:00pm	June 6, 2022	R.P.
13	Deleted dead hyperlinks to Safety Resource documentation and added to see the Safety Resources PAWS channel	June 6, 2022	R.P.
Cover	Changed Authority to current department head Prof. Bugg	June 6, 2022	R.P.
5	Updated reference to University Workplace responsibilities system to the Safety Resources PAWS channel and the Requirements and Regulations section	June 6, 2022	R.P.
8	Added a note about self-inspections	June 6, 2022	R.P.
7	Corrected regular business hours to 8:00am-5:00pm	July 5, 2022	R.P.
5	Clarified "Department Level" list	July 5, 2022	R.P.
7	Added Undergraduate employees to the responsibilities list	July 5, 2022	R.P.
8	Added self inspection logistics and frequency	May 15, 2023	R.P.
9	Added Chemical Labelling Requirement details for WHMIS and non-WHMIS products, and first aid kits	May 15, 2023	R.P.

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2. Introduction

This SOP outlines the general requirements for all graduate students, staff, and faculty in the Department of Mechanical Engineering as well as anyone else using Mechanical Engineering facilities.

Reading, understanding, and acknowledging this document is a requirement prior to using Mechanical Engineering facilities.

An acute awareness of health and safety within the workplace is an important part of the Engineering and Geoscience Professions Regulatory Bylaws (see section 20(2)(a)).

3. Definitions

SOP	Standard Operating Procedure
SDS	Safety Data Sheet
WHMIS	Workplace Hazardous Materials Information System
PPE	Personal Protective Equipment

4. Personnel

SOP originally issued under authority of: James Bugg, Ph.D., P. Eng., Department Head,
Mechanical Engineering.

Persons authorized to perform this SOP:

By signing this form I acknowledge that I have read and understand this SOP, as well as the applicable SDS's and that I will conduct myself in accordance with this SOP and general laboratory rules.

NOTE: ALL SIGNATURES MUST BE PRESENT ON THE SOP SIGNATURE PAGES LOCATED IN THE YELLOW BINDER IN ROOM 3B48 – Mechanical Engineering General Office. Digital copies of SOP's are made available for convenience only. SOP's printed from digital copies are valid for 24 hours only. After that time their accuracy must be verified with the **OFFICIAL HARDCOPY VERSION.**

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5. Safety

All work in the department must be carried out in a safe manner. Safety is the responsibility of everyone and must not be compromised. Talk to a departmental assistant and your supervisor if you are unsure of the necessary safety requirements for any activity.

The Safety Resources PAWS channel has a section on Requirement and Regulations which outlines of the obligations of all U of S employees (including graduate students and summer students), according to the Occupational Health and Safety Act (OHSA) and regulations of Saskatchewan. All employees are advised to read and understand the material in this section of the PAWS channel.

All members of the department and users of department equipment and laboratory space have certain training requirements. In addition, there are research area specific requirements and procedure specific requirements listed in the relevant SOPs.

No new activity can be started prior to discussion with the departmental assistant and/or research supervisor. The departmental assistant will determine if an SOP or hazard assessment is required. If one is required, the activity cannot be started until the SOP is created and approved.

When an SOP is required, the SOP must be read, understood, and signed by the end user **PRIOR** to conducting the procedure. In addition, approval by the departmental assistant must be obtained prior to conducting any procedure in a Mechanical Engineering laboratory. Digital and secondary printed copies of all SOPs are provided for convenience and reference only; the **OFFICIAL HARDCOPY MUST BE SIGNED PRIOR TO THE START OF ANY ACTIVITY.**

The Department of Mechanical Engineering is organized into seven research areas and the departmental office; with the safety management structure shown in Figure 1 (room numbers indicate SOP binder locations). The departmental assistants are the main contacts for safety issues in their work groups and have the authority to enforce safety compliance including denying access to equipment and facilities to anyone that, in their judgment, poses a risk to themselves, others, or equipment.

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The Department has three requirement levels with respect to safety. They are as follows:

- Departmental Level: Applies to all faculty, staff, graduate students, undergraduate student employees, summer students and visitors using department facilities.
- Area Level: Applies to members of the research area, or anyone using labs within that research area.
- Activity Specific: Applies to the specific activities and equipment being used to conduct work or research activities.

To conduct any activity you must have completed (read, understood and signed) all level-up requirements as illustrated by the following examples.

Example 1: Mechanical Engineering Graduate student working in the Thermodynamics research group (and has completed all of the required training for that area) wants to use a piece of equipment in the Materials area of Mechanical Engineering.

- Department Level – previously completed.
- Materials Level
 - – Required SOPs for **ANYONE** using the materials lab – **MUST BE COMPLETED.**
 - Using your original Orientation form (with digital signatures), UPDATE Section II for the new lab (including any newly required safety training courses) with the Departmental Assistant in the Material's Area, UPDATE section V of the orientation form to select the new key and submit the updated form to the grad/ESC staff, highlighting the updated lab and key request when submitting it and cc'ing the appropriate Departmental Assistant when submitting the form.
- Activity specific SOP – **MUST BE COMPLETED.**

Example 2: Civil Engineering Graduate student wants to use a piece of equipment in the Materials area of Mechanical Engineering.

- Department Level – **MUST BE COMPLETED.**
- Materials Level
 - – Required SOPs for **ANYONE** using the materials lab – **MUST BE COMPLETED.**
 - Using your original Orientation form (with digital signatures), UPDATE Section II for the new lab (including any newly required safety training courses) with the Departmental Assistant in the Material's Area, UPDATE section V of the orientation form to select the new key and submit the

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updated form to the grad/ESC staff, highlighting the updated lab and key request when submitting it and cc'ing the appropriate Departmental Assistant when submitting the form.

- Activity specific SOP – **MUST BE COMPLETED.**

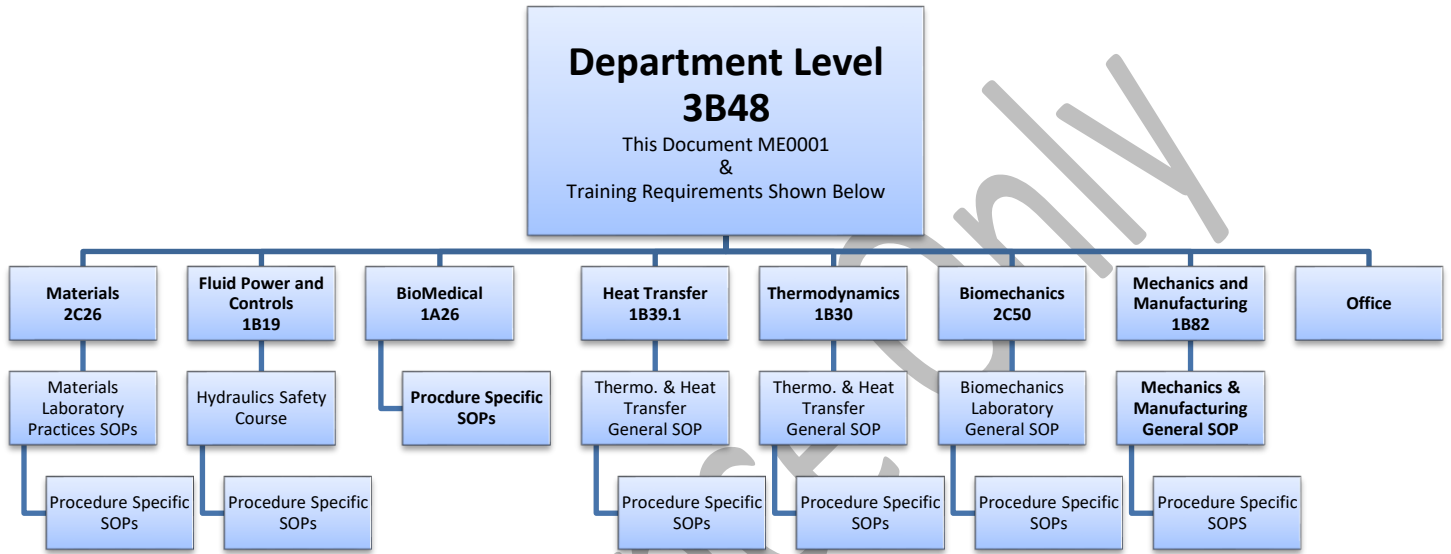


Figure 1: Department of Mechanical Engineering Organizational Structure.
(Room numbers indicate locations of SOP binders)

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6. Training, Codes and Standards

Users of Engineering Facilities are required to complete several steps prior to gaining access to laboratory spaces. The College of Engineering Orientation form summarizes the requirements including training, lab orientation and University and College policies. The ESMS (Engineering Safety Management System) should be consulted for further clarification when necessary.

7. Accountabilities

In addition to the requirements listed elsewhere in this document, individual **Faculty** are responsible for the following:

- ensuring that all required safety permits (Biohazard, Radiation etc.) are obtained and valid in their research laboratories (copies of permits should also be forwarded to the department office),
- ensuring that all required training for themselves, their graduate students, summer students, research staff and laboratory instructors for their courses is obtained,
- providing site-specific training for each work activity (This can be done by a departmental assistant if they are qualified and if they have time. In any case, it is the faculty member's responsibility to ensure that proper training is received before work commences),
- ensuring that their research laboratories have sufficient funding in place to maintain safe working conditions and proper disposal of any hazardous substances/equipment when it is no longer needed,
- responding to safety issues raised during routine laboratory inspections,
- ensuring that SOPs and other safe work practices are available and followed at all times, and
- holding safety meetings with their research groups as appropriate.

In addition to the requirements listed elsewhere in this document, individual **Departmental Assistants** are responsible for the following:

- participating in monthly department safety meetings,
- participating in monthly inspections of mechanical engineering laboratories,
- creating and updating – on a best effort basis – SOPs for their areas of responsibility,
- regulating access to their laboratories to those who, in their opinion, possess the required knowledge of safety procedures,
- making reasonable efforts to keep their training up to date on safety-related issues in their area, and
- bringing to the attention of the appropriate person any unsafe equipment or situation that they notice in the laboratories.

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In addition to the requirements listed elsewhere in this document, individual **Graduate Students, Visiting Research Students, Postdoctoral Fellows, Visiting Professors, Research Scientists, Summer Students, undergraduate student employees and Visiting Scholars** are responsible for the following:

- ensuring that their conduct in the laboratory is consistent with general laboratory safety practice,
- ensuring that they have consulted with the departmental assistant before using any piece of laboratory equipment,
- ensuring that they consult with the departmental assistant and their research supervisor before working after normal working hours (8:00am-5:00pm, Monday-Friday – not including statutory holidays), and
- bringing to the attention of the departmental assistant any unsafe equipment or situation that they notice in the laboratories.

8. Inspections

Each of the department areas will be inspected twice per year (one is done each month) by Mechanical Engineering Department Safety Committee members using a customized inspection form. Results of these inspections will be discussed at the monthly Department Safety Meeting and action items will be identified. In instances where it is appropriate for a faculty member to be involved in addressing safety issues arising from these inspections, the Chair of the Department Safety Committee will communicate the issue to the faculty member.

Self-Inspection (Frequency Dependent on Lab Hazard Level)

- Hard Copy of form is kept in each lab/area and inspection dates are noted, as are any deficiencies and the date that they were correct.
- Scanned PDF copy of the yearly records are **uploaded every July** to the **ESMS\Location\Room Number-DEPT** (name of file contains year) by technical staff in the department.
 - **HIGH RISK Monthly Inspections:** Required (12 times per year):
 - Labs that have a higher risk, this will typically be labs that also have a lab specific E.R.P. and have equipment or chemicals that can be deemed “Immediately Dangerous to Life or Health” (IDLH) and can cause a “lab/building level event”.
 - Examples:
 - Labs with HF, H₂S, high voltage and/or high-pressure vessels,
 - **MODERATE RISK Bi-Monthly Inspection:** Required (6 times per year)
 - All other laboratories except for computer or simulation labs.
 - **LOW RISK Annually Inspection:** Required (1 time per year)

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- Grad student offices, computer, and simulations labs without any other research equipment present.

9. Procedure

This SOP does not provide specific procedures, but instead outlines the organizational and safety requirements of the Department of Mechanical Engineering. The following information is relevant to all people using Mechanical Engineering facilities.

- Laboratory access is a privilege; people who are negligent with respect to their own or other's safety may lose laboratory privileges, and possibly their ability to conduct the required research for their program.
- Proper personal protective equipment (PPE) including, but not limited to, safety glasses, gloves, lab coats, and hearing protection **MUST** be worn when good laboratory safety practices dictate.
 - Closed-toed, closed-heeled shoes must be worn in any lab with hazardous substances. No sandals.
 - Full length pants must be worn in any lab with hazardous substances. No shorts or skirts.
 - No food or drink is allowed in any chemical or biohazard lab.
 - **Lab coats** must be worn when working with hazardous materials.
 - **Gloves are single use and MUST NOT be used to open doors, non-contaminated sink taps, computers, or other equipment.**
- All chemical spills, injuries, and /or near-miss incidents **MUST** be reported to the departmental assistant and/or supervisor and the appropriate paperwork completed (**within 24 hours**).
 - Employees of the University (Including Graduate Students) can complete the online form using the Safety Resources PAWS channel.
- Whenever possible experimental work **MUST** be conducted between the hours of 8:00am and 5:00pm, Monday-Friday – not including statutory holidays. If experimental work is to be conducted outside of these hours, approval from the departmental assistant and supervisor must be obtained and specific guidelines and rules must be put in place for each unique situation.
- **NO** unlabelled substances are permitted in the laboratories. All containers must meet WHMIS 2015 labeling requirements.
 - Any unlabelled substance that pertains to a particular research project will be sent away for identification and disposal at the expense of the researcher/faculty supervisor.
 - Details on WHMIS 2015 labeling and general laboratory practices can be found in the online WHMIS 2015 course.

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Chemical Inventory, Chemical Labelling and Equipment

- Consumer Products:
 - Do not require a WHMIS label even if an SDS is available and the SDS says that it is a WHMIS product. (As per CCOHS communication 2022).
 - Must be on the Chemical Inventory list.
 - SDS, if available should be in the SDS binder.
 - Must have a proper storage code sticker.
 - Consumer products are sold by retailers to the general public for household use.
 - Vendor Examples: Canadian Tire, Home Depot, Amazon etc.
 - Product Examples: WD-40, spray paint, glues, sealants etc.
 - Are easily identified by the consumer product hazard symbols (which are different than WHMIS symbols).
 - Explosive, Poison, Corrosive and Flammable
 - Decanted Consumer Products:
 - Must have a proper storage code sticker.
 - If the SDS says WHMIS controlled, then a WHMIS label must be used for the decanted product.
 - If the SDS is unavailable or it is non-WHMIS, then the label can be the product name and an indication that it is not WHMIS regulated.
- Small Item labelling including mixtures used for research:
 - Must have a label that can be used to clearly identify all constituents.
 - The label does not have to adhere to WHMIS 2015 (As per USASK WHMIS Resource Manual section 4.5)
 - Options include:
 - Numbering vials and having a cross-reference sheet that has more information, such as:
 - 1. 5% Nitric Acid, 6% Acetone, 89% Water
 - Chemical Formula and/or another identifier
 - Provided there is enough information to fully quantify the mixture using the label and a log or cross-reference sheet.
 - SDS must be available for all constituents (unless the constituent is a consumer product and no SDS is available)
 - For the above example: Nitric Acid and Acetone SDS's must be available.
 - For the Chemical inventory list, the constituents must be included and the total quantities that were purchased, if there is a 4L container of Nitric Acid purchased and 93 small vials are created as in the example the total quantity would still be 4 L of Nitric Acid and 1 container on the Chemical Inventory List, the 93 vials of mixtures would not appear on the inventory list only their constituents in the quantity purchased.

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- Exception: If a mixture creates a unique or more hazardous item than the constituents then it should be included on the chemical inventory as a new item, including the volume and number of containers.
- First-Aid Kit Contents:
 - Considered consumer products for chemical labelling.
 - Do not necessarily need to be replaced when the posted expiry date occurs.
 - Items should be replaced when they are no longer viable for use.
 - Sterile items:
 - Compromised packaging
 - Adhesive no longer viable
 - Disinfectants:
 - When visibly appear not suitable for use or have compromised packaging.
- The only items exempt from the chemical inventory list are those that are to be used on your person (sunscreen, lotion, personal bug spray (applied to the body) cosmetics and hair products).
- Faculty, Staff, and Graduate Students should be aware of their "right to refuse" any work that they feel is unsafe if information/documentation cannot be provided to prove that the work is being conducted in a safe manner.
- Upon completion of their research, students are responsible for notifying the departmental assistant and supervisor and providing a list and location of all used, unused, or waste chemical agents. The departmental assistant will then arrange for their disposal.
- Unsupervised visitors are not permitted in the lab without consent from the departmental assistant or supervisor. If their presence is ongoing they will be regulated by the same requirements as the employee/student.
- No piece of laboratory equipment can be removed from its location without consent from the departmental assistant or supervisor in charge of the area.
- No piece of laboratory equipment can be used without first receiving site specific training and consulting with the departmental assistant in charge of the area.
- To use equipment off campus, the Declaration of Property Used Off-Campus must be completed and authorized prior to removing a piece of University Equipment (including portable computers) off Campus.
- Unsupervised laboratory access is not permitted by anyone who has not completed the required training and provided the necessary documentation. If unsure of the requirements, ask the departmental assistant.
- Keep laboratory doors locked at all times when unattended.
- Compressed gas cylinder transportation is to be completed by trained individuals only.
- Departmental assistants or supervisors have the right to revoke laboratory privileges on a temporary basis should they observe behavior in clear violation of

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the acceptable practices outlined in this or any other applicable document or in violation of generally acceptable laboratory practices.

10. Equipment or Materials Required

Various Safety Documents and this SOP

11. Legal and Other Requirements

Legal and other requirements refer to all items of provincial and federal HSE legislation as well as any University policy or best practices that the University subscribes to. The document titled Mechanical Engineering Applicable Regulations identifies the legal and other requirements that apply to the activities of the department. The document is located on the Mechanical Engineering Safety site (<https://engineering.usask.ca/departments/mech.php#Safety> → Training) for all department members to read and be aware of the identified regulations and policy to ensure all department activities are in compliance with the identified regulations and policies. Work activities, procedures and/or equipment found to be in non-compliance must be rectified as soon as possible.

12. Highlights / Critical Control Points

Any questions with respect to safety, laboratory requirements or the organizational structure of the department can be discussed with any Mechanical Engineering departmental assistant or faculty member.

More information can be found on the Mechanical Engineering Safety page at: <https://engineering.usask.ca/departments/mech.php#Safety>

13. References

Association of Professional Engineers & Geoscientists of Saskatchewan, *The Engineering and Geoscience Professions Act, Regulatory Bylaws and Administrative Bylaws*, December 2004, Regina.

University of Saskatchewan Safety Resources Documents:

Hazardous Waste Disposal: see Safety Resources PAWS channel

Laboratory Safety Manual: see Safety Resources PAWS channel

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Mechanical Engineering Safety Page:

<https://engineering.usask.ca/departments/mech.php#Safety>

Reference Only