

**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: September 2, 2016

Supervisor of Procedure: David Torvi, Ph.D., P. Eng., Department Head

Authorised by: James Bugg, Ph.D., P. Eng., Department Head
2019-2015

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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 authorised 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.

Reference Only

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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
MSDS	Material 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 authorised to perform this SOP:

By signing this form I acknowledge that I have read and understand this SOP, as well as the applicable MSDS'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 University's Workplace Responsibilities System, http://safetyresources.usask.ca/procedures_forms/index.php outlines 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 this document.

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 organised 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.

Each research area has a separate Emergency Response Plan (ERP) which can be found on the Mechanical Engineering Safety Page <http://engineering.usask.ca/mech/safety/index.php>

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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, 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.**
 - Obtain a copy of your New Employee & Graduate Student Orientation Checklist (see Section 6) from the Mechanical Engineering Main Office, and complete Section B & D with the Departmental Assistant in the Material's Area, following the procedure outlined in Section 6 of this document to obtain keys if required, if the Checklist cannot be obtained, a new one must be completed fully.
- 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.**
 - Obtain New Employee & Graduate Student Orientation Checklist (see section 6), from your Department and complete Section B & D with the Departmental Assistant in the Material's Area, following the procedure outlined in Section 6 of this document to obtain keys if required, if the Checklist cannot be obtained, a new one must be completed fully.
- Activity specific SOP – **MUST BE COMPLETED.**

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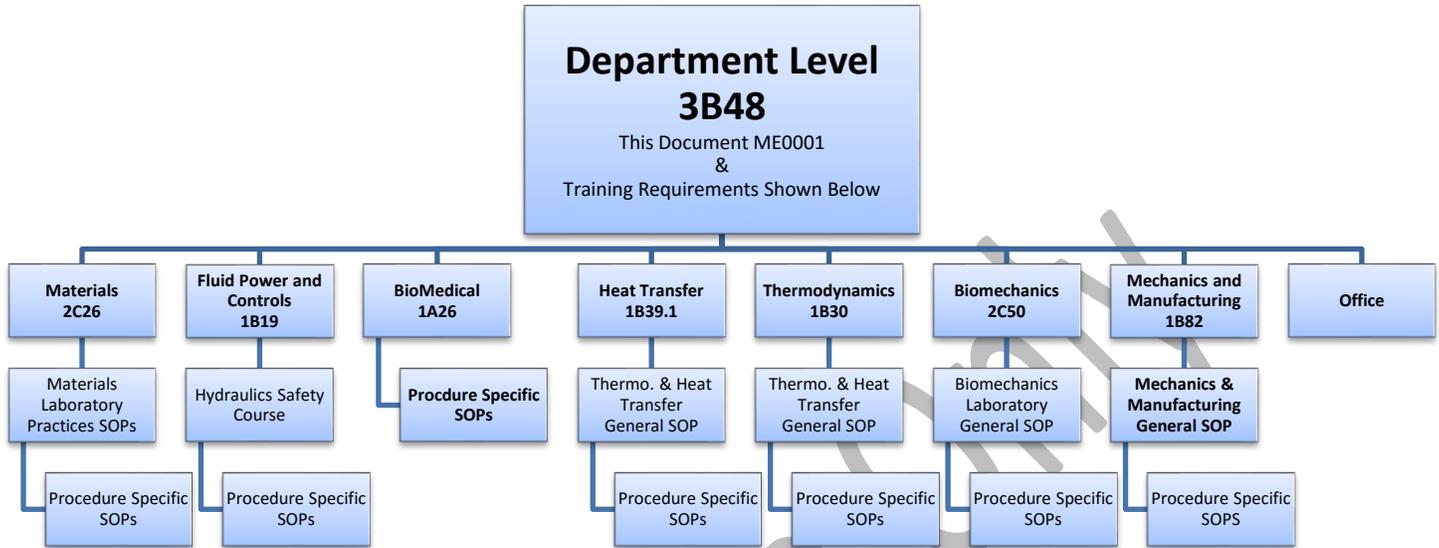


Figure 1: Department of Mechanical Engineering Organisational Structure.
(room numbers indicate locations of SOP binders)

Reference

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6. Training, Codes and Standards

Users of the Mechanical Engineering Facilities are required to complete a number of steps prior to gaining access to laboratory spaces. Below is a summary of the requirements, followed by expanded lists for training and documentation standards required.

Steps to gain Laboratory Access:

1. Require access for research/work/education purposes.
2. Complete the New Employee & Graduate Student Orientation Checklist
 - a. Available on the College website's Safety & Security section
 - i. <http://engineering.usask.ca/service-and-support/safety-security.php>
 - b. Complete Sections A, B and C with your Faculty Supervisor, using this SOP as a guideline for the required training courses.
 - i. Complete:
 1. Lab Safety
 2. WHMIS
 - ii. Register for:
 1. Safety Orientation for Employees
 2. Any other Required courses
 - a. BioSafety, Radiation Safety, Laser Safety etc.
 - c. Complete Section D with the Departmental Assistant associated with the Laboratory you want to access.
 - i. Proof of safety course completion will be required.
 - ii. Familiarity with the Mechanical Engineering Safety Page will be required.
 - iii. Note: If later in your research you need access to a different area, the orientation checklist will need to be used again for the new lab access.
 - d. Ensure all Signatures are acquired on the second page.
 - e. Take the completed form along with a completed Key Request Form to the Mechanical Engineering Office to have the Key request approved.
3. Upon completion of your laboratory work a Researcher & Graduate Student Exit Form is Required.
 - a. <http://engineering.usask.ca/service-and-support/safety-security.php>

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The minimum training requirements for people using Mechanical Engineering facilities varies by the type of work involved. Table 1 details the Safety Resources courses required or recommended by occupation. Copies of all training certificates are stored by the Department.

Table 1: Safety Resources Course Requirements

Course	Postdoctoral Fellows, Visiting Professors, Visiting Scholars, Research Scientists, Summer Students	Graduate Students	Departmental Assistants	Faculty	Clerical Staff
Safety Orientation for Employees	YES	YES	YES	YES	YES
Laboratory Safety (Online)	YES	YES	YES	YES	NO
WHMIS (Online)	YES	YES	YES	YES	NO
Nanomaterial	AD	AD	AD	AD	NO
Biosafety (Online)	AD	AD	AD	AD	NO
Laser Safety	AD	AD	AD	AD	NO
Radiation Safety	AD	AD	AD	AD	NO
Fire Safety	AD	AD	RC	RC	RC
Safety Orientation for Supervisors	AD	NO	YES	YES	NO
TDG (receiver)	NO	NO	AD	AD	AD
OHC Level 1	NO	NO	RC ¹	RC ¹	NO
First Aid (Not offered through Safety Resources)	RC	RC	RC	RC	RC

AD – indicates application dependent, required if you will be working in a facility with those hazards.

RC – indicates a recommended course.

1 – recommended for LSC member

In addition to the training courses listed above, there are a number of Codes and Standards that must be followed.

Campus wide Codes and Standards can be found on the Safety Resources website at: http://safetyresources.usask.ca/procedures_forms/index.php . Some are listed below for reference.

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- Biosafety Code of Practice
- Facility Decommissioning Standard
- Fire Safety Plan
- Hazardous Energy Lockout Standard
- Hazardous Waste Disposal Standard
- Laboratory Safety Manual
- Minimum Standards for Building Occupancy
- Radiation Safety Code of Practice
- Biosafety Cabinet Safety Guidelines
- Canadian Biosafety Standard
- Compressed Gas Cylinder Safe Handling, Use and Storage
- Radiation Safety Manual
- WHMIS Information System Manual
- Workplace Responsibility System

The College of Engineering also has specific safety resources and requirements available on the College Website: <http://engineering.usask.ca/service-and-support/safety-security.php>. Some are listed below:

- Engineering Emergency Response Procedure
- Engineering Building Evacuation
- Working Alone and/or After Hours Policy and Procedure
- Health & Safety Policy & Procedure
- Power Outage Procedures
- Nanoparticle/Nanomaterial SOP Form

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,
- 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),

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- 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.

In addition to the requirements listed elsewhere in this document, individual **Graduate Students, Visiting Research Students, Postdoctoral Fellows, Visiting Professors, , Research Scientists, Summer Students 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 (8:30am-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 customised 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

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these inspections, the Chair of the Department Safety Committee will communicate the issue to the faculty member.

9. Procedure

This SOP does not provide specific procedures, but instead outlines the organisational and safety requirements of the Department of Mechanical Engineering. In addition to the safety requirements listed above, the following information is also 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**). These forms are located on the Department Safety Webpage (<http://engineering.usask.ca/mech/safety/index.php>)
 - Employees of the University (Including Graduate Students) can complete the online form.
- University Policies on [working alone/after hours](#) must be followed.
- Whenever possible experimental work **MUST** be conducted between the hours of 8:30am 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 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.

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- Details on WHMIS labeling and general laboratory practices can be found in the Materials Laboratory Practices SOP, as well as the online WHMIS course.
- 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 or 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 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

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(<http://engineering.usask.ca/mech/safety/index.php>) 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 organisational 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: <http://engineering.usask.ca/mech/safety/index.php>

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:

http://safetyresources.usask.ca/procedures_forms/index.php

Laboratory Safety Manual:

http://safetyresources.usask.ca/procedures_forms/index.php

Mechanical Engineering Safety Page:

<http://engineering.usask.ca/mech/safety/index.php>