



UNIVERSITY OF WATERLOO
FACULTY OF ENGINEERING
Department of Systems
Design Engineering

Health and Safety Manual

Faculty, Staff, Students (Undergraduate and Graduate), Postdoctoral Fellows, Research Personnel, Work Term placements, Volunteers and Visitors (paid or unpaid)

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1 Introduction

This manual is provided to all “Members” of the Systems Design Engineering Department. “Members” include all SYDE Faculty, Staff, Students (Undergraduate and Graduate), Postdoctoral Fellows, Research Personnel, Work Term placements, Volunteers, and Visitors (paid or unpaid). The information in this manual will include Health & Safety policies and procedures for safe practices in research and teaching labs, classrooms and general office environment.

It is expected that all “Members” read and understand the information in this document with regard to laboratory safety and emergency procedures.

2 Roles and Responsibilities

All members of the SYDE community share responsibility for health and safety however, the responsibilities and accountabilities of each individual will depend on their role. The responsibilities with respect to safety of university employees and students are outlined in Policy 34, and specific operating procedures are provided by the Safety Office. This manual serves as a general reference for SYDE members and may supplement, but not supersede, procedures provided by the Safety Office.

2.1 Undergraduate Students

All undergraduate engineering students receive WHMIS and evacuation training in 1A. Upon completion of this instruction, a sticker is awarded to be affixed to the student’s ID card.

- Students must adhere to written safety rules, regulations and standard operating procedures.
- Follow verbal safety instructions throughout the academic term. Since additional instructions may be given at the beginning of laboratory sessions, it is important that students arrive at each session on time.
- Complete mandatory safety training.
- Consult with PI/Lab Supervisor before using hazardous materials or conducting high risk experimental procedures and obtain prior approval if required.
- Keep work area safe and uncluttered. Practice good housekeeping and chemical hygiene.
- Use personal protective equipment as required.
- Never work alone in the lab.
- Absolutely no food, drink, or smoking is permitted in the lab at any time.
- Use equipment for its intended purpose only.
- Report all broken equipment, emergencies, injuries, near misses or safety concerns to the PI/Lab Supervisor.
- Do not touch anything with which you are not completely familiar.
- In the event of an emergency, call **911** and the UW Police ext. 22222

It is expected that each student will work in a responsible manner and exercise good judgement and common sense. If at any time you are not sure how to handle a particular situation, ask your Teaching Assistant or Instructor for advice. It is always better to ask questions than to risk harm to yourself or others, or damage to the equipment.

Students on Unpaid Work Placements

A Work/Education Agreement Form is to be used by Faculties/Departments arranging unpaid placements. The Ministry of Training Colleges and Universities (MTCU) requires information on placement hours, grant eligible and visa status. The form, adapted from MTCU, includes a student accident/injury report form. To comply with MTCU reporting requirements, Faculties/Departments are to complete the form with the student before placement, then provide the Safety Office with the completed form (including total hours worked) at the end of each term.

2.2 Graduate Students and Personnel Working in Research Laboratories

All persons working in research labs must:

- Complete all applicable safety training.
- Be familiar with relevant standard operating and emergency procedures.
- Review all lab specific hazards and safety precautions with supervising researcher.
- Become familiar with any unusual hazards in designated areas, and procedures for dealing with them. Know the specific Materials Safety Data Sheets and equipment manual(s) for these areas.
- Follow all departmental and university safety procedures and policies.
- Report any malfunction of equipment or equipment breakdowns to your project supervisor.
- Read this manual in its entirety and sign the form that they understand these regulations and will comply with them.
- Review and follow relevant lab safety manual(s) and materials and hazards
- Follow oral and written lab safety rules, regulations, and standard operating procedures required for the tasks assigned
- Keep work areas safe and uncluttered

2.3 Visiting Researchers/Scientists

The Department is host to many visitors who use SYDE facilities to pursue their own research or conduct collaborative research under faculty supervision. Those who are engaged in research activities in SYDE are expected to comply with the University's policies designed to ensure that their work is conducted safely and in a professional manner. In particular, visitors who will participate in laboratory research must receive appropriate safety training and be familiar with the University's policies concerning laboratory safety and the handling and disposal of hazardous materials. Visitors to the laboratory are expected to follow the same requirements as the laboratory workers with regards to such items as personal protective equipment (PPE), proper dress, food and drink, etc.

The faculty host/supervisor or designate is responsible for the appropriate lab safety orientation and other project hazards. It is expected that visitors to the Laboratory have similar worker's compensation coverage from their own institutions or companies. It is required that visitors to SYDE labs provide evidence of insurance coverage.

2.4 Visitors

Safety of visitors is the responsibility of the person in the department who is hosting them or bringing them into the department. The host should accompany the visitor at all times or provide a brief orientation so that the visitor would know what to do in the event of an emergency.

2.5 Teaching Assistants Working in Teaching Laboratories

All Teaching Assistants (TA) are considered supervisors and must ensure the safety of all those who enter the lab. TAs who work in teaching laboratories receive written information specifying their responsibilities with respect to safety in the laboratory.

TAs should provide a lab orientation to ensure that all students are familiar with the use and location of equipment and safety aids. Orientation should include information on:

- Electrical equipment and manuals
- Safety Data Sheets (SDSs)
- Review safety manuals and resources
- Chemical inventories and demonstrated methods of access
- Explain use of and limitations of personal protective equipment (PPE) e.g., safety glasses, face shields, temp resistant gloves, etc.
- Importance of reporting every incident, accidents, and unsafe conditions to a supervisor
- Review emergency procedures and location of emergency equipment and supplies (nearest phone, fire extinguishers, first aid kits etc.)
- Fire alarm pull station
- Evacuation procedures (emergency routes and exits)
- Procedures for medical emergencies and injuries
- Information concerning the existence of, and procedures for dealing with any unusual hazard which may exist in a particular laboratory.

All teaching assistants must sign a form which states that they understand their responsibilities and will follow the specified procedures.

2.6 Department Faculty and Staff

All faculty and staff are expected to be familiar with departmental safety protocols. They are expected to complete all mandatory training that pertains to their job, and to work to maintain the standards established by the SYDE health and safety committee. Faculty and staff are also expected to be able to

direct other members of the SYDE community to relevant resources should they be approached with questions regarding health and safety.

2.7 Principal Investigators/Laboratory Supervisors

The Principal Investigator/Laboratory Supervisor has overall responsibility for safety in the lab. All lab users (employees, students and visitors) must be provided with appropriate safety orientation when they are assigned to a lab. These apply to all persons working in any research laboratory and computer area whether they are receiving remuneration or not.

The Principal Investigator/Laboratory Supervisor should explain lab expectations, hazards, safety requirements/resources, and emergency procedures associated with the particular materials, equipment, procedures, etc. associated with their lab. The PI/LS is responsible for training staff and visitors on the use of all lab equipment and processes, and ensure that they work in a safe manner, follow standard operating procedures, and use the required personal protective equipment.

PI/Lab Supervisors are responsible for inspections of their lab and ensuring deficiencies are corrected. In addition, they must inform all lab users of any required corrective actions.

The lab supervisor or designate should escort all visitors to the lab due to potential hazards and to protect the security of the research, equipment and supplies. The lab supervisor must not knowingly permit entrance to anyone not qualified to be in the lab e.g., has not completed the mandatory training, or unauthorized persons without appointments.

2.8 SYDE Health and Safety Committee

This committee meets at least once a term to perform the following duties:

- Review and update the Safety Manual
- Review any incident reports
- Emergency planning
- Ensure that laboratory areas are inspected regularly and that any safety infringements found are corrected promptly
- Ensure that all persons using laboratory facilities have acknowledged (by signature) that they will comply with the regulations pertaining to the laboratory that they are working in.

The members of the committee are:

Eric Kubica (Committee Chair – Lab Director, staff)
Calvin Young (Lab Instructor, staff)
Nasser Lashgarian Azad (SYDE faculty)
Thomas Willett (SYDE faculty)
Elahe Cheraghi (graduate student)
Sadaf Mohsenkhani (graduate student)
Kevan Bell (post-doctoral fellow)

2.9 University Safety Committees

UW Joint Health and Safety Committee

Described in Policy 34 (available on the UW website):

<https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-34>

Engineering Safety Planning Committee (ESPC)

The current SYDE department representative is Eric Kubica.

3 Emergency Telephone Numbers and Information

Emergency Contact	Phone/Extension
Fire/Ambulance/Police	911
UW Police	External: 519-888-4911
	Internal: 22222
Health Services/First Aid: <u>Fall/Winter Term</u> Monday – Thursday 8:30AM – 7:30PM, Friday 8:30AM – 5:00PM <u>Spring Term</u> Monday – Friday 8:30AM – 5:00PM	External: 519-888-4096
	Internal: 84096
Spill Control	External: 519-888-4911
	Internal: 22222
Poisoning/Overdose Information	1-800-268-9017
Plant Operations (24h)	43793
Director of Safety – Kate Windsor	35814
SYDE Department Chair – Lisa Aultman-Hall lisa.aultman-hall@uwaterloo.ca	519-888-4970
SYDE Administrative Officer – Sarah Landy sarah.landy@uwaterloo.ca	47689
SYDE Lab Director & Health and Safety Coordinator – Eric Kubica eric.kubica@uwaterloo.ca	43074

3.1 How to get help in an emergency:

In the event you are in a situation where you have urgent need of emergency services the first step is to contact **911**. You can dial **911** from any campus phone. When using a university phone to contact emergency services UW Special Constables will be automatically notified of the location and time of the call. If you use a cell phone to dial 911 UW Special Constables will **not** be notified. If you are able, please contact the UW Special constables to inform them of the emergency. UW Special Constables also provide non-emergency response and are always available. Contact UW Special constables when:

- You require first aid and department first aiders are not available
- You are being followed or threatened
- See or hear unusual, suspicious activity
- Need assistance with an emotionally upset or distraught person
- Need assistance with a person with a disability who is in difficulty

4 First Aid

4.1 First Aid Kits

If you use material from a first aid kit, you must record the details in the first aid logbook.

Undergraduate Lab areas

In the undergraduate lab area major first aid kits are located in rooms E7-6402 and E5-6129. Minor first aid kits are located in the Teaching Lab – room E5-6005 and the Biodevices Teaching Lab – DWE 3502.

Research areas

Minor first aid kits are located in CPH-1336D, CPH-1335, CPH-2398, E2-1303F, and DWE 3507.

4.2 First Aider Contacts

First Aider Contact	Extension
Orion Bruckman	45218
Tom Willett	48405

4.3 First Aid Procedures

Minor injuries may be treated at Health Services or by trained SYDE Staff. If in doubt, call Health Services at 33544. Note that vehicle access is off Westmount Road.

Major injuries or illness are best handled by phoning **911**. The ambulance entrance for your area is listed on the first aid poster. First aid posters are located in all labs as well as:

- E5 building, 6th floor, across 6102
- E7 building, 6th floor, across from 6358

If you encounter someone who is suffering from a medical condition or injury take the following action:

- If an ambulance is required contact **911** or UW Police Ext. 22222 advising of your location and the condition of the individual. Advise UW Police if you contact **911** direct.
- UW Police will dispatch a constable to the location.
- UW Police will meet the Fire/Paramedic Service and escort them to your location.
- If qualified, administer First Aid, or seek assistance from someone who is qualified.
- Monitor the individual until the arrival of Fire/Paramedic Service personnel.

4.4 Reporting Accidents

All accidents, incidents, and near misses must be reported. Should an injury or incident occur:

1. Obtain medical aid if necessary.

2. Report any injury to your supervisor immediately.
3. Complete injury/incident report with supervisor and forward to the Safety Office, Commissary Building within 1 day of the injury.
4. Should you have any questions or concerns contact Andrew Scheifele (Manager, Safety Office) at ext. 36359

Major Accidents

Critical injuries must be reported immediately to the Safety Office ext. 35755. Critical injuries meet at least one of the following criteria:

- Place life in jeopardy
- Produce unconsciousness
- Substantial loss of blood
- Fracture of leg or arm, but not finger or toe
- Amputation of a leg, arm, hand or foot, but not a finger or toe
- Burns to major portion of body
- Loss of sight in one eye

In the event of a death or critical injury, do not "interfere with, disturb, destroy, alter or carry away any wreckage, article or thing at the scene of or connected with the occurrence until permission so to do has been given by an inspector", unless necessary to:

- a. save life or relieve human suffering;
- b. maintain an essential public utility service or a public transportation system;
- c. prevent unnecessary damage to equipment or other property;

Any critical injury at a workplace, whether suffered by a student, visitor, or another employee, may give rise to immediate reporting and evidence preservation obligations under the **Occupational Health and Safety Act (the OHSA)**. These employer accident reporting obligations are initiated when any person, not just a worker is killed or critically injured.

Minor Incidents

If you require the services of a health professional or lose time from work as a result of an accident, a UW accident investigation form must be completed. This is a government (Workers Compensation Act) regulation and results in a fine if ignored. Remember that breaches of the OHSA can result in fines of up to \$500,000 to the corporate employer.

5 Fires and Evacuation Procedures

5.1 Emergency Shutdown Procedures

Lab personnel or the instructor in charge of the class must follow basic steps for an emergency shutdown **if time permits**.

- STOP ALL ACTIVITIES
- Shutdown experiments that could be affected by the loss of electricity, water, gas or other services (e.g., HVAC).
- Turn off and unplug all electrical or electronic equipment.
CAUTION: Do not cover ventilation vents and/or fan motors that could result in overheating and possible fire.
- Remove all material and equipment from inside ventilated hoods.
- Close the sash on all chemical fume hoods in the event that ventilation is lost.
- Cap all chemical containers. Ensure that water reactive chemicals are in sealed containers and stored in areas that are unlikely to become wet.
- Ensure that all chemical, radioactive materials and hazardous waste containers are properly covered and sealed.
- Ensure that all gas valves are closed.
- Vent all containers of cryogenic liquids to prevent buildup of internal pressure.
- Check that all gas cylinders are secured and in an upright position.
- Remove regulators and install transport caps where possible.
- Turn off all appliances, computers, Bunsen burners, and other equipment.
- Refrigerator and freezers must be closed.
- Elevate equipment, materials and supplies, including electrical wires and chemicals, off of the floor, particularly in lower elevations that are prone to flooding.
- Close all doors, including cabinets, storage areas, offices and utility chase-ways.
- Secure lab notebooks/CDs, and backup critical data on computers.
- Close and secure windows.
- Lock all exterior lab doors before leaving.

Upon returning to laboratory facility:

- Visually inspect the lab through the room or door windows to determine lab condition before entering
- Conduct a damage assessment of the lab

5.2 Evacuation procedure

All undergraduate laboratories have fire and first aid posters located in the lab near the door. Upon hearing the fire alarm or when an evacuation order is received, WALK immediately to the nearest exit. Remain outside until further instructions are received.

Laboratory supervisors are responsible for ensuring that there are appropriate evacuation procedures in place for those persons with mobility difficulties.

5.3 Fires

1. Notify others in the immediate area that there is a "FIRE".
2. Attempt to extinguish the fire **only** if you can extinguish the fire without putting your own safety or the safety of others at risk.

NOTE the type of fire extinguisher must correspond to the type of fire e.g., Class C for energized electrical equipment (wiring, fuse boxes, circuit breakers, plugged in electrical equipment).

3. Close the windows if you can do this safely.
4. Assist physically impaired to a safe location (stairwell or office with phone).
5. Leave the room and close the door.
6. Activate the nearest alarm or, if there is no convenient fire alarm, call **911** and alert the University Police at ext. 22222.
7. WALK out of the building via the closest safe emergency exit.
DO NOT USE THE ELEVATOR.
8. Report location of fire.
9. Report to the fire department the location of physically impaired or if anyone is thought to be still in the building (**phone 911**).

5.4 Fire Extinguishers

All laboratories in E2 and CPH have a fire extinguisher located in the room near the door or in a fire hose cabinet in the corridor just outside. In E5 they are located in the lunch room and in hose cabinets in the main corridors near rooms 6131, 6007, and in the main lobby.

6 Emergency Procedures

It is your responsibility to read safety posters and follow instructions during an emergency. Know the location of the closest fire extinguisher, eye wash and safety shower and know how to use them. Know the building evacuation procedures.

General Advice

- Do not panic.
- Size up the situation quickly and decide what to do.
- If you are in personal danger, first get to safety and then summon help.
- If you are asked to leave the area, make your area safe if time permits by turning off hazardous experiments or equipment, and closing the door. Then leave promptly.

6.1 Earthquake

- **Stay calm.**
- Get under a table, desk or bench, or stand in a doorway.
- Avoid windows.
- Leave building by stairs after shaking has stopped.
- Do not use elevators.
- When outside, stay clear of buildings and overhead hazards.

6.2 Flooding/Water Damage/Leaks

Serious water damage can occur from a number of sources: overland flooding, broken water pipes, clogged drains, damaged skylights or windows, or leaking roofs. If flooding or water leaks occur:

- Contact Plant Operations Ext. 33793 and report the exact location and severity of the flood or leak.
- If there is a hazard of electrical shock evacuate the area immediately;
- If safe to do so, take steps to avoid or reduce water damage by covering vulnerable objects;
- If you know the source of the water and are confident of your ability to stop it (e.g. close window) do so.
- If in doubt, phone ext. 22222.

6.3 Gas Leaks

When a natural gas odour/leak is detected take the following action:

- Evacuate the immediate area.
- If safe to do so, turn off the natural gas supply.
- If you cannot safely identify the source of the leak and turn off the natural gas supply, contact Emergency Services 911, Physical Plant Ext. 33793 or UW Police Ext. 22222 advising them of the location of the odour/leak.
- If the odour/leak is from an off-campus site, evacuate the area and contact Emergency Services **911**.

6.4 Electrical Shock

- **ACT FAST – CALL UW POLICE Ext. 22222**
- **GET EMERGENCY CARE**
- Do not touch the person until the power has been shut off.
- Do not remove the person from the electric source until the power has been shut off.
- If you cannot shut off the power, use an insulator such as dry rope, cloth, or broom handle to drag the person away from live wire.

- If there is no heartbeat and no breathing, do CPR only if you are trained.
- If there is a heartbeat but no breathing, immediately start rescue breathing.
- Check for burns and treat as third-degree burns.
- If the person is breathing, put them in the recovery position.
- Get the person to a doctor if:
 - Their heart is skipping beats
 - They have a fever
 - Are coughing up sputum.

6.5 Utility Failure

All utility failures (electrical, elevators, heat etc.) must be reported immediately to Plant Operations Ext. 33793.

Note phones will not work in power outages; please use your cell phone.

In partial electrical power disruption students, faculty and staff should move to areas where there is light and not return to the affected area until power has been restored.

Take all personal belongings and secure the room, if possible.

In complete electrical power disruptions students, faculty and staff should leave the buildings and not return until power has been restored. Take all personal belongings and secure the room, if possible.

Students, faculty or staff who need to enter the affected area(s) to pick up personal belongings, should report to the UW Police and request an escort.

NOTIFY YOUR SUPERVISOR/INSTRUCTOR IMMEDIATELY AFTER ANY INJURY, FIRE, EXPLOSION OR SPILL.

7 Mandatory Safety Training

All faculty, staff, students, postdoctoral fellows, research personnel, work term placements, volunteers, and visitors (paid or unpaid) working in any research or teaching laboratory must take the following courses to comply with UW Health and Safety requirements:

- Those "working" in paid or unpaid positions **at University of Waterloo (UW)** must take the following courses:

SO1001 Employee safety orientation (requires 30-60 minutes to complete)

SO1081 Workplace violence awareness (requires 30-60 minutes to complete)

These online courses are available through LEARN.

- **All employees (new and existing), regardless of job description, must complete the WHMIS 2015 course.**

SO2017 WHMIS 2015 (requires 45-60 minutes to complete)

This online course is available by self-registering on LEARN.

- All supervisory and managerial staff are required to take:

SO1100 Supervisor Safety Awareness (requires 60 minutes to complete)

Enforced by the Ontario Ministry of Labour, a new provincial regulation requires health and safety awareness training for **every worker and supervisor** under Ontario's Occupational Health and Safety Act (OHSA). This regulation came into effect on **July 1, 2014**.

Training is provided to all laboratory users. Emphasis in this training is placed on safe operating procedures; hazards related to specific equipment usage and general laboratory safety. Personal Protective Equipment (PPE) is issued to each laboratory user while working in the facility. This PPE includes, but is not limited to, safety glasses and goggles, masks or respirators as needed. Numerous first aid kits and fire extinguishers are mounted throughout the department. Eye wash stations are easily accessible to all laboratory users.

7.1 Health, Safety and Environment Management System (HSEMS) - New Risk Assessment Program

As part of our Health, Safety and Environment Management System (HSEMS), the University is implementing a Risk Assessment Program, the objective of which is to manage workplace hazards through proactive recognition, assessment, control and evaluation.

Building on existing tools and practices, the Risk Assessment Program helps to establish awareness and accountability at key points throughout the management chain and will enable department heads/chairs/directors to oversee hazards and controls in areas for which they are responsible. This will also simplify our annual compliance reporting.

Required Training:

For all department heads/directors/chairs, supervisors, managers, and health and safety coordinators:

- Online training - **Risk Assessment** [SO 2500](#) .

For supervisors and managers who are responsible for completing risk assessments:

- Classroom training - Application of Risk Assessment SO 2501 (Will start on September 2019 and SO 2500 must be completed before this one).

Important Links:

- [Risk Assessment Web Page](#)
- [Risk Assessment Program](#)

7.2 Hazard Specific Training

All lab workers must receive adequate training in the use of specific equipment and how to use the information provided by warning labels and Safety Data Sheets (SDSs).

Safety training and/or information should be provided by a faculty member, teaching assistant, or staff member at the beginning of a new assignment or when a new hazard is introduced into the workplace.

The following training modules are mandatory for those working with the specific hazard or performing the specified functions. Online sessions may be taken at any time. Classroom sessions are scheduled on a regular basis each term.

Course Description	Course Number	Approximate Duration
Biosafety	SO1069	1.5 hours
Cryogenic and compressed gas safety	SO1030	45 minutes
Laboratory safety	SO1010	45 minutes
Laser safety training theory	SO1066	2 hours
Radiation safety open sources	SO1013	3 hours
Radiation safety devices	SO1017	45 minutes
Radiation safety sealed sources	SO1015	2 hours
Radiation safety transportation	SO1021	2 hours
Supervisor's safety awareness	SO1100	1 hour
Working in clean rooms	-----	2 hours
X-ray safety	SO1011	2 hours

Every person working in a laboratory is responsible for ensuring that they:

- **Completes all applicable health and safety training**
- **Follows all applicable safety rules and practices**
- **Uses and wears protective equipment as require**
- **Reports unsafe equipment and working conditions to the laboratory supervisor**

- Reports all accidents/incidents to the laboratory supervisor

YOU ARE RESPONSIBLE FOR YOUR OWN SAFETY!

7.3 SYDE Employee Training Matrix

* Training may be required more frequently by supervisor		Training Frequency [Years]	Management and supervisors of low risk work	Supervisors of high risk work	Supervising Faculty	Graduate Students (Post Docs) Visiting Scholars	Teaching Assistants	Admin Staff	IT Staff	Demonstrators, Technical Staff, Lab Personnel
M – Mandatory	R – Recommended									
1. Mandatory if hazard present or supervising employees or students working with hazard 2. Each department is expected to have 10% of its employees to be trained in emergency first aid 3. Schools located off Main Campus are expected to have 10% of its employees trained in standard first aid 4. Departments are expected to provide enough employees to provide coverage for all of its assigned space 5. For all department heads/directors/chairs, supervisors, managers, and health and safety coordinators 6. For supervisors and managers who are responsible for completing risk assessments High risk work includes, but is not limited to: Research laboratories, technical and maintenance shops, areas where hazardous materials are used, custodial/housekeeping, chemical dispensing areas, student project rooms										
General										
SO1001	Employee Safety Orientation		M	M	M	M	M	M	M	M
SO1081	Workplace Violence		M	M	M	M	M	M	M	M
SO2017	WHMIS 2015	5	M	M	M	M	M	M	M	M
SO1100	Supervisor Safety Awareness		M	M	M					
SO1007	Inspecting the Workplace		R	M	R					
SO1012	Incident Investigation		R	M	R					
SO1038	First Aid Emergency 1-Day	3	2	2	2			2	2	2
SO1039	First Aid Emergency 2-Day	3	3	3	3			3	3	3
SO1040	Fire Warden Training		4	4	4			4	4	4
SO2500	Risk Assessment		5	5	5					5
SO2501	Application of Risk Assessment		6	6	6					
Hazard Specific										
SO1062	Asbestos Awareness			1		1			1	1
SO2015	Asbestos Training Type I and Type II			1		1			1	1
SO1023	Confined Space Entry			1		1			1	1
SO1036	Elevated Work Platforms	3								
SO1026	Fall Protection			1		1			1	1
SO1027	Forklift Training	3		1						1
SO2033	Electrical Awareness			1		1				1
SO1051	Hearing & Eye Protection			1		1			1	1
SO1035	Inspection of Slings and Chains			1		1				1
SO1057	Laboratory Support Worker	3								
SO1050	Ladder Safety			1		1	1	1	1	1
SO2031	Heat Stress Awareness									
SO1088	Fire Extinguisher Training									1
SO2020	MOL Working at Heights	3		1		1				1
SO1056	Office Ergonomics			1		1		1		1
Research										
SO1069	Biosafety			1		1				1
SO1030	Cryogenic and Compressed Gas Safety			1		1				1
SO1010	Lab Safety			1		1	1			1
SO1066	Laser Safety Theory			1		1				1
SO2030	Working with Radiation			1		1				1
SO2016	Safe Chemical Handling			1		1				1
SO1011	X-ray Safety			1		1				1
SO2035	Hazardous Waste Segregation			1		1				1

8 General Safety Practices

General Rules

- **No food or drink allowed in the labs**
- **No tampering with wires or network cables**
- **No compromising building or network security**

8.1 General Safety

- Be aware of the risks that are present in the particular lab you are working in
- Know and follow the safety rules and safe procedures.
- Fire doors must be kept closed at all times.
- Know and understand the hazards, safe handling and standard operating procedures of the materials, equipment and methods being used.
- Review SDSs, equipment manuals, and procedures instructions before attempting to conduct an experimental protocol, operate any machine or instrument.
- Read labels carefully.
- Never hurry. Work deliberately and carefully.
- Learn the location of emergency exits, fire alarms, fire extinguishers, etc.
- If you are unsure of any work to be done, ask the lab supervisor before proceeding
- Running, horseplay, pranks, and practical jokes are prohibited
- Report accidents and near misses promptly to the lab supervisor immediately

Housekeeping

- Do not use stairways or hallways for storage
- Aisles must be kept clear
- Never block access to exits, emergency equipment, e.g., fire extinguishers/eye washes/emergency showers, or electrical panels
- Maintain a clear 36" diameter area around all fire sprinkler heads
- Keep work area clear of all materials except those needed for your work.
- Extra books, backpacks, etc. should be kept away from equipment that requires air flow or ventilation to prevent overheating
- Equipment and chemicals must be properly stored and labeled
- Clean up your work area once experiments are completed and before leaving
- Properly dispose of used materials if any in proper containers. Waste batteries can be deposited into receptacles for recycling
- If leaving a lab unattended, turn off all ignition sources and lock the doors.
- Ensure drawers and doors are closed after use so they do not present a bump or trip hazard
- Store large, heavy or breakable items on lower and middle shelves
- Be careful when lifting heavy objects

- Step stools must be used to access items on high shelves
- Do not overcrowd storage areas and shelves
- Remove empty boxes and packing materials from lab

Food

- Consumption of food and/or drink (including water) in research and teaching labs is prohibited.
- Use of lab equipment to store or prepare food/drink is prohibited.
- Consumption or storage of other ingestible products (e.g., gum, lip balm, cosmetics, tobacco products) in research and teaching labs is prohibited.
- Wash hands before leaving lab and before eating.

Clothing and Personal Protective Equipment

- No open toes shoes or sandals allowed
- Restrain loose clothing, long hair, and dangling jewelry
- Wear appropriate clothing for the task, for example:
 - Long sleeves should be worn to minimize burn hazards e.g., when using the soldering station
 - Short sleeves or long sleeves rolled above elbow should be worn around moving parts to minimize entanglement hazards.
- Remove any conductive watch bands or chains, rings, wrist watches, etc.
- Personal protective equipment must be used as required and in consideration of the hazards present in each lab
- Gloves must be worn to protect hands and arms e.g., rubber insulated gloves tested to appropriate voltage or lead-lined rubber, plastic or leather gloves for radiation
- Face shields are required over safety glasses when grinding, chipping, brushing and abrasive metal cutting, to provide protection against flying objects
- Safety glasses should be worn to avoid danger from any arc which may occur across the switch terminals
- Remove gloves before touching computers or phones, opening doors, etc.

Smoking

Smoking is not permitted in any University building or vehicle and in areas within ten meters of all buildings.

8.2 Classroom and Office Safety

Classrooms and offices are generally low risk environments; however, care should be taken to ensure that any safety concerns are promptly addressed.

- Keep aisles and walkways clear of backpacks, bags, books and other potential tripping hazards.

- Ensure that any electrical cables (e.g., power bricks, extension cords, etc.) are arranged in a manner which does not pose a tripping hazard.
- Be aware of the location of the nearest emergency exit.
- Promptly report any safety concerns to your supervisor.

Ergonomic risk factors are also of concern for personnel working in offices. All office employees are encouraged to take SO1056 – Office Ergonomics. This online module introduces ergonomics strategies and offers advice for configuring your workspace to mitigate ergonomic risk. Registration is available through LEARN.

8.3 Security

Keep facilities locked when unoccupied to avoid unauthorized entry. Individual users are responsible for the security of any space to which they have keys and shall not admit unauthorized or non-registered persons into that space. Safeguarding University resources from unauthorized access, misuse or removal is a duty of all department members. All SYDE members have a responsibility to take reasonable precautions against theft or misuse of materials, particularly those that could threaten the public. Any extraordinary laboratory security measures should be commensurate with the potential risks and imposed in a manner that does not unreasonably hamper research.

8.4 Working Alone

Working alone under certain circumstances can increase an individual’s risk to health and safety.

Procedures

1. Working alone, especially after regular business hours, should be avoided whenever possible
2. Working alone requires supervisor/PI knowledge or approval
3. Approval for working alone or after normal hours must consider:
 - Tasks and hazards involved in the work
 - Consequences resulting from a worst-case scenario
 - The possibility of an incident or injury that would prevent an individual from calling for help
 - The individual’s training and experience level
 - The time the work is to be conducted
 - Access to emergency assistance
4. Conduct a risk assessment as per the guideline in section 7.4, identifying the hazards involved and safety protocols in place
 - a. High Risk: Working alone prohibited as per applicable regulations
 - b. Moderate Risk: Each area must develop a Standard Operating Procedure for working alone, including materials, equipment, and processes that may not be used, and security measures to protect against theft, property damage, or personal injury due to an intruder. All individuals who are approved to work alone must be trained on the SOP

- c. Low Risk: May work alone, however minimal precautions are required, including periodic check-in (supervisor or UW Police), access to phone and security measures to protect against theft, property damage, or personal injury due to intruder. Individuals should follow the University Special Constable Service [Personal Safety Guide](#). A campus safety app is also available for download, which includes emergency tools, notifications, and tips for staying safe. A campus safety app is also available for download, which includes emergency tools, notifications, and tips for staying safe. Visit [the WatSafe web page](#) for more information.

8.5 Working Alone Risk Assessment

High Risk – Working Alone Prohibited

- Confined space entry
- Electrical Systems rated at more than 750 volts
- Trenches
- Portable ladder that exceeds 6 meters in length and is not securely fastened, or work with a ladder that is likely to be endangered by traffic
- Use of fall arrest equipment (without travel restraint) or scaffolds
- Machines and power tools that may cause critical injury (e.g., lathe, table saw, chain saw)
- Work with acutely toxic material (e.g., cyanides, fumigants, hydrofluoric acid) as described in Safety data Sheet (SDS)
- Use of supplied air or self-contained breathing apparatus (SCBA)
- Risk of drowning
- Use of a vehicle, boom, or similar equipment near live power lines where it is possible for any part of the equipment or its load to make contact with the live power line
- Open flame associated with flammable solvents
- Hot work where a fire watch is required
- Other tasks which, based on hazard analysis, is deemed to require more than one other person for safety reasons

Moderate Risk – Presence of others is recommended (within shouting distance) and Standard Operating Procedure is required

- Large volumes of chemicals
- X-rays
- Radioactive materials (above exempt quantities)
- Exposed, energized electrical systems
- Risk Group 2 Biohazard labs
- Class 3B and 4 lasers
- Work with materials acutely hazardous to health
- Work with human subjects

- Extreme temperature environments
- Handling of cash
- Dealing directly with public
- Work in isolated areas (fieldwork)

Low Risk – May work alone

- Custodial work
- Building maintenance with low risk
- Laboratory work with minimal risk (analytical equipment, monitoring equipment or process, work not involving hazardous materials)
- Routine office work or study

8.6 Electrical Safety

There is always a potential danger of electric shock or fire whenever there are outlets, plugs, wiring or connections. In addition to the usual electrical hazards, some labs have high voltage electrical equipment.

- Familiarize yourself with the location of Circuit breaker panels in labs.
- Maintain an unobstructed access to all electrical panels.
- Electrical cords must be secured
- Connect to the power source **LAST**.
- Turn off and unplug equipment (instead of relying on interlocks that can fail) before removing the protective cover to replace a part, adjust or troubleshoot.
- Do not use an electrical outlet or switch if the protective cover is ajar, cracked or missing
- All electrical apparatus must be properly grounded.
- Never remove the ground pin of a 3-pronged plug.
- Do not run wires over moving or rotating equipment, or on the floor, or string them across walkways from bench to bench as this creates a trip hazard.
- DO NOT use electric wires as supports and never pull on live wires.
- Ensure that all wires are dry before plugging into circuits.
- Remove electrical cords from the receptacle by grasping and pulling the plug not the cord
- Always pick up and carry portable equipment by the handle or base.
- Only use DRY hands and stand on a dry surface when using electrical equipment, plugging in an electric cord, etc.
- If electrical equipment emits smoke or a burning smell, shut off power immediately and take it out of service for repair.

Extension Cords

- Avoid using extension cords whenever possible.

- Extension cords must only be used as a temporary solution and should be appropriately rated for the job.
- Do not run extension cords under doors, across aisles, or hang from ceiling
- Power strips with an appropriate ESA approval mark may be used, however care must be taken to ensure the circuit has appropriate capacity for the connected load.
- “Piggy-backing” of extension cords is prohibited.

High Voltage

- Obtain permission before operating any high voltage equipment
- Never modify, attach or otherwise change any high voltage equipment
- Always make sure all capacitors are discharged (using a grounded cable with an insulating handle) before touching high voltage leads or the inside of any equipment even after it has been turned off. Capacitors can hold charge for many hours after the equipment has been turned off.
- When you are adjusting any high voltage equipment or a laser which is powered with a high voltage supply, USE ONLY ONE HAND. Your other hand is best placed in a pocket or behind your back. This procedure eliminates the possibility of an accident where high voltage current flows up one arm, through your chest, and down the other arm.

Report any Abnormal Wear, Damage or Equipment Failure

- Inspect electrical cords regularly – replace frayed or damaged cords and repair broken plugs.
- Inspect electrical equipment with power off and unplugged for frayed and damaged connections.
- If a piece of equipment fails while being used, report it immediately.
- Report defects/faults to your supervisor.
- If you receive a mild shock from a piece of equipment, turn it in for repair.
- Tag/Label equipment UNSAFE – DO NOT USE and describe the problem.
- Do not attempt to repair electrical equipment yourself. Only qualified and trained people should repair or modify electrical or electronic equipment.

Electrical Safety Certifications

All electrical equipment purchased or built within the department must be certified by an approved authority and have a [recognized approval mark](#). The **only** exception is if the equipment is connected to an approved power supply with an output that does not exceed 100 VA, with the operating voltage not more than 30 V rms, 42.4 V peak, or 60 V dc. The approved power supply must be certified to CAN/CSA-C22.2 No. 223, CAN/CSA C22.2 No. 66.1, CAN/CSA C22.2 No. 66.3, or CAN/CSA-C22.2 No. 60950-1. Please refer to the ESA '[Exceptions to Product Approval Requirements](#)' documentation for complete details. Unapproved equipment may be purchased/built however it will require field evaluation and affixation of a field approval mark from the Canadian Standards Association (CSA), Electrical Safety Authority (ESA), or an equivalent field evaluation agency. Do not bring into the lab or use in the lab equipment that does not conform to ESA rules.

8.7 Online Resources

The Safety Office serves as a Health, Safety and Environment (HSE) resource for health and safety. The Safety Office oversees many programs on campus and has specific procedures that must be followed to ensure compliance with UW policy and governmental regulations. The official web site of University of Waterloo Safety Office is: <https://uwaterloo.ca/safety-office/>.

Most governments have posted regulations pursuant to health and safety on the web and many institutions have placed their health and safety policies, procedures and programs on the web as well. Below are several topics with support from the University Safety Office and there are more topics on their website.

[LITHIUM CELL AND BATTERY STANDARD \(uwaterloo.ca\)](#)

[Biosafety | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Chemical safety | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Compressed gas and cryogenic liquid | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Designated substances | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Remotely Piloted Aircraft Systems \(Drones\) | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Electrical safety certification | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Facilities, equipment and laboratory apparatus | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Fire hazards | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Hazardous material spills | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Hazardous Waste Standard | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Hot work | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Incident and hazard reporting | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Laboratory safety | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Laboratory apparatus | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Lasers | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Nanomaterials | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Personal protective equipment \(PPE\) | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Radiation | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[Training | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

[X-ray | Safety Office | University of Waterloo \(uwaterloo.ca\)](#)

9 Field Work Risk Management

Field Work Risk Management Form must be completed and approved prior to undertaking field work in any location external to UW that involves higher risk. The Field Work Risk Management Form is available on the Safety Office website.

Includes any activity that may cause personal harm and examples include, but are not limited to:

- Field work, field trips and internships outside Canada and USA
- Field work at industrial sites such as factories, mining operations and construction sites
- Activities that require specialized safety training and/or certification in the use of personal protective or safety equipment
- Field work at any international or remote location
- Travel to areas where immunization and/or significant health and safety precautions are required
- Work at sites with hazardous substances
- Field work which by nature entails risk (e.g., travelling on water or ice, high altitude work, etc.).