

COEN GENERAL TEACHING LAB SAFETY SUPPLEMENT FOR INSTRUCTORS & TAs

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REVISION HISTORY

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COEN GENERAL TEACHING LAB SAFETY SUPPLEMENT
FOR INSTRUCTORS & TAs

REVISION HISTORY, cont'd

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TABLE OF CONTENTS

1.0 Scope 3

2.0 Hazard Mitigation 3

 2.1 Overview..... 3

 2.2 Elimination 3

 2.3 Substitution..... 3

 2.4 Engineering Controls 4

 2.5 Administrative Controls..... 5

 2.6 Personal Protective Equipment 6

3.0 Electrical Safety 6

4.0 Working With Chemicals 7

 4.1 Chemical Ordering..... 7

 4.2 Chemical Inventories and MSDSs 7

 4.3 Chemical Contact 8

 4.4 Large Chemical Spill..... 9

 4.5 Small Chemical Spill..... 10

 4.6 Uncontained Spill Release..... 11

 4.7 Management of Hazardous Wastes 11

 4.8 Illegal Disposal of Waste 12

 4.9 Waste Pickup..... 12

5.0 Additional Resources 13

 5.1 COEN Safety Liaison..... 13

 5.2 EHSS..... 13

 5.3 Lab Incidents, Accidents and Property Loss..... 14

 5.4 COEN Safety Website 14

COEN GENERAL TEACHING LAB SAFETY SUPPLEMENT FOR INSTRUCTORS & TAs

1.0 SCOPE

This document describes the general standard operating procedures and practices in the College of Engineering's teaching laboratories and is required training for all instructors and TAs in those labs.

Each course also has a lab-specific safety manual that is to be assigned to all students, instructors and TAs associated with the course.

Due to the wide scope of activities that may take place within a lab, this document is not intended to be comprehensive. Instead, it is intended to provide a general overview in defining safe work practices. Activities not covered by this safety supplement should be included in the lab-specific safety manual or SOP/protocol for that lab.

It is mandatory that all individuals who perform work in the lab be fully aware of this document's existence, understand its contents, and satisfy the testing requirements associated with it. This burden of knowledge, therefore, is the responsibility of both the PI and the individual. Contact the [COEN Safety Liaison](#), Section 5.1 for more information.

2.0 HAZARD MITIGATION

2.1 Overview

Five commonly used methods to reduce the risk of hazards are shown in priority order:

1. Elimination
2. Substitution or reduction
3. Engineering controls
4. Administrative controls
5. Personal protective equipment (PPE)

While many are familiar with examples of PPE, it is important to understand the other methods and why they need to be employed first, before PPE, for hazard mitigation.

2.2 Elimination

Hazard elimination is the best way to provide hazard mitigation by physically removing the hazard. An example would be to use a non-toxic material in place of a toxic one, where possible.

2.3 Substitution

In many cases, hazards can be reduced by substituting a less toxic material or a smaller amount of the material.

COEN GENERAL TEACHING LAB SAFETY SUPPLEMENT FOR INSTRUCTORS & TAs

2.4 Engineering Controls

Engineering controls are lab systems or features that protect all workers by removing the hazard from the lab, or sequestering the hazard. Examples of engineering controls include:

- fume hoods or other local exhaust systems to remove vapors and/or particles at source
- specialized storage systems such as flammables, acids, and corrosives cabinets, sharps containers, etc.
- safety shields on tools
- “glove boxes” to contain hazardous materials

For more detailed information on the engineering controls required in your lab, consult the protocols and procedures for specific lab processes and/or discuss with your lab instructor.

COEN GENERAL TEACHING LAB SAFETY SUPPLEMENT FOR INSTRUCTORS & TAs

2.5 Administrative Controls

Administrative controls play an important part of reducing hazard risk when engineering controls alone are not sufficient. Below are administrative controls that are in place for this laboratory.

Lab Training

The manner in which lab training is provided is up to the instructor. It is important that any training for the lab be consistent and verifiable to ensure all students and T/As receive proper training.

Laboratory Safety Notebook

The laboratory safety notebook is intended to provide a variety of safety-related content that can be readily accessed by lab members and visitors to the lab.

In general, the notebook will contain:

1. This document
2. The lab-specific safety manual(s) for your lab(s)
3. Boise State Emergency Response Guide
4. Current contact information for COEN and BSU safety personnel
5. Information and forms relating to lab incidents/accidents
6. Chemical inventory and SDSs for labs that use chemicals

More information on how to organize a lab safety notebook can be obtained by contacting the [COEN Safety Liaison](#), Section 5.1.

Signage

The number of signs should be kept to a reasonable minimum and be clear and concise.

Information relating to the general hazards, PPE, and rules of the lab will be posted on the each laboratory entrance from the main hall.

If a phone is provided in the lab, the secondary contact information should also be provided adjacent to the phone.

COEN GENERAL TEACHING LAB SAFETY SUPPLEMENT FOR INSTRUCTORS & TAs

2.6 Personal Protective Equipment

The information provided below is intended only to provide an overview of Personal Protective Equipment (PPE) requirements that may exist for your lab.

PPE should be considered the last avenue in providing work protection and be implemented only if engineering and administrative controls cannot provide sufficient protection.

In general,

- **Closed-toe shoes and leg coverage** must be worn in the lab at all times.
- **Safety glasses** must be worn under the following circumstances in labs:
 - Performing sawing, grinding or cutting operations
 - When there is any foreseeable risk of injury to your eyes.
 - Use of any chemical
- **Lab safety coats and gloves** must be worn when handling chemicals and biomaterials.

For more detailed information on the PPE required in your lab, consult the protocols and procedures for specific lab processes and/or discuss with your lab instructor.

If you feel you are engaged in a process that places you at risk, it is your responsibility to wear the appropriate PPE, if available, or halt work until the proper PPE can be procured.

NOTE: Grainger Industrial Supply (www.grainger.com) is a good source for purchasing of, and information on, PPE. See your PI or laboratory supervisor for information on and proper fitting of PPE.

3.0 ELECTRICAL SAFETY

Labs sometimes rely on custom electrical circuits and devices to perform their work. However, there are limitations to what labs are able to do without the assistance of a licensed electrician.

When lab members intend to design, fabricate or modify electrical circuits that have voltages that exceed either 30 volts ac rms or 60 volts dc, they must first discuss the work with the [COEN Safety Liaison](#), Section 5.1 for more information.

The safety liaison will then contact a University electrician to see if their assistance is required.

COEN GENERAL TEACHING LAB SAFETY SUPPLEMENT FOR INSTRUCTORS & TAs

4.0 WORKING WITH CHEMICALS

4.1 Chemical Ordering

- Lab personnel must order all chemicals in accordance with the College of Engineering chemical ordering policy.
- This policy is designed to provide guidelines for how chemicals are ordered and delivered to laboratories.
- For more information on the policy and the process to be followed, contact the [COEN Safety Liaison](#), Section 5.1.

4.2 Chemical Inventories and MSDSs

- A chemical inventory of the laboratory is to be performed on a yearly or more frequent basis.
 - Boise State uses the Chematix online chemical inventory system. Contact the [COEN Safety Liaison](#), Section 5.21 for assistance.
 - The inventory and SDSs for the lab's chemicals must be made available by at least one of the methods below:
 - Hardcopies included in the lab safety notebook
 - Online access from a PC within the lab
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COEN GENERAL TEACHING LAB SAFETY SUPPLEMENT FOR INSTRUCTORS & TAs

4.3 Chemical Contact

- **If you are not sure how dangerous the chemical contact is, call 9-1-1.**
 - The treatment of a chemical exposure takes precedent over spill cleanup, spill containment, or property damage including water damage from the use of an eyewash or safety shower.
 - In the event of chemical contact with skin or eye, flush the affected area for a minimum of 15 minutes. Use the nearest safety shower and eye wash station as identified by the [Lab Safety Checklist](#) in the lab-specific safety manual for your lab. If possible, obtain assistance to remove contaminated PPE and clothing after flushing has begun.
 - If contact is made through inhalation, immediately move to an area away from the exposure.
 - After immediate treatment for the exposure has been completed, contact your supervisor; then call University Security and Police at 426-6911.
 - Have the SDS information for the chemical(s) available for reference. This information can be found in your lab safety notebook. If first responders are summoned, meet them at the location described in the Lab Safety Checklist in your lab safety supplement with the SDS information for the chemical(s) that were contacted.
 - After the immediate needs associated with the contact have been dealt with, contact Boise State Risk Management and Insurance to follow the proper processes relating to the exposure. See Section 5.3.
 - Complete a [Spill Investigation Report](#), which can be found in Section 4.6
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COEN GENERAL TEACHING LAB SAFETY SUPPLEMENT FOR INSTRUCTORS & TAs

4.4 Large Chemical Spill

A large spill is a spill greater than 200mL or 200 g, OR any amount of an extremely hazardous substance, OR beyond the cleaning capabilities or comfort level of the laboratory or laboratory workers.

If deemed necessary or you are unsure of spill severity, immediately call University Security and Police at 426-6911. You may also pull a fire alarm or request them to sound the alarm.

Otherwise, take the following steps:

- Inform others in the area of the spill.
 - Turn off any gas burners without putting yourself in harm's way.
 - Retrieve SDS(s) without putting yourself in harm's way.
 - Evacuate the area, closing the doors behind you.
 - Contact your supervisor; then call University Security and Police at 426-6911.
 - Post warning outside the area and lock doors if possible to prevent re-entry.
 - Complete a [Spill Investigation Report](#), which can be found in Section 4.6
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COEN GENERAL TEACHING LAB SAFETY SUPPLEMENT FOR INSTRUCTORS & TAs

4.5 Small Chemical Spill

A small spill is defined as a spill less than or equal to 200mL or 200 g, AND not of an extremely hazardous substance, AND within the cleaning capabilities and comfort level of the laboratory and laboratory workers.

If you are not sure or uncomfortable with the cleanup, contact your supervisor and University Security and Police at 426-6911.

Otherwise, take the following steps:

- Inform others in the area of the spill.
 - Turn off any gas burners without putting yourself in harm's way.
 - Retrieve SDS(s) without putting yourself in harm's way.
 - Review applicable SDS(s) and determine controls, PPE, and need for assistance.
 - Put on necessary protective clothing (gloves, safety goggles or glasses, and lab coat).
 - Cover small spills with absorbent towels. Clean spill area working from outside toward the center.
 - Rinse spill area with water. Label and retain spill materials for EHSS.
 - Contact your supervisor; then call University Security and Police at 426-6911 so that they may contact EHSS.
 - Complete a [Spill Investigation Report](#), which can be found in Section 4.6
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COEN GENERAL TEACHING LAB SAFETY SUPPLEMENT FOR INSTRUCTORS & TAs

4.6 Uncontained Spill Release

A spill or release of chemicals into any drain is an uncontained spill release. **Communicate all uncontained spills to a member of EHSS at 863-8024 (24-hr cell) so that they can contact the proper authorities.**

If EHSS cannot be reached, the responding faculty or staff member must report the spill to the [COEN Safety Liaison](#), Section 5.1 or

Lander Street Wastewater Treatment Plant:

Normal hours: 608-7382

After hours: 608-7380

Boise Department of Public Works Pretreatment Contacts

Mike Hunter, Senior Environmental Specialist 384-3993

Walt Baumgartner, Pretreatment Prog. Coordinator 384-3991

Terry Alber, Senior Environmental Specialist 384-3992

Spill Investigation Report

A Spill Investigation Report form must be completed in the event of a spill or an uncontained release of chemicals into a drain. The URL for the form can be found below:

<http://operations.boisestate.edu/ehs/files/2011/09/SpillInvestigationReport.pdf>

Contact EHSS, Section 5.2. for assistance in completing this form if necessary.

4.7 Management of Hazardous Wastes

- Chemical waste must be segregated, stored and disposed of properly, in accordance with BSU's [Hazardous Waste Management Manual](#).
 - If you have any questions regarding whether a waste material is hazardous or how to store or dispose of it, contact the EHSS [Hazardous Waste Officer](#), Section 5.2.
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COEN GENERAL TEACHING LAB SAFETY SUPPLEMENT FOR INSTRUCTORS & TAs

4.8 Illegal Disposal of Waste

Examples of illegal waste treatment include:

1. Leaving solvent-wetted materials or containers on the bench top or in fume hood to evaporate.
 2. Diluting a waste to render it non-hazardous.
 3. Venting a pressurized aerosol can solely to remove the contents.
 4. Disposing a waste down the sink or drain without prior approval from EHSS. Consult with the EHSS [Hazardous Waste Officer](#), Section 5.2 before disposing of any chemical down a sink or drain.
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4.9 Waste Pickup

All chemical waste generated in Boise State laboratories must be disposed of by the university's EHSS department.

The use of the online system Chematix , allows the user to characterize the waste and enter a pickup request into the system, which, in turn, notifies EHSS to come pick it up.

For training on how to use Chematix, or if you have any questions regarding how to handle waste, contact either your lab PI, supervisor, [COEN Safety Liasion](#), Section 5.1, or [Hazardous Waste Officer](#), Section 5.2.

COEN GENERAL TEACHING LAB SAFETY SUPPLEMENT FOR INSTRUCTORS & TAs

5.0 ADDITIONAL RESOURCES

5.1 COEN Safety Liaison

The College of Engineering is staffed with a safety liaison that works closely with COEN labs and the Boise State Environmental Health, Safety and Sustainability team. The safety liaison can also help with chemical ordering, handling chemical waste and many other issues.

Contact information for the COEN Safety Liaison can be found below:

Jon Scaggs, Lab Safety Specialist
Office: ENGR 332
email: jonathanscaggs@boisestate.edu
Office: 426-3943

5.2 EHSS

The Boise State Environmental Health, Safety and Sustainability (EHSS) team can provide a wealth of information regarding university policy and safety information regarding laboratory work across campus. Two members of the EHSS staff that support COEN labs heavily are:

- Suzy Arnette, Executive Director, EHSS and Risk Management
suzyarnette@boisestate.edu
ph. 426-3906
- Chris Siepert, EHSS Hazardous Waste Officer
christophersiepert@boisestate.edu
ph. 426-33913

Additional information regarding other members of the EHSS team, university policy, training, etc. is provided on their website site at: boisestate.edu/operations/ehss/

COEN GENERAL TEACHING LAB SAFETY SUPPLEMENT FOR INSTRUCTORS & TAs

5.3 Lab Incidents, Accidents and Property Loss

Note: If you have any emergency, first take appropriate measures as described elsewhere in this manual.

If you have an incident your lab, whether it was an actual accident or just a “near miss”, it should be logged by filling out an “Incident/Accident Injury Report.” This form can be found in your Lab Safety Manual, and on Risk Management’s website, [here](#). Once filled out, give a copy to your PI and the [COEN Safety Liason](#), Section 5.1.

If the incident resulted in injury or property damage, also contact the Boise State Office of Risk Management and Insurance to ensure the proper measures are taken to protect health and property. Their contact information can be found by going to:

boisestate.edu/rmi/

Also, your lab notebook should have the proper forms and a flow chart to describe how to handle an incident for an employee.

5.4 COEN Safety Website

The COEN Safety website is hosted on the College of Engineering’s website at <https://www.boisestate.edu/coen-safety/>.

Topics of the website include:

- Emergency response information
 - Safety training resources for research and teaching labs as well as for student projects
 - Commonly used forms, documents and templates
 - Chemical management guidance, including chemical ordering, chemical inventory and SDS record-keeping
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