Department of Civil and Environmental Engineering

Michigan State University

Safety Manual

For Individuals Working In Labs and at Field Sites

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OVERVIEW

All individuals working in the department's labs and at field sites are responsible for their own safety.

In addition, certain individuals and the department, as spelled out in this document, have special responsibilities for providing the information and organization necessary to establish a safe working environment.

This document is broken into four sections that provide the following information:

The *Safety Responsibility Guidelines* section outlines specific responsibilities of the department, individual faculty members, students, employees, and research-group safety representatives.

The *Minimum Safety Training Requirements* section states the minimum safety training required for all faculty, students, post docs, and staff using the department's labs or working at field sites.

The *General Laboratory Safety Rules* section states elementary safety rules that apply in all of the department's labs.

The Forms section provides examples of the forms mentioned in this safety manual.

SAFETY-RESPONSIBILITY GUIDELINES

Each faculty, staff member, employee, and student is responsible for his/her own safety in the conduct of experiments.

The specific responsibilities of the department, of individual faculty members and of research-group safety representatives are detailed below:

1. **Research labs/field sites – faculty, student, and employee safety responsibilities.**

   a. It is the individual's responsibility to *obtain* safety training.

   b. Faculty must keep their own safety training current and it must cover the work they and their students are undertaking as well as the settings where all of their students are working.

   c. Students and employees must meet with their advisor or the supervising PI to have them identify all safety training the student/employee will require for both the work and setting where they are working. Use the *Safety Training Required for Students/Employees Working in the Department's Labs or on Field Projects* form (Section 5).

   d. Students / employees must file this signed form with Ms. Conner in the CEE office.

   e. Students / employees must schedule and complete the necessary training and provide Ms. Conner proof of training for each course within 30 days of filling the above form.

2. **Research labs and field sites – Faculty oversight responsibilities.** Each faculty member is responsible for safety in the laboratory space or at the field site under their direction. This shall include:

   a. Becoming knowledgeable about the hazards in the laboratory or at the field site.

   b. Establishing written laboratory-specific or site-specific standard operating procedures and keeping copies in the laboratory or field site safety notebook.

   c. Annually reviewing the safety training courses available from ORCBS and determining those you need to attend and those that

students working in your labs or under your supervision at others labs or at field sites need to attend.

d. Maintaining a file of MSDS sheets within each laboratory, group of laboratories, and at any field site where chemicals are present or used.

e. Insuring that all personnel are aware of the risks involved in their work, including **posting** of the following:

   i. A Hazardous Substance Inventory (updated annually).
   ii. Safety Rules and Regulations.
   iii. Poster telling where MSDS Sheets can be found.
   iv. Placard on doorway exterior with current emergency phone numbers and hazard labels.

f. Identifying for each student all of the safety training courses they need to complete and maintain to work in the lab(s) or participate in field projects. See Form 5.4.

g. Providing laboratory-specific training for the unique hazards in each laboratory (this includes hazards stemming from all work that other students/faculty are conducting in the same lab), and assuring that safe practices are followed and evacuation procedures are established for the lab. This training is to supplement the general, less specific training available from the University and Department. Laboratory specific training shall include the following:

   i. Review of this safety document.
   ii. Specific chemical hazards and disposal procedures for the lab.
   iii. Specific physical hazards, i.e. hot surfaces, pinch points, rotating equipment, UV, laser light sources, electrical hazards, etc.
   iv. Requirements for dress, eye protection, hearing protection, respiratory protection.
   v. Laboratory safety equipment, its location and proper use.

h. Signing the Advisor's block on each student's or employee's *Informed Employee/Student Consent Statement (Form 5.1)*.

i. Appointing a safety representative for the faculty member's

research group. In the event that the faculty member has laboratory facilities in two or more locations, more than one safety representative may be appointed.

j) Assuring that weekly “short list” inspections are made and maintained for one year in a notebook in the laboratory.

3. **Research labs and field sites – the Research Group Safety Representative’s responsibilities.** The research group safety representative will assist the responsible faculty member by:

   a. checking that all laboratory workers have completed the required safety training;

   b. coordinating annual inventories of laboratory chemicals;

   c. performing weekly inspections using the departmental "Weekly Laboratory Inspection Checklist" and keeping copies in the research group's safety notebook for a period of one year.

   d. serving as research group contact for safety communications from the department.

4. **General Coordination – the Department’s responsibilities.** The Department will take responsibility for the following safety matters:

   a. Providing all faculty with a list identifying all students the department believes to be working in that faculty member’s labs or on their field projects and the most recent date that their training status was reviewed by the responsible faculty member.

   b. Conducting an annual seminar that provides an overview of safety and outlines the precautions necessary to work safely in the department’s labs and at field sites. The department will distribute copies of these safety regulations at the seminar.

   c. Establishing and maintaining a library of pertinent safety literature at the Civil Infrastructure Lab.

   d. Nominating a faculty member to the College Safety Committee. This person shall:

      i. Participate in all departmental safety inspections.

ii. Coordinate correction of identified safety hazards.
iii. Prepare the annual safety report in cooperation with the College Safety Committee.

e. Conducting annual safety inspections of all the department's laboratories in cooperation with the College Safety Committee Chairman and/or ORCBS.

f. Preparing the annual safety report to the College Safety Committee.

5. Laboratory Courses – Faculty responsibilities. The faculty-in-charge of the course is responsible for the following:

a. Designing experiments to minimize hazards.

b. Establishing safety rules and regulations for all instruction and student personnel.

c. Maintaining a file of MSDS sheets in the lab.

d. Insuring that all personnel are aware of the risks involved in their work, including **posting** of the following:

i. Hazardous Substance Inventory
ii. Safety Rules and Regulations (one page)
iii. Poster telling where MSDS Sheets can be found.

e. Assuring compliance with safety rules.

f. Training students and teaching assistants to handle lab-specific safety issues.

g. Obtaining a "Classroom Laboratory Safety Agreement" from all students and teaching assistants. This form has a place for 30 signatures. The form will be kept on file in the Civil and Environmental Engineering Office.

MINIMUM SAFETY TRAINING REQUIREMENTS

All safety training must be complete *PRIOR TO WORK!* **The following minimum safety training is required of all faculty, students, post docs, and staff using the department's labs or working at field sites:**

1. For all Faculty, Plan A Graduate Students, Post Docs, and Staff working in the Engineering Research Complex (ERC) Labs, In the Civil Infrastructure Lab (CIL), or in the Department's other Labs:

Chemical Initial Training through ORCBS[1] - Once
Online Research Laboratory Security Training - Once
Right-to-Know Video/Consent Form[2] - Once
Lab Specific Training[3] - Once
Departmental Seminar - Annually
Hazardous Waste Refresher - Annually

Others as specified by the advisor/PI on the department's *Safety Training Required for Students and Employees (F*orm 5.4)

2. Independent Study Students, Undergraduate Employees, Senior Thesis Students working in Labs

Same as in category A above except Departmental Seminar is not required.

3. Staff Not Working in Lab

Right-to-Know Video/Consent Form[2] - Once

4. Plan B (non-Thesis) Graduate Students

Right-to-Know Video/Consent Form[2] – Once. If working in a laboratory, then category A applies.

5. Facultly, students, post docs and staff working at field sites.

Safety training and seminars as required by the advisor/PI.

[1]"Chemical Initial Training" Offered through the Office of Radiation, Chemical, and Biological Safety (ORCBS). Call the ORCBS hotline at 2-SAFE (2-7233) to find out dates and times the course is offered. You can also find the information online at http://www.orcbs.msu.edu .
[2]Michigan Right-to-Know VCR Tape/Consent Form The Department Office will let you view this 20 minute VCR tape. The consent form is in the appendix
[3]Specific Training Your supervising professor will discuss the type of activities you will be doing in the laboratory. Your professor will provide specific laboratory training.

GENERAL LABORATORY SAFETY RULES

The safe conduct of all experiments is the responsibility of each student. Follow the guidelines set forth below:

1. Know the location of safety equipment in and near the laboratory. Depending on the particular lab, these items may include:

    a. Safety shower
    b. Fire extinguishers and hoses
    c. First aid kits
    d. Eye wash station
    e. Fire blanket
    f. Telephone
    g. Material Safety Data Sheets (MSDS)
    h. Chemical spill kit

2. Know how to use each of the items listed above.

3. Report all hazardous situations to your professor.

4. Report all injuries to your professor.

5. Wear protective glasses at all times while in the lab. Soft contact lenses should not be worn in a laboratory where hazardous chemicals are in use.

6. Refrain from smoking, drinking, or eating in the lab.

7. Learn and avoid the hazards associated with the equipment you will use in your experiments.

8. Avoid horseplay.

9. Know the hazardous characteristics of the materials you will be using in your experiment. Know where MSDS sheets are located. Incorporate suitable precautions into your lab work.

10. Become conscious of safety--make suggestions, assist others in maintaining a safe working environment.

11. Wear only closed-toes shoes in the laboratory.

12. All employees, graduate students, and undergraduate independent study students working in labs must sign the Informed Employee Consent Form before working in a laboratory.

13. No unauthorized visitors are allowed in the labs.

Michigan State University
Department of Civil and Environmental Engineering

Employee/Student Consent Statement

Academic Year:

Employee _____
Print Name

The Michigan Right to Know Law requires that all employees be informed in the safe handling of hazardous chemical materials in the workplace. As part of its program, Michigan State University provides an orientation on the Right to Know Law.

You are required to view the orientation videotape. The tape needs to be viewed within one month of your employment date or your paycheck may be held. The viewing of the tape takes approximately 14 minutes. The video is also on the Occupational Safety-Programs & Guidelines website. Go to http://www.orcbs.msu.edu/videos/rtk2.htm

In addition, the Office of Radiation, Chemical and Biological Safety has prepared a Hazardous Communication Document. A copy of this document is available for you to review by contacting the department representative at the bottom of this page.

The ORCBS provides a specific training seminar designed for laboratory personnel in which radiation, chemical and biohazardous safety information is reviewed. This four hour course is offered regularly throughout the term and **attendance is required if personnel are working with radioactive materials**. Contact the ORCBS (355-0153) to enroll as prior registration is necessary.

_____ I have attended the Right to Know orientation.

_____ I have had the opportunity to review the Hazardous Communication Document.

_____
Employee Signature Date

Department Representative:

_____ Mary Mroz CEE 5-5107 3546 Engineering Building

Michigan State University
Department of Civil and Environmental Engineering

CLASSROOM LABORATORY SAFETY AGREEMENT

_____	_____	_____
(Lab Course)	(Room #)	(Instructor)

Work in a laboratory exposes a person to risk of injury and illness from hazardous materials and equipment. The risks associated with working in this lab have been explained to my satisfaction, and I have had the opportunity to ask questions about them.

Regulations and guidelines, however well conceived, are not sufficient to achieve safe laboratory practice. It is the skill, knowledge and basic common sense of the individual laboratory worker that is crucial to a safety program. To this end, each person working in a laboratory assumes the following responsibilities.

1. To attend safety seminars when asked and to read all safety materials issued (such as manuals, hazard alerts, etc.). If new hazards are observed, these should be communicated to the instructor and the unit safety committee.

2. To comply fully with all established safety regulations and practices and to consult the instructor for advice in circumstances where safe practice is in doubt.

3. To limit laboratory work to projects authorized by the instructor.

4. To warn visitors to the laboratory of existing hazards and; when necessary, to inform them of the Department and University safety regulations. Warning signs shall be properly displayed and maintained. Unoccupied laboratories must be locked.

Note: to completed for all laboratory courses

I have read and understand the responsibilities on the Classroom Laboratory Safety Agreement and agree to observe them in my laboratory work. I have also read the Safety Rules and Regulations for this laboratory. I know where to locate the MSDS forms in the laboratory. Prior to an experiment, I will familiarize myself with known hazards of the materials involved in my experiment. I agree to observe the regulations in this course.

Signing of this Classroom Laboratory Worker Safety Agreement is not a waiver of individual rights of redress in case of injury.

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29. _____
30. _____

Instructor _____ Date _____

TA _____ Date _____

Michigan State University
Department of Civil and Environmental Engineering

Weekly Laboratory Inspection Checklist

Room:_____ Inspected By:_____ Date: _____

	Yes	No	N/A
All personnel have received required training	_____	_____	_____
Eyewash unobstructed and tested/flushed	_____	_____	_____
Food/Beverage not used or stored in lab	_____	_____	_____
Spill kits available and complete	_____	_____	_____
Fire extinguishers unobstructed	_____	_____	_____
Gas cylinders properly secured	_____	_____	_____
Peroxide forming agents are dated when opened and not expired	_____	_____	_____
Hazardous waste containers labeled, dated upon first use	_____	_____	_____
Waste tags are complete	_____	_____	_____
Biohazard waste container available for sharps* and none accumulated beyond 90 days	_____	_____	_____
No waste accumulated over 90 days	_____	_____	_____

*Sharps are razor blades, needles, syringes (with or without needles), scalpels, and intravenous tubing with needles attached. Do not dispose of sharps in cardboard boxes or with other solid debris. By Michigan law, all sharps are disposed of by incineration, using a biohazard waste container, even if the sharps are not infectious. See Hazardous Waste Disposal Guide.

Michigan State University
Department of Civil and Environmental Engineering

SAFETY TRAINING REQUIRED FOR STUDENTS AND EMPLOYEES WORKING IN THE DEPARTMENT'S LABS OR ON FIELD PROJECTS

Instructions: Students and employees must meet with their advisor or the responsible PI(s) to determine what safety training will be required in order for the student or employee to work safely in the department's labs or in the field while working as part of their university experience.

It is the student's (employees) responsibility to *obtain* safety training. 1) Meet with your advisor (PIs). Have them identify below all safety training required for the work you expect to be doing and sign the form. 2) File this signed form with Ms. Conner in the CEE office. 3) Schedule and complete the necessary training within 30 days. 4) Provide Ms. Conner with proof of training for each course. The advisor (PIs) should write "NO SAFETY TRAINING REQUIRED" across the form of any student (employee) not working in a lab or on a field project and sign the form. **Failure to attend specified safety training will result in a hold being placed on a student's registration; this could cause disenrollment from classes a student is already enrolled in.**

ORCBS TRAINING*	
☐ Biological	Biological Safety
☐ Biological	Biosafety Awareness
☐ Biological	Biosafety Cabinets
☐ Biological	Biosafety Basics for Animal Users
☐ Biological	Biosafety Principles for Animal Users
☐ Biological	Bloodborne Pathogen Awareness, Initial, and Refresher
☐ Biological	Medical Waste
☐ Biological	Particulate Respirator Initial Training and Fit Test; Annual Re-Testing and Re-Fitting
☐ Chemical	Acrylonitrile Safety
☐ Chemical	Chemical Hygiene and Laboratory Safety
☐ Chemical	Compressed Gas Cylinder Safety
☐ Chemical	Confined Space – 8-Hour Entry, 16-Hour Entry, Awareness, Alternate Entry, Permit Required
☐ Chemical	Formaldehyde Safety
☐ Chemical	Non-Liquid PCB Awareness Training
☐ Chemical	Respirator Initial Training and Fit Test; Annual Re-Testing and Re-Fitting
☐ Chemical	Right-To-Know
☐ Environmental	Asbestos Awareness (4 hour), Initial, and Refresher
☐ Environmental	EPA-Lead Management Programs
☐ Environmental	Universal/RCRA Regulation Overview
☐ Hazardous Waste	Hazardous Waste Initial and Refresher
☐ General	Laboratory Security Awareness Training
☐ General	Hearing Conservation Program
☐ Radiation	General Radiation Safety – Awareness, Initial, and Refresher
☐ Radiation	Radiation Sealed Source – Initial and Refresher
☐ Radiation	Analytical X-Ray Radiation
☐ Radiation	Medical X-Ray Radiation
☐ Radiation	Soil Moisture Gauge

*A description of the above courses can be found at http://www.orcbs.msu.edu/training/training_toc.htm	
PI/ADVISOR TRAINING	
☐ **Lab/Site Specific Training**	**Training that each PI or their designee provides to supplement the basic training offered by ORCBS and to prepare the student to work safely in/at a specific CEE lab, group of labs, or field site.**

Other Training Required:

_____
_____
_____

Signatures:
ADVISOR: My signature verifies that I believe the above training sufficient for this student.

_____
Date_____

GRADUATE STUDENT: My signature verifies that I have discussed safety training with my advisor and will complete the specified training and provide Ms. Conner with verification of such within the next 30 days.

_____
Date_____

Print Name: _____