Safety Manual

September 30, 2015

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 Responsibilities* 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-RESPONSIBILITIES

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, students, other employees, 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 CEE Safety Form 4: Safety Training Required for Students/Employees Working in the Department’s Labs or on Field Projects.
   d. Students / employees must file this signed form with Ms. Conner in the CEE office.
   e. Students / employees must complete the necessary training and provide Ms. Conner proof of training for each course within 2 weeks 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 the MSU office of Environmental Health and Safety (EHS) determining those new or refresher courses 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* and *chemical inventories* 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. Use CEE Safety Form 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 or employee’s CEE Safety Form 4.

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 CEE Safety Form 3 (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. 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 to the Dean.

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

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 by getting them to sign CEE Safety Form 2. This form has a place for 30 signatures. The completed form will be kept on file in the CEE 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. Staff Not Working in Lab or Field
   - Right-to-Know Video/Consent Form\(^1\) (CEE Safety Form 1):

2. All Graduate Students
   - Right-to-Know Video/Consent Form\(^1\) (CEE Safety Form 1):
   - Departmental Seminar
   - EHS\(^2\) training as specified below (Safety Form 4):

<table>
<thead>
<tr>
<th>Hazard Communication</th>
<th>All CEE graduate students (includes course work option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Hygiene and Laboratory Awareness</td>
<td>All CEE graduate students (includes course work option)</td>
</tr>
</tbody>
</table>

3. All Faculty, Graduate Students, Post Docs, and Staff working in the Engineering Research Complex (ERC) Labs, in the Civil Infrastructure Lab (CIL), in the Department’s other Labs, or in the field:
   - Right-to-Know Video/Consent Form\(^1\) (CEE Safety Form 1)
   - Departmental Seminar
   - EHS\(^2\) training as specified below (Safety Form 4):

<table>
<thead>
<tr>
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<tbody>
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<td>All CEE graduate students</td>
</tr>
<tr>
<td>Global Harmonization System for Laboratory Workers</td>
<td>All students working in a lab or in the field</td>
</tr>
<tr>
<td>Compressed Gas Cylinder Safety</td>
<td>All students working in a lab or in the field</td>
</tr>
<tr>
<td>Security Awareness</td>
<td>All students working in a lab or in the field</td>
</tr>
<tr>
<td>Hazardous Waste Initial</td>
<td>All new students working in a lab or in the field</td>
</tr>
<tr>
<td>Hazardous Waste Refresher</td>
<td>All continuing students working in a lab or in the field</td>
</tr>
<tr>
<td>Back Safety</td>
<td>All students working in the Civil Infrastructure Laboratory</td>
</tr>
<tr>
<td>Ladder Safety</td>
<td>All students working in the Civil Infrastructure Laboratory</td>
</tr>
<tr>
<td>Hand and Portable Power Safety</td>
<td>All students working in the Civil Infrastructure Laboratory</td>
</tr>
</tbody>
</table>

   - Lab Specific Training\(^3\) (CEE Safety Form 4)

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\(^1\)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.

\(^2\)EHS training: Offered through MSU Office of Environmental Health and Safety (http://www.ehs.msu.edu).

\(^3\)Specific Training: Your supervising professor will discuss the type of activities you will be doing in the laboratory. Your professor will require specific laboratory training by EHS or other 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.


15. Check with your advisor to determine acceptable hours to be working at their lab/field site.
APPENDIX

Safety Form 1
Safety Form 2
Safety Form 3
Safety Form 4
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 20 minutes.

In addition, the MSU Office of Environmental Health and Safety (EHS), formerly the Office of Radiation, Chemical and Biological Safety (ORCBS) offers online training on Hazard Communication, Chemical Hygiene and Laboratory Awareness, and other specialized training sessions. These training sessions can be found online at the EHS website.

_____ I have attended the orientation seminar and viewed the “Right to Know” videotape.

_____ I have completed basic EHS online training (Hazard Communication, and Chemical Hygiene and Laboratory Awareness) and other specific training as required by my supervisor.

_________________________     ___________________
Employee Signature          Date

Department Representative:

_____ Margaret Conner     CEE      5-5107     3546 Engineering Building
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.

1. ________________________________  16. ________________________________
2. ________________________________  17. ________________________________
3. ________________________________  18. ________________________________
4. ________________________________  19. ________________________________
5. ________________________________  20. ________________________________
6. ________________________________  21. ________________________________
7. ________________________________  22. ________________________________
8. ________________________________  23. ________________________________
9. ________________________________  24. ________________________________
10. ________________________________  25. ________________________________
11. ________________________________  26. ________________________________
12. ________________________________  27. ________________________________
13. ________________________________  28. ________________________________
14. ________________________________  29. ________________________________
15. ________________________________  30. ________________________________

Instructor ___________________________ Date _____________

TA ________________________________ Date _____________
## Weekly Laboratory Inspection Checklist

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

*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](#).
SAFETY TRAINING - CIVIL & ENVIRONMENTAL ENGINEERING - FALL 2015

Instructions: It is a requirement of MSU that any student, employee or visitor working in a lab or field site to complete all safety training specified by their supervisor. You must 1) Meet with your supervisor to identify below all on-line safety training courses; 2) complete the on-line courses, print out certificate forms for each course; and 3) get your supervisor’s signature and return this form and all certificates to Margaret Conner in the CEE office by September 18, 2015. Forms will not be accepted without certificates or if they are not signed by both you and supervisor. Failure to complete the specified on-line safety training courses and refreshers will result in a hold being placed on your registration and possible disenrollment from classes you are already enrolled in. All safety courses and additional information can be found at http://www.ehs.msu.edu/.

Courses specified by Faculty Advisor: Required for:

- ☐ Hazard Communication: All CEE graduate students (includes course work option)
- ☐ Chemical Hygiene and Laboratory Awareness: All CEE graduate students (include course work option)
- ☐ Global Harmonization System for Laboratory Workers: All students working in a lab or in the field
- ☐ Compressed Gas Cylinder Safety: All students working in a lab or in the field
- ☐ Security Awareness: All students working in a lab or in the field
- ☐ Hazardous Waste Initial: All new students working in a lab or in the field
- ☐ Hazardous Waste Refresher: All continuing students working in a lab or in the field
- ☐ Back Safety: All students working in the Civil Infrastructure Laboratory (CIL)
- ☐ Ladder Safety: All students working in the Civil Infrastructure Laboratory (CIL)
- ☐ Hand and Portable Power Safety: All students working in the Civil Infrastructure Laboratory (CIL)
- ☐ Hearing Conservation Program
- ☐ Hearing Conservation Program Refresher
- ☐ Biosafety Principles
- ☐ Biosafety Refresher
- ☐ Biosafety Level 3
- ☐ Biological Substance Shipping
- ☐ Bloodborne Pathogen Awareness
- ☐ Bloodborne Pathogen Initial
- ☐ Bloodborne Pathogen Refresher
- ☐ Medical Waste
- ☐ Radiation Safety Initial
- ☐ Radiation Safety Refresher
- ☐ Radiation Sealed Source Initial
- ☐ Radiation Sealed Source Refresher
- ☐ Cryogen Safety
- ☐ Laser Safety
- ☐ Other (list):
- ☐ No further training is necessary for this student (only applies to continuing students not working in a lab or field)

GRADUATE STUDENT:
1. Are you currently working in a lab or at a field site (circle one)? yes no If yes, where? ________________
2. My signature verifies that I have discussed safety training with my advisor and will complete the specified training and provide the Graduate Secretary, Ms. Margaret Conner, with verification of such training by the due date shown above.

Name: _______________________________ Signature: _______________________________ Date: __________

FACULTY ADVISOR: I hereby verify that a) I have met with the student and specified the training needed to work safely as a graduate student, b) the student has provided evidence of having completed the required ORCBS courses, and c) I have provided or arranged for any additional non-course safety training needed to work safely under my supervision.

Name: _______________________________ Signature: _______________________________ Date: __________