

## ***SAFETY TRAINING***

All safety training must be complete *PRIOR TO LABORATORY WORK!*

**A. All Faculty, Plan A Graduate Students, Post Docs, Staff working in East Lansing  
Chemical Engineering and Materials Science Labs**

Chemical Hygiene and Laboratory Safety -- through EHS - Once

Online Research Laboratory Security Training -- Once

Consent Form<sup>2</sup> - Once

Lab Specific Training<sup>3</sup> - Once

Departmental Seminar - Annually

Hazardous Waste Refresher - Annually

If applicable:

Hand and Power Tools – Once

Compressed Gas Cylinder Safety – Once

Lock Out/Tag Out -- Once

X-ray Safety Training -- Once

Bloodborne Pathogens -- Initial/Annual Refresher

Hearing Conservation -- Initial/Annual Refresher

Radioisotopes -- Initial/Annual Refresher

Respirators -- Initial/Fit Test Varies

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

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

**C. Staff Not Working in Lab**

Right-to-Know Video/Consent Form<sup>2</sup> - Once

**D. Plan B (non-Thesis) Graduate Students**

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

**E. Affiliates Working in Other Locations**

Safety training and seminars are provided by a safety officer at that location. Consult departmental safety representative.

<sup>2</sup>Michigan Right-to-Know VCR Tape & Safety Consent Form

**Lauren** in the Department Office will let you borrow this 20 minute VCR tape. The right-to-know material is covered as part of the Chemical Hygiene and Laboratory Safety course. The consent form is included in this document. **Jennifer** should receive the signed consent form to complete new hiring processes.

<sup>3</sup>Specific Training

Your supervising professor will discuss the type of activities you will be doing in the laboratory and will provide laboratory specific training.

Approved: \_\_\_\_\_  
Department Chairperson  
(Revised: 8/21/2012)

*Michigan State University*  
*Department of Chemical Engineering and Materials Science*

## ***SAFETY COMPLIANCE GUIDELINES***

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

1. Each Project Director (P.D.) is responsible for safety in the laboratories under their direction. This shall include:

- a. Becoming knowledgeable about the hazards in the laboratories.
- b. Establishing written laboratory specific standard operating procedures (SOPs) and keeping copies in the laboratory safety notebook or on a computer in the laboratory.
- c. Research Labs: Providing computer access to all materials safety data sheets (MSDSs) via a computer (on-line or off-line) or maintaining a file of MSDSs within each laboratory or group of laboratories where chemicals are used. However, all extremely hazardous chemicals (e.g., peroxides, class A carcinogens, and HF) MSDSs should be kept in a file or posted at appropriate places in each laboratory where the chemicals are used.

Laboratory Courses: MSDSs should be printed in a notebook and kept within the laboratory.

- d. Insuring that an annual Hazardous Substance Inventory is completed and kept on file. The P.D. will review the inventory to be aware of chemicals that should be treated as hazardous waste.
- e. Insuring that all personnel are aware of the risks involved in their work, including **posting** of the following:
  - i. Poster telling where MSDSs can be found, as required by Michigan law.
  - ii. Placard on doorway exterior with emergency phone numbers and hazard labels
- f. Providing background for Independent Study/Project students on the following topics prior to student enrollment:
  - i. MSDS Forms

- ii. MSU Chemical Hygiene Plan
- iii. MSU Right-to-Know Hazardous Communication Document

These documents are available at <http://www.ehs.msu.edu>.

- g. Supplementing University and Departmental training for unique hazards in each laboratory, and assuring that safe practices are followed and evacuation procedures are established. Laboratory specific training shall include the following:
  - i. Departmental safety rules
  - ii. Specific hazards and disposal procedures for chemicals in your laboratory
  - iii. Specific physical hazards, i.e. hot surfaces, pinch points, rotating equipment, lock out/tag out, UV, laser light sources, electrical hazards.
  - iv. Requirement for dress, eye protection
  - v. Laboratory safety equipment its location and use
- h. Signing the Informed Employee/Student Consent Statement for each employee or independent study student assigned to his or her laboratory.
- i. Assure that bi-weekly “short list” inspections are made and recorded on-line so that the department can keep track of the inspections. The link for online reporting is available after logging into the departmental database.

2. The Department will be responsible for safety matters and will:

- a. Assure the compliance of the following for all Chemical Engineering Affiliates according to the Safety Training section of this document.
- b. Conduct an annual seminar giving an overview of chemical safety and outlining the precautions necessary. Distribute copies of these safety regulations at the seminar.
- c. Nominate a faculty member to membership on the College Safety Committee. This person shall:
  - i. Participate in all Departmental safety inspections.
  - ii. Coordinate correction of safety hazards identified.
- d. Conduct safety inspections of all laboratories in cooperation with the College Safety Committee and/or EHS.
- e. Prepare annual safety report in cooperation with the College Safety Committee.

3. Laboratory Courses. The faculty-in-charge of the course is responsible for:

- a. Design of experiments to minimize hazards.

- b. Establishing safety rules and regulations for all instruction and student personnel.
  - c. Maintaining a file of MSDS sheets.
  - 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 in safety.
  - 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 Chemical Engineering Office.
4. Research Group Safety Representatives. Each project director will appoint a safety representative. In the event that a project director has laboratory facilities in two or more locations, more than one safety representative may be appointed. The safety representative will assist the project director by:
- a. checking that all laboratory workers have completed the required safety training;
  - b. coordinating annual inventories of laboratory chemicals;
  - c. performing bi-weekly inspections using the departmental "Bi-weekly Laboratory Inspection Checklist" and recording the inspection results on-line.
  - d. serving as research group contact for safety communications from the department.

Approved: \_\_\_\_\_

Department Chairperson

(Revised: 8/21/2012)

Michigan State University

Department of Chemical Engineering and Materials Science

## *LABORATORY SAFETY RULES AND REGULATIONS*

The safe conduct of all experiments is the responsibility of each student. You will be expected to follow the guidelines set forth below:

1. Know the location of safety equipment in and near the laboratory. Know how to use each item. These items include:
  - a. Safety shower
  - b. Fire extinguishers
  - c. First aid kits
  - d. Eye wash station
  - e. Fire blanket
  - f. Telephone
  - g. Material Safety Data Sheets (MSDS)
  - h. Chemical spill kit
2. Report all hazardous situations to your professor.
3. Report all injuries to your professor.
4. Wear protective glasses in compliance with MSU guidelines and lab specific SOPs. Soft contact lenses should not be worn in a laboratory where hazardous chemicals are in use.
5. Refrain from smoking, drinking, or eating in the lab.
6. Learn and avoid the hazards associated with the equipment you will use in your experiments.
7. Avoid horseplay.
8. 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.
9. Become conscious of safety--make suggestions, assist others in maintaining a safe working environment.
10. Open-toes shoes shall not be worn in the laboratory.
11. All employees, graduate students, undergraduate independent study students working in labs must sign the Informed Employee Consent Form before working in the laboratory.

## *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 laboratory courses including  
ChE 316, ChE 472, ChE 481, laboratory sections of ChE 491  
MSE 250, MSE 331, MSE 380, MSE 451, MSE 466

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 \_\_\_\_\_

Michigan State University

DEPARTMENT OF CHEMICAL ENGINEERING AND MATERIALS SCIENCE

*Bi-Weekly Laboratory Inspection Checklist*

Room: \_\_\_\_\_ Inspected By: \_\_\_\_\_ Date: \_\_\_\_\_

	Yes	No	N/A
All personnel have received required training	_____	_____	_____
Eyewash unobstructed and tested/flushed within last 30 days.	_____	_____	_____
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.



# Informed Employee/Student Consent Statement

I understand that this statement does not legally bind me in any way, nor does it negate any employee rights as set forth in the Employee Rights and Responsibilities handbook. I further understand that this statement of consent is required strictly as an acknowledgment that I have completed the requisite training for my particular job description at Michigan State University and that I agree to fulfill those duties safely, to the best of my ability. Understanding this, I verify that:

1. I have viewed the videotape detailing the requirements of the Michigan Right-to-Know Law and I know where to locate the University's Hazardous Communication Document. I know how to properly label containers.
2. I know where to find material safety data sheets (MSDS) for each hazardous chemical in my work area and how to read them.
3. I have received training from the Office of Radiation, Chemical, and Biological Safety concerning (check those that apply):

<input type="checkbox"/> Chemical Initial Training	<input type="checkbox"/> Biological Safety Training
<input type="checkbox"/> Biohazardous Waste Training (sharps, etc.)	<input type="checkbox"/> Lab Security Awareness
<input type="checkbox"/> Radioisotope Safety	<input type="checkbox"/> X-ray Safety Training
<input type="checkbox"/> Respirator Training	<input type="checkbox"/> Hearing Conservation
<input type="checkbox"/> Compressed Gas Training	<input type="checkbox"/> Shipping Training
<input type="checkbox"/> Bloodborne Pathogens	_____
<input type="checkbox"/> Hand Tools	<input type="checkbox"/> None of the above required for my position

4. I know how to access the University's Chemical Hygiene Plan, Radiation Safety Manual, and/or Biosafety Manual, introduced in the related safety course(s) checked above.
5. I know where to locate a copy of the Hazardous Waste Disposal Guide. I understand the proper procedures for labeling and disposal of all chemical, biological, or radioactive wastes which I will encounter. I understand that chemical wastes can be explosive if incompatible wastes are mixed. I understand that I will be required to complete an annual refresher course on Hazardous Waste if I routinely handle chemicals.
6. I have reviewed the Chemical Engineering Departmental SAFETY RULES AND REGULATIONS, and I know where to locate the document.
7. I have been informed in:
  - the procedures in my work area that involve hazardous chemicals;
  - the physical and health hazards that the chemicals in my work may present;
  - the measures I can take to protect myself from accidental overexposure to hazardous chemicals;
  - the methods and observations for detecting the release of any hazardous chemical in my work area.

\_\_\_\_\_  
Employee/Student Signature, Job Title, Department

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed Name

Permission is hereby granted to the above individual to conduct work under my supervision. I have supplemented the above documented University and Departmental training for this individual with discussions of identified hazards in their specific workplace, as outlined in the Departmental Safety Rules and Regulations.

\_\_\_\_\_  
Principal Investigator Signature

\_\_\_\_\_  
Date