



## **DEPARTMENTAL SAFETY PROCEDURES**

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## TABLE OF CONTENTS

<b>Introduction</b>	<b>3</b>
<b>Responsibilities and Accountability</b>	<b>4</b>
<b>Laboratory Inspection Program</b>	<b>5</b>
<b>Training</b>	<b>5</b>
<b>General Laboratory Safety Guidelines</b>	<b>7</b>
<b>Personal Protective Equipment (PPE)</b>	<b>9</b>
<b>Safety Equipment</b>	<b>10</b>
<b>Chemical Storage and Containment</b>	<b>11</b>
<b>Transfer and Transportation of Hazardous Materials</b>	<b>12</b>
<b>Reporting Accidents and Near Misses</b>	<b>13</b>
<b>Signature Form</b>	<b>14</b>
<b>Attachments</b>	<b>15</b>
<b>Undergraduate Laboratory Safety Rules, Procedures and Practices</b>	<b>16</b>
<b>Undergraduate Student Laboratory Agreement</b>	<b>18</b>
<b>Safety Expectations for Teaching Assistants</b>	<b>19</b>
<b>Safety Expectations for Graduate Students working on Research Labs</b>	<b>20</b>
<b>Basic Laboratory Safety Orientation</b>	<b>21</b>
<b>Training Record</b>	<b>22</b>
<b>Laboratory Check-out Form</b>	<b>23</b>
<b>EHS Laboratory Safety Review</b>	<b>25</b>
<b>Spot Check Laboratory Safety Review</b>	<b>28</b>

## DEPARTMENTAL SAFETY PROCEDURES

University of South Florida-Department of Chemistry

### **Department of Chemistry Safety Commitment**

Recognize and assess hazards in the chemistry labs, establish methods to minimize exposure to hazardous materials, eliminate unsafe laboratory practices, reduce chemical waste, and prevent accidents. Develop and sustain a safety culture within the Department of Chemistry's research and undergraduate laboratories. The Department of Chemistry is committed to comply with laws, regulations, and organizational requirements applicable to our daily operations. We aim to improve safety continually and offer a safer working and learning environment to our students.

Per the USF Office of the General Counsel, a failure to follow these Safety Procedures may subject the violator to personal liability.

### **Introduction**

*All personnel of any laboratory using or storing hazardous chemicals should know where to find the Chemical Hygiene Plan. Environmental Health and Safety (EH&S) provides a Chemical Hygiene Plan for the university, but each laboratory needs to further customize it according to its own needs. The document is available for download at: <https://www.usf.edu/administrativeservices/environmental-health-safety/documents/chemical-hygiene-plan.pdf>*

*The EH&S Chemical Hygiene Plan is used as the main reference material for the content presented in this document.*

The University and the Department of Chemistry will comply with the provisions of the Occupational Safety and Health Administration (OSHA) Standard: "29 CFR§1910.1450 commonly known as "The OSHA Lab Standard", the OSHA Personal Protective Equipment (PPE) Standard 29 CFR 1910.132–1910.138, and the Florida State Loss Prevention Program (Safety Program Standard). The backbone of the Lab Standard is its requirement for employers to develop and carry out the provisions of a written Chemical Hygiene Plan (CHP). Those standards mentioned above require a completion of the hazard's assessment for each work area, as well as specific lab safety training of all personnel working in the lab. The analysis involves the identification, assessment, and mitigation of hazards and their associated risks before initiating any laboratory work. Keeping accurate records is as important as performing the analysis or training.

The National Research Council's report, *Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards* and the American Chemical Society Report on *Creating Safety Cultures in Academic Institutions, Safety in the Academic Chemistry Laboratory, Volume 1 and 2* also emphasize the importance of training and hazard analysis.

## **Responsibility and Accountability**

Safety is everyone's responsibility, but safety in the laboratory ultimately depends on the safety culture and working habits of the individuals working in it. A well administered laboratory should

have structures that value, use and enforce safety as a priority. All personnel, including principal investigators/laboratory supervisors, employees, and students, have a duty to maintain a safe work environment. All employees, students and other personnel working with potentially hazardous chemicals have the responsibility to conscientiously participate in training seminars or courses on general laboratory safety as well as review and become familiar with the contents of their customized laboratory Chemical Hygiene Plan (CHP). Those working with chemicals are responsible for staying informed about the chemicals in their work areas, safe work practices and proper personal protective equipment (PPE) required for the safe performance of their job. Failure to comply with these requirements can result in progressive disciplinary actions in accordance with the university's policy (USF progressive steps for disciplinary action) and in temporary suspension of laboratory activities until a corrective action is implemented.

Principal Investigators (PI) and laboratory managers have overall responsibility for implementation and enforcement of the CHP in their laboratories. The PI or lab manager will develop and implement SOPs (Standard Operating Procedures) and training programs specific to the work being carried out in their laboratories. They should also maintain current inventories for all chemicals stored in their laboratories and/or in other storage areas and have Safety Data Sheets (SDSs) readily accessible for all hazardous chemicals stored in their laboratories. In addition, it is mandatory to keep records of all training performed by the lab personnel. PI's and laboratory managers should ensure that lab personnel understand and follow the customized CHP, comply with all required training established by EH&S and all customized training developed in each laboratory. Each PI or lab manager should designate a person (s) as a safety officer of the laboratory, who will act as the safety leader in their designated lab and the liaison with the Department of Chemistry Safety Coordinator and EH&S.

Prior to beginning any laboratory work, the PI or lab manager should ensure that all laboratory personnel are registered with EH&S by filling out a lab personnel registration form available at the EH&S website.

PI's, lab managers or a designee are responsible for ensuring that any researcher (PI, postdoc, graduate student or undergraduate student) terminating their research completes the "Laboratory Checkout List". The document should be verified and signed by the PI, lab manager or designee before the departure of the researcher. Record of the document should be kept in the lab records and a copy given to the Department of Chemistry for record keeping.

## Laboratory Inspection Program

Laboratory safety inspections help to identify and evaluate workplace hazards and conditions that could result in illness, injury or property damage. PI's, managers and supervisors should ensure that safety inspections are conducted on a regular basis. Inspections should also be completed when management is made aware of existing new hazards in the workplace.

The PI, lab manager or designated safety officer is responsible for identifying workplace hazards. These individuals are responsible for ensuring that periodic inspections are completed to assess, record, and correct hazardous or potentially hazardous conditions that may exist. The inspections may be conducted by the PI, Department Safety Coordinator, Safety Committee, Lab Supervisors or other designated personnel.

There are four types of inspections that are suggested as best practices to be performed in all chemistry laboratories (teaching and research):

1. **Scheduled inspection:** EH&S will announce an inspection to all laboratories PI's or lab managers well in advance. At least one member of the laboratory should be present (preferable the safety officer or PI). This inspection should be performed at least once a year or when deemed necessary. See attached form (Lab Safety Review)
2. **Self-inspection:** The PI, lab manager or lab safety officer can perform this type of inspection in their own lab at least three times a year or when deemed necessary. See attached form (Lab Safety Review)
3. **Spot-check:** The PI, lab manager, lab safety officer or any designee lab member can perform regular walk-up inspections of their labs. This can be performed as many times as reasonable to enrich the safety culture of the labs. See attached form (Lab Safety Review "Spot-check")
4. **Unannounced inspection:** EH&S will perform this visit after 30 days of a written notice of a safety violation to check if the item was corrected. EH&S may perform unannounced inspections of the laboratories when deemed necessary. See attached form (Lab Safety Review)

All inspections are aimed to find and correct trends or unsafe behaviors that may lead to incidents if not addressed in a timely manner. The person performing the inspection should ensure that the visited lab get a copy of the inspection. Records of any type of inspection should be kept for up to three years by the PI, lab manager, lab safety officer or designee. Laboratory inspection sheet can be found in the EH&S website.

<https://www.usf.edu/administrative-services/environmental-health-safety/resources/checklists.aspx>

## Training

All personnel working in laboratories are required to attend laboratory safety training (given by EH&S) before beginning to work in the lab. Training should be updated annually by attending an EH&S laboratory safety-training refresher course. In addition, PI's should provide their research personnel with specialized training on lab-specific hazards. Any researcher planning to work with biological, lasers, or radiological hazards, or with laboratory animals or human subjects, should also receive specialized training before beginning any work in the lab.

All required safety training shall be completed and documented for each lab personnel. All

reasonable efforts shall be made to complete the required training before the individual begins working with the material, process or equipment. Given the wide diversity of the Department of Chemistry activities, specific training should occur at the individual workplace level.

### **Basic Laboratory Safety Orientation**

Laboratory members are required to receive a safety orientation specific to their unique laboratory work location and the processes common to their laboratory worksite. A “Basic Laboratory Safety Orientation” shall be performed by the PI, lab safety officer, supervisor or designee on the first day the member is granted access to or assigned work activities in the laboratory. This training orientation should be documented, signed and the record kept by the laboratory designee. See under Attachments

### **PPE Assessment Form**

This form should be completed by the PI, lab supervisor, safety officer or their designee to conduct a laboratory hazard assessment specific to activities in their laboratories. The laboratory hazard assessment identifies hazards to workers, research assistants, undergraduate research assistants, and volunteers, and specifies personal protective equipment (PPE) to protect them during daily laboratory activities. This assessment consists of two sections. Section 1: Laboratory PPE Assessment and Section 2: Conduct PPE Training. This assessment should be documented, signed and the record kept by the laboratory designee. See EH&S website or the USF Department of Chemistry’s safety website to retrieve the document.

### **Site-Specific Operating Procedure (SOP) and Hazard-Specific Safety Training**

This training is most appropriately provided by the PI, lab safety officer, supervisor or designee and is focused on the specific procedures and activities unique to the investigator’s primary work place. These operating procedures might include work with particularly hazardous substances, pyrophoric chemicals, radioisotopes, biological agents, lasers, machine tools, autoclaves, etc. Members shall attend training on the specific additional hazards that may be present in the work place. This training should be documented, signed and the record kept by the PI or laboratory designee. See EH&S website for SOP samples and master sheet.

### **Training Documentation**

Documentation shall include at minimum: the full name of the individual trained; full name of the individual(s) providing the training for instructor-led training (signatures of trainer and trainee are required); date of the training; and a brief description of the training topics covered. See form under Attachments.

Training records shall be maintained for a minimum of one year after the member leaves the university or as required by the terms of a grant, whichever period is longer. In the event of an accident, records shall be retained three years from the date of the accident or one year after the member leaves the university or as required by the terms of a grant, whichever period is longer. Safety Expectations for Graduate Students working on Research Labs (see attachment).

## General Laboratory Safety Guidelines

**Working Alone:** Personnel should never work alone where hazardous chemicals are being handled or stored. There should always be someone nearby who can provide assistance quickly if an accident occurs.

**Laboratory Etiquette:** The chemical laboratory is inherently a dangerous environment and all who enter and work in it should be properly trained and professional in work ethic. Personnel should be respectful of others and cognizant of safety hazards around them. Proper Personal Protective Equipment and proper attire should always be worn.

**Laboratory Clothing:** Proper attire should be worn to completely cover as much of the skin as possible. Long pants and long sleeve shirts are recommended to completely cover the legs, arms, and torso. Shoes should be worn at all times while in the laboratory, regardless of the experiment or curricular activity. Shoes should totally cover the feet up to the ankles, no skin should be shown. Socks do not constitute a cover replacement for shoes. Sandals, backless and open toed shoes are unacceptable. Shoes should be made of non-permeable material. All parts of the legs and feet should be covered. Hair, loose clothing, or jewelry that might come into contact with chemicals or get tangled in equipment should be tied back or secured.

**Food:** *Food and beverages should not be brought into or stored in laboratories.* Eating, drinking, chewing gum, and smoking are prohibited in the laboratories. Cosmetics should not be applied while in the lab.

**Safety Data Sheets (SDS):** Fire code requires that all laboratories should have up-to-date SDS for all chemicals used or stored in that facility and be readily accessible at all times. It is advised that printed copies be kept near or within the Chemical Hygiene Plan binder, and that labs choosing instead to access SDSs online should ensure that the computer is always accessible for this purpose. All research personnel should know where to find them in case of any emergency. Laboratory personnel should read and understand the SDS for any chemical before using it for the first time.

**Safety Operating Procedure (SOP):** According to the USF Chemical Hygiene Plan, SOPs should be developed and made available to laboratory personnel. Research laboratories as well as teaching laboratories' stockroom in the Department of Chemistry should develop SOPs. Written SOPs are required for work involving hazardous chemicals, including EPA p-listed, DHS listed, carcinogens, toxic gases, time-sensitive, and pyrophoric. Refer to <http://www.usf.edu/administrative-services/environmental-health-safety/programs-services/laboratory-safety/sops.aspx>.

**RAMP Concept:** All laboratory personnel working with chemicals should follow the **RAMP** concept for scientific safety. The concept was developed by Robert H. Hill and David C. Finster and introduced in their text- book *Laboratory Safety for Chemistry Students*. The RAMP concept stands for **R**ecognize the hazards, **A**ssess the risk of the hazards, **M**inimize the risk of the hazards and **P**repare for emergencies from uncontrolled hazards. The practice of the concept prior to and during any lab work will support prudent safety practices in the laboratory.

### **Recognize the Hazards**

Students should be able to recognize common laboratory hazards, to explain why these are hazards, and to have familiarity with hazard rating systems. There are two main tools to identify chemical hazards: Safety Data Sheets (SDS) and Chemical Labels. For the labels, there are two main sources, the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and National Fire Protection Association (NFPA) 704: Standard System for the Identification of the Hazards of Materials for Emergency Response.

### **Assess the Risks of the Hazards**

Laboratory personnel should be able to assess the risks of specific hazards. Risk is the probability of suffering injury or harm from exposure to a hazard. Laboratory personnel should be able to determine the relative severity of a specific hazard and to give an estimate of the likelihood of exposure under certain circumstances.

### **Minimize the Risks of the Hazards**

Laboratory personnel should be able to identify ways in which the risk can be lowered. This may involve using appropriate engineering controls (equipment such as hoods, ventilation systems, and safety interlocks), administrative controls (procedures, processes, and training), and personal protective equipment (PPE) to reduce or mitigate the hazard. Students should know common methods to minimize hazards and the limitations of those protective measures. Laboratory personnel should be aware that all laboratory experiments have risks and that careful planning and preparation can reduce those risks to acceptable levels.

### **Prepare for Emergencies from Uncontrolled Hazards**

Laboratory personnel should prepare for emergencies by being able to explain how to respond to common emergencies that could occur in laboratories, such as fires, explosions, chemical exposures, injuries, and chemical spills. Students should be able to explain the selection and proper use of emergency equipment such as fire extinguishers, eyewash stations, safety showers, first aid kits, fire alarms, fire blankets and spill kits. Laboratory personnel should know the importance of reporting laboratory incidents and the lessons that can be learned from the incidents. Training, walking to locations of all emergency equipment, and considering what one would do should occur BEFORE an incident or emergency occurs.

### **Visitors, Volunteers, and Minors**

It is the responsibility of the Department's Chairperson, PIs, and Safety Supervisors to restrict access of visitors, minors, and volunteers to areas under their supervision when potential health and physical hazards exist. If authorization is granted, the organizer of the activity shall ensure proper PPE is used and consult with EH&S regarding any training requirements.

## Personal Protective Equipment (PPE)

The laboratory environment contains many potential hazards. Most hazards can be reduced or eliminated by substitution and/or engineering controls. When hazards cannot be adequately controlled with substitution and/or the implementation of engineering controls, personal protective equipment (PPE) may be required. The OSHA Personal Protective Equipment standard, 29 CFR 1910 Subpart I, has the following requirements: hazard assessment and equipment selection, employee training, record keeping requirements, guidelines for selecting PPE, and hazard assessment certification. PPE issued to laboratory personnel should be appropriate for the task and will depend upon the proper hazard identification and assessment made by the PI. Laboratory personnel should understand the use and limitations of the PPE. PPE includes, but is not limited to, laboratory coats and aprons, eye protection (safety glasses, face shields, etc.), and gloves. Laboratory personnel should wear proper PPE when it is required.

**Lab Coat:** Lab coat should be worn at all times in laboratories (including teaching and research labs) to prevent incidental and unexpected chemical exposures to skin and clothing. The lab coat should be wrist-fitted. The lab coat should remain buttoned at all times. In research labs, the lab coat should be composed of a material compatible with the chemicals being used (flame-retardant materials for working with flammables and pyrophoric reagents). *It is the PI's responsibility to provide this protection for their researchers.*

**Earphones or ear buds** should never be worn when working in the laboratory (unless needed for the experiment or to provide protection from loud equipment), due to the risk of not hearing someone calling for help or a potentially harmful event occurring in the laboratory.

**Scrub Pants (only teaching laboratories):** Wear your scrub pants at all times in laboratories (including lab presentations or examinations) to prevent incidental and unexpected chemical exposures to your skin and clothing. Scrubs should completely cover the entire leg from the waist to the ankle (no skin showing between your shoe and the scrub pant) no ankle fitted scrub pants allowed.

**Eye Protection:** Chemical splash-proof goggles meeting the **OSHA approved, ANSI Z87.1** standard (imprinted on the goggle) for impact and splash protection should be worn over the eyes at ***all times in laboratories in which chemicals are stored or used*** (teaching laboratories). In situations where highly hazardous (corrosive, shock sensitive, explosive, toxic) chemicals are in use, a full face and neck shield meeting the ANSI Z87 standard should be worn in addition to goggles for complete protection. For research laboratories, the PI has the responsibility of assessing the potential for eye/face injuries due to exposure to hazards and determine the type of eye/face protection to be used in the laboratory.

**Gloves:** Gloves should be worn when handling hazardous materials, sharp, or very hot or cold items. Refer to a chemical glove compatibility chart to choose appropriate gloves specific to the material being used. The gloves should be inspected for tears or punctures before use and frequently while being worn. Know the limitations of the gloves you choose to wear- latex gloves are not suitable for work with hazardous chemicals. Refer to <https://www.usf.edu/administrative-services/environmental-health-safety/programs-services/laboratory-safety/chemicals.aspx>.

## Teaching Laboratories

All the teaching laboratories in the Department of Chemistry should use the Laboratory Safety Rules, Procedures and Practices provided in this document, as well as the Safety Laboratory Agreement and the Basic Laboratory Safety Orientation. The signed Safety Agreements and the Basic Laboratory Safety Orientation should be kept in the stockroom or by the TA teaching the corresponding lab section. The documents should be kept for six months after the semester has ended, TAs should read and sign the Safety Expectations for Teaching Assistants (see Attachments).

TAs working in the teaching labs should comply with all safety regulations mentioned in this document. TAs are responsible for enforcing the safety rules in their assigned lab section. In case of repetitive safety violations by a TA or RA, the safety coordinator or any other faculty member can write an official memo and a safety evaluation for the TA/RA with a copy to the Department of Chemistry's Chair and student's PI.

## Safety Equipment

*The Principal Investigator or Lab Manager are responsible for ensuring that all laboratory personnel know the location and use of all safety equipment and the exits from the laboratory, as well as the proper maintenance of the safety equipment.*

**Eyewash Stations:** The eyewashes should be flushed weekly and noted on the card. Nothing should be placed near or around the eyewash to block access.

**Safety Showers:** Safety showers should be checked routinely by Facilities Management. Access to the shower should not be blocked.

**Spill Kit:** Every laboratory should have a spill kit. Its location should be clearly marked on the laboratory doors and available to all personnel. The kit should contain enough types and amounts of materials to enable personnel to clean up a spill of the largest size container of any chemical in the lab. The spill kit should be replenished after each use and expired contents should be replaced immediately.

**First Aid Kit:** Every laboratory should have a first aid kit. Its location should be clearly marked on the laboratory doors and available to all personnel. The kit should be inspected periodically, and its contents replenished as needed.

**Fire Extinguishers:** All laboratory personnel should know the location of the fire extinguisher in every laboratory and trained to use it in an emergency. Access to the extinguisher should not be blocked. Those handling water-reactive agents, such as organometallics and pyrophoric substances, should have Class D extinguishers available in case of an electrical or chemical fire.

**Fume Hoods:** Experiments that produce flammable, noxious, odiferous or toxic vapors should be done in an operating fume hood according to the manufacturer's instructions. EH&S will inspect the operation of the fume hoods annually.

## **Chemical Storage and Containment**

- a.** All laboratories should have a complete, accurate and up-to-date inventory of chemicals used or stored in that facility. It is highly encouraged to keep an inventory of all the chemicals using a digital source like an Excel sheet or other software and review the inventory twice a year. Chemicals that are used up or pass their shelf-life should be properly disposed of and removed from HITS. Refer to <http://www.usf.edu/administrative-services/environmental-health-safety/hits/index.aspx>.
- b.** Chemicals should be marked with a date when they are received and opened and kept in preferably the same container in which they were received.
- c.** Chemical containers should be clearly and accurately labeled.
- d.** Liquids that can splash if the bottle falls and breaks should not be stored above eye level, and preferably no higher than bench top.
- e.** Chemicals should be stored according to their chemical reactivity, as described at <http://www.usf.edu/administrative-services/environmental-health-safety/documents/labsafety-chemicalcompatibility.pdf>  
Incompatible chemicals should be stored separately from each other.
- f.** Flammables and corrosives should be stored in cabinets designed to hold them.
- g.** All chemicals should be returned to storage when not in use.
- h.** Many chemicals have limited shelf-life and should not be kept beyond the manufacturer's expiration date.
- i.** Gas cylinders should be stored in an upright position, securely strapped or chained to a wall or bench top. Compressed gas cylinders should be capped when not in use or outfitted with an approved regulator.

## Transfer and Transportation of Hazardous Materials

- a. When transporting or moving gas cylinders, use a cylinder cart and be sure to cap the cylinder (do not move it with a regulator on it), and secure it tightly to the cart with a chain or strap.
- b. When walking from one laboratory to another (transporting materials or moving equipment) lab coat can be worn but gloves should be removed before leaving the laboratory.
- c. Individuals transporting chemicals between labs should **wear appropriate Personal Protective Equipment (PPE)**. A lab coat should be worn while transporting chemicals. Lab appropriate attire is required. Additional personal protective equipment may be required if deemed necessary by a risk assessment. A pair of chemical resistant gloves should be maintained in a pocket for use as-needed. To prevent the spread of contamination from laboratories into public spaces, **do not wear gloves in public, unless a spill or other incident dictates the precaution.**
- d. Chemicals should be transported in **break-resistant secondary containers that can contain all materials in the event of breakage or spill**. Secondary containers are defined as commercially available bottle carriers made of rubber or plastic, with carrying handle(s). Or, if the chemicals are too numerous to safely carry with a bottle carrier, an easily maneuverable cart with leak resistant sides of several inches in height on all four sides should be used. Chemicals should not be carried without the secondary containment and support described in this policy.
- e. Small chemical spill procedure can be found in the following link:  
*<https://www.usf.edu/administrative-services/environmental-health-safety/documents/labsafety-smallspillcleanup2016.pdf>*

## **Reporting Accidents and Near Misses**

In case of emergency, call 911 for immediate medical care for the injured or ill employee.

All other non-medical emergency injuries or illnesses are to be reported to **AmeriSys 1-800-455-2079**. The injured person should be present for the call.

All accidents, injuries, near misses and hazardous situations in the laboratory should also be reported to EH&S at <http://www.usf.edu/administrative-services/environmental-health-safety/reporting/index.aspx>.

In the case of injury, Workers' Compensation forms should be filled out within 24 hours. The forms can be downloaded from <http://chemistry.usf.edu/department/policies/#Accident>

More information about laboratory safety can be found at <https://www.usf.edu/administrative-services/environmental-health-safety/>

### Signature Form

By signing this form, you acknowledge that you have received a printed copy of the Departmental Safety Procedures Manual, and that you will adhere to the stated practices throughout your research and teaching in the Department of Chemistry.

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Signature

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Date

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Printed Name and University Number

*Please sign this form and give the original copy to the Graduate Program Coordinator for departmental files.*

*ATTACHMENTS*

## Laboratory Safety Rules, Procedures and Practices



Safety is the number one priority in all undergraduate chemistry laboratories at USF. Read all of the following items carefully. If you have any questions do not hesitate to ask your instructor for clarifications.

### **I. Personal protective equipment and proper attire basics**

- 1. Lab Coat (Thigh Length):** Wear your lab coat at all times in laboratories (including lab presentations or examinations) to prevent incidental and unexpected chemical exposures to your skin and clothing. The lab coat should be wrist-fitted. Always Keep the lab coat buttoned.
- 2. Scrub Pants:** Wear your scrub pants at all times in laboratories (including lab presentations or examinations) to prevent incidental and unexpected chemical exposures to your skin and clothing. Scrubs should completely cover the entire leg from the waist to the ankle (no skin showing between your shoe and the scrub pant). No ankle fitted scrub pants allowed.
- 3. Eye Protection:** Splash goggles that meet OSHA approved ANSI Z87.1 standard should be worn over by all persons at all times in the laboratory while students are working with chemicals. *Safety glasses, with or without side-shields are not an acceptable substitute.*
- 4. Footwear:** Shoes should be worn at all times while in the laboratory, regardless of the experiment or curricular activity. Shoes should totally cover your feet up to the ankles, no skin should be shown. Socks do not constitute a cover replacement for shoes. Sandals, backless and open toed shoes are unacceptable.
- 5. Clothing:** Clothing like shirt, blouse, etc. which completely cover the torso from the waist to the neck should be worn. Shoulders should be completely covered, and sleeves should be worn that cover the arm from the shoulder to halfway to the elbow. Tank tops, halters, shorts, cutoffs, etc. are not acceptable.
- 6. Hair:** If hair is long it should be tied back.
- 7. Accidents:** Report all accidents including minor incidents to your instructor immediately.
- 8. Workspace:** Working spaces should always be kept neat and cleaned up before leaving. Equipment should be returned to its proper place. Keep backpacks or bags off the floor as they represent a tripping hazard.

9. **Open flames:** Open flames of any kind are prohibited in the laboratory, unless specific permission is granted to use them during an experiment.

10. **Emergency equipment:** Know the location and use of all safety equipment and exits.

11. **Chemicals:**

- If you spill chemicals in your hands or body, immediately flush the affected area liberally with water. Get further directions from your instructor.
- Use chemicals that generate harmful vapors in the fume hood.
- Do not remove reagent bottles from their location, cap the reagent bottles after use.
- Never pour unused chemicals back into the reagent bottles or lab sinks.
- Change your gloves regularly to prevent permeation of chemicals into your hands.

12. **Waste disposal:** Chemicals and used materials should be discarded in designated containers. Keep the container closed when not in use. When in doubt, check with your instructor.

**II. General safety principles.** All students are required to know and comply with good laboratory practices and safety norms; *otherwise they be will asked to leave the laboratory.* Make sure you understand all the safety precautions before starting your experiments, otherwise ask your instructor. The following are some general guidelines that should always be followed:

- Bring your personal protective equipment (PPE) in good condition to the lab, including a basic wrist-fitted lab coat, scrub pants and splash-proof goggles.
- Do not wear open-toed shoes, sandals, flip-flops, etc.
- Check the Safety Data Sheets (SDS) for every chemical used in the laboratory. Hard copies of these documents can be found in each laboratory or online through the Learning Management System Canvas.
- Keep the sash of the hood closed when not in use or to the proper level when working with chemicals (see hood marking for reference).
- Do not pour chemicals down the drain.
- Do not taste or sniff chemicals in the laboratory.
- Do not eat or drink in the laboratory. Do not wear headphones in the lab.
- Do not apply makeup while in the lab.
- Do not hazardously mix chemicals. Do not pipette by mouth.
- Do not fool or play around in the laboratory.
- All backpacks, skateboards, or other items should be off the floor where they could be a tripping hazard. There is a specific location for those items in each laboratory. Ask your instructor.
- Avoid the use of personal items like cellphone, computers, notebook, pens, etc. when wearing gloves. Cross contamination may occur while performing those activities and you and others may result affected. Remove your gloves and wash your hands before you use the items mentioned above.
- Wear your safety splash proof goggles at all time while performing experiments (handling chemicals) or while other students in your laboratory are still handling chemicals.

## **Student Laboratory Agreement**

Read all the following items and initial in the blank next to each statement to indicate that you understand and agree to abide by it. If you have questions about the items, please ask your instructor for clarification. Once you read all items, complete the information at the bottom of the sheet.

\_\_\_\_\_ **1.** I have received a copy of the Laboratory Safety Rules, Procedures and Practices. They have been explained to me by the laboratory instructor. I understand these rules and recognize it as my responsibility to follow at all times.

\_\_\_\_\_ **2.** I recognized that my instructor may give me additional safety instructions, either verbally or in writing during the laboratory period. I agree to follow these additional instructions and accept this as my responsibility.

\_\_\_\_\_ **3.** I accept the authority of the laboratory instructor, the laboratory coordinator, safety coordinator, laboratory manager, stockroom personnel or any other official of the University of South Florida (faculty or staff). I understand that failure to follow the safety rules, procedures and practices presented to me may result in dismissal from the laboratory session or, for repeated offences, dismissal from teaching laboratories with the consent of the Department of Chemistry.

\_\_\_\_\_ **4.** Check-in Day: I have inspected the equipment provided in the BIN assigned to me and my group and I acknowledge that all equipment is in good condition. I consulted with my instructor to replace damaged equipment, if any.

### **Check-in Day**

Name (Print): \_\_\_\_\_

University ID Number: \_\_\_\_\_

BIN Number: \_\_\_\_\_

Course Number: \_\_\_\_\_ Lab Section Number: \_\_\_\_\_ Room Number: \_\_\_\_\_

Lab Schedule (Day/time): \_\_\_\_\_ / \_\_\_\_\_

Date: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ Signature: \_\_\_\_\_

## Safety Expectations for Teaching Assistants in the Department of Chemistry

Graduate students teaching in chemistry laboratories need to know and follow the appropriate safety practices mandated by the Department of Chemistry. Teaching laboratories is part of your duties as graduated student and your attitude towards safety should include value safety, work safely, prevent at-risk behavior, promote safety, and accept responsibility for safety. Teaching assistants (TAs) have responsibilities for operating and overseeing undergraduate students and laboratories. A list of minimal expectations that encompass the department commitment is described below.

1. Understand the organizing principles of safety (**RAMP**). **R**ecognize the hazards, **A**ssess the risk of hazards, **M**inimize the risk of the hazards, **P**repare for emergencies from uncontrolled hazards and how these apply to each experiment.
2. Read and sign the Safety Agreement for Instructors for the teaching laboratories.
3. Participate in safety training programs as required by the Department of Chemistry's policy and their supervisors and instructors.
4. Know the location of the Safety Data Sheets (SDS) and Chemical Hygiene Plan (CHP) for their assigned laboratories.
5. Know the underlying chemistry for each experiment being taught.
6. Demonstrate proper laboratory techniques for each experiment to the students.
7. Demonstrate appropriate procedures for operation of common laboratory equipment (in accordance with the assigned teaching lab), such as burners, hot plates, stirring plates, melting points, IR, GC, NMR, pH meter, spectrometer, etc.
8. Provide appropriate laboratory safety instruction to students, including explaining the health hazards and risks associated with each experiment.
9. Manage the setup and cleanup of laboratory experiments.
10. Follow appropriate safety and PPE protocols during laboratory preparation activities, such as making solutions and preparing student samples.
11. Maintain good housekeeping in assigned laboratories.
12. Know, follow, and enforce the institutional policies and procedures for the following: Appropriate use of PPE and laboratory clothing, responding to students who have mental health problems, generation and disposal of hazardous waste.
13. Know, follow, and enforce institutional procedures and reporting protocols for emergencies, including: lab chemical spills, building evacuation, near miss, injury and non-injury incident, fire and fire alarm.

I certify that I have read the above information regarding TA safety expectations. My signature also certifies my understanding and agreement with all the above policies.

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Student's name

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Signature

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Date

## **Safety Expectations for Graduate Students Working in a Research Laboratory in the Department of Chemistry**

Graduated students teaching in chemistry laboratories need to know and follow the appropriate safety practices mandated by the Department of Chemistry. As a research assistant, your attitude towards safety should include: value safety, work safely, prevent at-risk behavior, promote safety, and accept responsibility for safety. Research assistants (RAs) have responsibilities for operating and managing chemicals and equipment in their research laboratory. A list of minimal expectations that encompass the Department's commitment is described below.

1. Understand the organizing principles of safety (**RAMP**). **R**ecognize the hazards, **A**ssess the risk of hazards, **M**inimize the risk of the hazards, **P**repare for emergencies from uncontrolled hazards and how these apply to each experiment.
2. Read and sign the Safety Agreement for research assistants.
3. Participate in safety training programs as required by the Department of Chemistry's policies and by their supervisors and instructors.
4. Know the location of the Safety Data Sheets (SDS) and Chemical Hygiene Plan (CHP) for their assigned laboratories.
5. Be able to create or develop Safety Operating Procedures (SOP) for hazardous materials.
6. Be able to assess the risk and decrease the likelihood of an injury by using proper Personal Protective Equipment (PPE) and engineering controls in each project or experiment.
7. Follow appropriate safety and PPE protocols during any laboratory activity.
8. Maintain good housekeeping in assigned laboratories.
9. Know, follow, and enforce the institutional policies and procedures for the following:
  - a. Appropriate use of PPE and laboratory attire
  - b. Generation and disposal of hazardous waste
  - c. Proper chemical storage
10. Know, follow, and enforce institutional procedures and reporting protocols for emergencies, including:
  - a. Lab chemical spills
  - b. Building evacuation
  - c. Near misses
  - d. Injury and non-injury incidents
  - e. Fire and fire alarms

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Student's name

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Signature

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Date

## Laboratory Safety Orientation-Department of Chemistry

Each student registered in a teaching laboratory in the Department of Chemistry should go through the Laboratory Safety Orientation provided by the Teacher Assistant (TA) of the lab or designee. A check mark from the TA and student along with their names and signatures at the end of the document confirm that the student understood all of the topics covered during the Laboratory Safety Orientation.

TA	Student	Training Topic
		<b>1. Emergency Procedures</b>
_____	_____	<b>a. Emergency exits:</b> Locations
_____	_____	<b>b. Eye wash/safety showers:</b> Location of and demonstrate how to use them.
_____	_____	<b>c. Fire extinguisher/Fire blanket:</b> Locations
_____	_____	<b>d. Shelter-in-Place:</b> Review procedures for securing the lab for shelter-in-place orders. Active shooter or any other emergency.
_____	_____	<b>e. Emergency Assembly Area:</b> Review lab gathering point and evacuation procedures.
		<b>2. Engineering Controls</b>
_____	_____	<b>a. Chemical fume hoods:</b> Demonstration of proper use and instruction on adjustable controls.
_____	_____	<b>b. Chemical storage locations:</b> Locations and proper use.
		<b>3. Administrative Controls</b>
_____	_____	<b>a. Safety Data Sheets (SDS):</b> Demonstrate location and access to SDSs.
		<b>4. Personal Protective Equipment</b>
_____	_____	<b>a. Scrub Pants:</b> Wear your scrub pants at all times in laboratories (including lab presentations or examinations).
_____	_____	<b>b. Lab Coat:</b> Each person should have and wear a fitted lab coat while performing any activity in the laboratory.
_____	_____	<b>c. Goggles:</b> Each person should have and wear splash proof goggles while doing Experiments or while other students are still working with chemicals in the lab.
		<b>5. Waste Disposal</b>
_____	_____	<b>a. Hazardous Waste:</b> Demonstrate proper disposal, location and waste segregation.

TA Name: \_\_\_\_\_

TA Signature: \_\_\_\_\_

Student Name: \_\_\_\_\_

Student Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## TRAINING RECORD

### ASSIGNED TASK:

### OBSERVATIONS, NOTES OR COMMENTS

By signing below, I acknowledge that I have been trained and that I understood the procedure and the safety implications.

(**TRAINEE**) Employee name: \_\_\_\_\_ Date: \_\_\_\_\_

(**TRAINEE**) Employee signature: \_\_\_\_\_

(**TRAINER**) Employee name: \_\_\_\_\_ Date: \_\_\_\_\_

(**TRAINER**) Employee Signature: \_\_\_\_\_

## Graduate Student Laboratory

### Check-Out Form

Name of exiting graduate student / Post doc (print) \_\_\_\_\_

PI or Supervisor (print) \_\_\_\_\_

Building(s) / Room(s) \_\_\_\_\_

Please initial the items completed, mark N/A for items that do not apply:

1 _____	<b>Chemical Containers:</b> all chemical containers used by me have been properly labeled, stored or disposed.
2 _____	<b>Research Products:</b> research samples and prepared solutions have been transferred to _____. An inventory of transferred or disposed materials is attached in this document and it includes amounts and storage location.
3 _____	<b>Biological Materials:</b> biological materials (organisms, tissues, fluids, cell lines, etc.) have been decontaminated and disposed of. The biological materials inventory has been updated and it includes storage location(s) for all transferred materials.
4 _____	<b>Waste:</b> a request for pick-up of unwanted hazardous materials has been submitted to EH&S as well as containers placed in the Satellite Accumulation Area (SAA) with tags completed.
5 _____	<b>Research documents:</b> notebooks and data records were handed to my PI. <i>[Notebooks and data are the property of <b>University of South Florida</b> and cannot be removed; however, copies can be made for writing up publications].</i> The locations and organization of notebooks, data and computer files have been reviewed with my supervisor or PI.
6 _____	<b>Computer files:</b> personal files and software were deleted from computers, research documents and software necessary for viewing images or data remained on computers for analysis.
7 _____	<b>Workspace:</b> personal workspace and equipment used have been cleaned/decontaminated/ disinfected. Please indicate that the following locations have been checked and all samples and prepared solutions have been properly discarded or transferred to _____: <input type="checkbox"/> Office space <input type="checkbox"/> Lab bench <input type="checkbox"/> Refrigerators/freezers <input type="checkbox"/> Cell culture room <input type="checkbox"/> Fume and/or biosafety cabinet <input type="checkbox"/> Shelves, storage areas <input type="checkbox"/> Other _____
8 _____	<b>Keys:</b> all keys have been located and returned to General Services. Access to lab spaces (or any space) using ID card has been removed by university personnel.

**Comments:**

\_\_\_\_\_  
**Signature of exiting graduate student / Post doc**

\_\_\_\_\_  
**Date**

**Verified By:** \_\_\_\_\_

**(Principal Investigator, Supervisor, Laboratory Manager, or Designee)**



**University of South Florida  
Environmental Health &  
Safety Laboratory Safety  
Review**

Building/Room Number:	PI/Supervisor:
Purpose: Routine      Follow up	Lab Hazards: Chemical      Biological
College:	Department:

<b>1</b>	<b>Documentation</b>	<b>Yes</b>	<b>No</b>	<b>S</b>	<b>Comments</b>
1.1	Emergency telephone numbers posted				
1.2	Emergency information current in lab				
1.3	Location of first aid & spill kits, fire extinguishers posted				
1.4	Updated chemical inventory available				
1.5	Chemical Hygiene Plan (CHP) is available and has been read and signed by all faculty, staff, & students				
1.6	SDS access to all personnel in lab				
1.7	All accidents and spills reported to supervisor and EH&S				
<b>2</b>	<b>Training</b>	<b>Yes</b>	<b>No</b>	<b>S</b>	<b>Comments</b>
2.1	Lab training has been completed for all personnel ( <b>Initial training is a critical deficiency</b> )				
2.2	Personnel have received lab-specific safety training				
2.3	Lab-specific SOPs have been read and signed by applicable lab personnel				
2.4	Chemical-specific SOPs are developed for extremely hazardous chemicals				
2.5	Process-specific SOPs include safety procedures for the handling of hazardous materials				
2.6	Equipment specific SOPs are developed for the safe use of machinery				
<b>3</b>	<b>Chemical Storage</b>	<b>Yes</b>	<b>No</b>	<b>S</b>	<b>Comments</b>
3.1	Chemical containers labeled to identify contents				
3.2	Stock solutions and wash bottles labeled				
3.3	Non-flammable refrigerators & flammable cabinets labeled				
3.4	Flammables stored in flammable cabinets/refrigerators				
3.5	Quantity of flammable liquids does not exceed storage limits				
3.6	Chemicals are segregated by hazard class (acids,bases, etc.)				
3.7	Chemicals not stored on floor, fume hoods, bench tops				
3.8	Chemical containers are kept closed when not in use				
3.9	Leaking chemical containers should be placed in secondary containment and submitted for disposal				
3.10	Time sensitive chemicals are less than one year old				
<b>4</b>	<b>Housekeeping</b>	<b>Yes</b>	<b>No</b>	<b>S</b>	<b>Comments</b>
4.1	Emergency exits unobstructed				
4.2	Work areas free of clutter				
4.3	Broken glassware disposed in box labeled "Broken Glass"				
4.4	Broken glass container lined with non-red plastic bag				

4.5	Needles, razor blades, scalpels and other sharps are not left unattended when not in use				
4.6	Food, drinks, and applying cosmetics prohibited in lab				
<b>5</b>	<b>Compressed Gas Cylinders</b>	<b>Yes</b>	<b>No</b>	<b>S</b>	<b>Comments</b>
5.1	Properly labeled & stored upright				
5.2	Attached to a permanent fixture				
5.3	Gas cylinders are segregated by hazard class				
5.4	Empty cylinders are marked "Empty" & not stored in lab				
5.5	Regulators are not obstructed				
5.6	Capped when not in use				
<b>6</b>	<b>Safety and Emergency</b>	<b>Yes</b>	<b>No</b>	<b>S</b>	<b>Comments</b>
6.1	Personal protective equipment (PPE) available				
6.2	PPE worn by personnel while working in lab				
6.3	If NIOSH approved respirators used, copy of written Respiratory Protection Plan accessible				
6.4	If NIOSH approved respirators are needed, personnel has been enrolled in Respiratory Protection Program				
6.5	Fume hoods have current inspection/certification				
6.6	Sashes kept closed when not in use				
6.7	Air flow monitor operates appropriately				
6.8	Emergency eyewash/safety shower accessible				
6.9	Eyewashes are flushed weekly				
6.10	Expired contents removed from required first aid & spill kits				
6.11	Monitors indicate negative pressure relative to all entrances				
<b>7</b>	<b>Hazardous Waste</b>	<b>Yes</b>	<b>No</b>	<b>S</b>	<b>Comments</b>
7.1	Containers labeled "Hazardous Waste" with contents and nature of hazard				
7.2	Hazardous waste stored in a designated Satellite Accumulation Area (SAA)				
7.3	Hazardous wastes are being stored in compatible containers				
7.4	Waste segregated by hazard class within the SAA				
7.5	Hazardous waste containers kept closed when not in use				
7.6	All solder and scrap metal are collected for recycling or disposal as hazardous waste				
7.7	Hazardous waste-contaminated rags are managed as hazardous waste				
7.8	Used mercury containing lamps managed appropriately				
7.9	Spent lead-acid and recyclable batteries are being recycled				
7.10	Hazardous pharmaceutical waste is collected for disposal				
7.11	All chemical spills have been appropriately decontaminated and surfaces cleaned regularly				
7.12	Requests have been made in HITS for the removal of all full waste containers.				
<b>8</b>	<b>Fire Safety</b>	<b>Yes</b>	<b>No</b>	<b>S</b>	<b>Comments</b>
8.1	Exit signs illuminated and emergency lights operational				
8.2	No permanent use of extension cords				
8.3	Breaker panels are accessible				
8.4	Fire extinguisher inspected monthly				

<b>8.5</b>	Evacuation routes posted in lab				
<b>8.6</b>	Fire drills & start-up/shutdown procedures tested semi-annually				
<b>8.7</b>	Electrical cords in good condition				
<b>8.8</b>	All storage kept at least 18" below fire sprinklers				
<b>8.9</b>	Heat-generating lab equipment (autoclave, hot plate, water bath) is used according to manufacturer's safety guidelines				
<b>9</b>	<b>Biomedical Waste (BMW)</b>	<b>Yes</b>	<b>No</b>	<b>S</b>	<b>Comments</b>
<b>9.1</b>	Copy of BMW plan available				
<b>9.2</b>	BMW Training documentation available				
<b>9.3</b>	BMW contained at point of generation				
<b>9.4</b>	Sharps disposed of in sharps container				
<b>9.5</b>	No recapped needles in sharps container				
<b>9.6</b>	Non-sharp biomedical waste disposed in red bags				
<b>9.7</b>	Red bags meet requirements as outlined by FAC 64E-16.004 and copy of certification is available				
<b>9.8</b>	Red bags placed in outer container that is rigid, leak/puncture resistant, and labeled with the international biohazard symbol				
<b>9.9</b>	All outer reusable containers constructed of smooth, easily cleanable materials & decontaminated after each use				
<b>9.10</b>	BMW spill kit available				
<b>9.11</b>	All BMW spills properly decontaminated				
<b>9.12</b>	BMW bags and sharps boxes labeled according to the USF Biomedical Waste Plan prior to disposal				
<b>9.13</b>	BMW containers are not overflowing				
<b>9.14</b>	Sharps boxes are disposed of at ¾ full OR 30 days after first non-sharps item is placed in container				
<b>9.15</b>	BMW is separated from chemical waste				
<b>9.16</b>	Red bags disposed of within 30 days after first BMW item is placed in bag				
<b>9.17</b>	Generator is properly disposing of BMW containers to the appropriate vendor pick-up container				
<b>9.18</b>	BMW bags are used for biomedical waste only (i.e. bags not used in broken glass containers)				
<b>9.19</b>	Access to outdoor storage areas secured and conspicuously marked with a 6 inch international biohazard symbol				
<b>9.20</b>	Hand washing areas available				
<b>9.21</b>	Proper PPE used when handling BMW				
<b>9.22</b>	BMW transported to the waste storage areas via cart				

S: Serious finding that should be corrected within 48 hours or less, depending on severity of finding.

EH&S Representative: \_\_\_\_\_ Date: \_\_\_\_\_  
 Lab Representative: \_\_\_\_\_ Date: \_\_\_\_\_



**University of South Florida  
Laboratory Safety Review  
(Spot-check)**

Building/Room Number:	PI/Supervisor:
Purpose: Routine      Follow up	Lab Hazards: Chemical      Biological
College:	Department:

<b>1</b>	<b>Chemical Storage</b>	<b>Yes</b>	<b>No</b>	<b>S</b>	<b>Comments</b>
1.1	Chemical containers labeled to identify contents				
1.2	Chemicals not stored on floor, fume hoods, bench tops				
1.3	Chemical containers are kept closed when not in use				
<b>2</b>	<b>Housekeeping</b>	<b>Yes</b>	<b>No</b>	<b>S</b>	<b>Comments</b>
2.1	Emergency exits unobstructed				
2.2	Work areas free of clutter				
2.3	Food, drinks, and applying cosmetics prohibited in lab				
<b>3</b>	<b>Compressed Gas Cylinders</b>	<b>Yes</b>	<b>No</b>	<b>S</b>	<b>Comments</b>
3.1	Attached to a permanent fixture				
3.2	Capped when not in use				
<b>4</b>	<b>Safety and Emergency</b>	<b>Yes</b>	<b>No</b>	<b>S</b>	<b>Comments</b>
4.1	PPE worn by personnel while working in lab				
4.2	Sashes kept closed when not in use				
4.3	Emergency eyewash/safety shower accessible				
<b>5</b>	<b>Hazardous Waste</b>	<b>Yes</b>	<b>No</b>	<b>S</b>	<b>Comments</b>
5.1	Containers labeled "Hazardous Waste" with contents and nature of hazard				
5.2	Hazardous waste stored in a designated Satellite Accumulation Area (SAA)				

S: Serious finding that should be corrected within 48 hours or less, depending on severity of finding.

Lab Representative: \_\_\_\_\_

Date: \_\_\_\_\_