Appendix 1a - Laboratory User Training

Use this sheet to record dates of training for each lab user. Mark N/A for any training which is not applicable.
Retain original records of training sessions, such as training sign-in sheets or certificates, in lab safety binder or office files.

Other records of training (sign-in sheets or certificates) are stored in the following locations:

Lab user	Training Dates					
	Lab Safety Fundamentals	Heat illness Training	Biosafety/ Containment	Chemical Safety	Radiation Safety	Other

Laboratory User Training

Use this sheet to record dates of training for each lab user. Mark N/A for any training which is not applicable.
Retain original records of training sessions, such as training sign-in sheets or certificates, in lab safety binder or office files.

Other records of training (sign-in sheets or certificates) are stored in the following locations:

Lab user	Training Dates					
	SOP	SOP	SOP	SOP	SOP	SOP

Appendix 1b - Laboratory Hazard Assessment Tool

This form must be completed by the PI, Lab Manager, or their designee at least once each calendar year to conduct an activity hazard assessment specific to activities in their laboratories. The Activity Hazard Assessment identifies hazards to employees and specifies personal protective equipment (PPE) to protect employees during work activities. The person(s) conducting the assessment must verify that it is complete and that training has been conducted.

EH&S personnel are available to assist you with completing your Activity Hazard Assessment form or with reviewing it after you've completed it. EH&S may also be consulted for specific questions regarding PPE requirements. Contact your EH&S representative.

Principal Investigator:		
Department:		
PI Phone:		
PI e-mail:		
Laboratory Safety Contact:		
Laboratory Safety Phone:		
Laboratory Safety e-mail:		
Name of Person(s) conducting Assessment		
Assessor e-mail:		
Assessor Phone Number		
Date Assessment Completed		
Lab Locations: Building(s) / Room(s):		

Appendix 1b - Laboratory Hazard Assessment Tool

Provide a listing of all of your Laboratory Personnel using the format below.

	First Name	Last Name	E-mail	Role (Principal Investigator (PI), Lab Manager (LM), Lab Worker (LW))
Laboratory Personnel:				

Role: LW = Lab Worker, PI = Principal Investigator

Appendix 1b - Laboratory Hazard Assessment Tool

Activity Hazard Assessment

In this section, you will:

- Conduct a hazard assessment of this lab group to identify activities when PPE is needed to protect the lab personnel;
- Certify the hazard assessment for the laboratory.

Note: In all cases chemical splash goggles can be substituted for safety glasses. For splash or impact protection, either safety goggles or safety glasses respectively need to be worn under face shields.

The final assessment report will identify PPE applicable to each hazard identified in the lab. **For activities that are described in a laboratory specific SOP or for activities where a Use Authorization(s) (UA) has been issued by a campus safety committee, the PPE specified in that SOP/UA shall take precedence.**

Appendix 1b - Laboratory Hazard Assessment Tool

Activity performed		**All Laboratories** ☐ Laboratory has been approved and posted as free of physical or chemical hazards Skip all other sections.			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher Attire (direct manipulation)**	**Adjacent Individuals Attire**
☐	☐	E01. Entering laboratory	Many	✓ Long pants or equivalent ✓ Closed-toed/heel shoes ✓ Long hair tied back Note: Tights & panty hose are considered undergarments	All personnel in laboratory room: ✓ Long Pants ✓ Closed toed/heel shoes

Under UC Policy full length pants (or equivalent), and closed toe/heel shoe attire must be worn at all times by all individuals who are occupying or entering a laboratory/technical area.

Appendix 1b - Laboratory Hazard Assessment Tool

Activity performed		Chemical Hazards			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	C01. Working with small volumes of corrosive (e.g. acids, caustics, etc.) liquids or solids.	Eye or skin damage. Low probability for a splash hazard.	✓ Safety glasses ✓ Chemical-resistant gloves ✓ Lab coat	In adjacent area within ___meters: ✓ Safety glasses ✓ Lab coat
☐	☐	C02. Working with corrosive or acutely toxic liquids or other materials which creates a splash hazard.	Poisoning, increased potential for eye and skin damage.	✓ Safety goggles ✓ Chemical-resistant gloves ✓ Lab coat and ✓ Chemical-resistant apron	In adjacent area within ___meters: ✓ Safety glasses ✓ Lab coat
☐	☐	C03. Working with small volumes of flammable solvents/materials when no reasonable ignition sources are present.	Skin or eye damage, potential poisoning through skin contact.	✓ Safety glasses ✓ Chemical-resistant gloves ✓ Lab coat	In adjacent area within ___meters: ✓ Safety glasses ✓ Lab coat
☐	☐	C04. Working with flammable materials (including solvents): When using a large quantity; or, any quantity when there is a risk of ignition; or, areas where flammable vapors or gas are may be present.	Major Fire. Major skin or eye damage, potential poisoning through skin contact.	✓ Safety glasses ✓ Flame-Resistant (FR) outer gloves ✓ Chemical-resistant inner gloves ✓ NFPA 2112 rated Flame-Resistant (**FR) lab coat**	All personnel in laboratory room: ✓ Safety glasses ✓ NFPA 2112 rated Flame-Resistant (FR) lab coat
☐	☐	C05. Working with toxic or hazardous chemicals (solid, liquid, or gas). (including but not limited to GHS H301, H302, H311, H312, H331 H332)	Skin or eye damage, potential poisoning through skin contact.	✓ Safety glasses (chemical splash goggles for large quantities) ✓ Chemical-resistant gloves ✓ Lab coat	In adjacent area within ___meters. ✓ Safety glasses ✓ Lab coat
☐	☐	C06. Working with Acutely Toxic Chemicals. (GHS H300, H310, H330)	Spills, splashes, ingestion, inhalation, absorption. Chemicals pose a high level of immediate health risk.	✓ Safety glasses ✓ Chemical resistant gloves ✓ Lab coat (plus chemical protective apron for H330)	All personnel in laboratory room: ✓ Safety glasses ✓ Lab coat
☐	☐	C07. Working with an apparatus with contents under pressure or vacuum.	Eye or skin damage.	✓ Safety glasses ✓ Face shield (for high risk activities) ✓ Chemical-resistant gloves ✓ Lab coat ✓ Chemical-resistant apron (for high risk activities)	In adjacent area within ___meters. ✓ Safety glasses ✓ Lab coat

Appendix 1b - Laboratory Hazard Assessment Tool

Activity performed		Chemical Hazards			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	C08. Working with pyrophoric (air reactive) chemicals or chemicals that in contact with water releases flammable gasses (water reactive). (GHS H25x and H26x)	Severe skin and eye damage. Fire.	For work outside glove boxes: ✓ Safety glasses ✓ Face shield ✓ FR rated outer gloves ✓ Chemical-resistant inner gloves ✓ NFPA 2112 Flame Resistant **(FR) lab coat.** Work in inert atmosphere when possible.	All personnel in laboratory room: ✓ Safety glasses ✓ NFPA 2112 Flame Resistant (FR) lab coat
☐	☐	C09. Working with potentially explosive chemicals. (e.g. Nitrates, Perchlorates, Azides, Nitrites etc.)	Splash, detonation, flying debris, skin and eye damage, fire.	✓ Safety glasses ✓ Face shield, and/or use blast shield ✓ Chemical-resistant gloves ✓ **NFPA 2112 Flame Resistant (FR) lab coat**	All personnel in laboratory room: ✓ Safety glasses (or goggles) ✓ NFPA 2112 Flame Resistant (FR) lab coat
☐	☐	C10. Minor chemical spill cleanup	Skin or eye damage, respiratory damage.	✓ Safety glasses ✓ Chemical-resistant gloves ✓ Shoe covers ✓ Chemical-resistant apron ✓ Lab coat	In adjacent area within ___meters: ✓ Safety glasses ✓ Lab coat
☐	☐	C11. Major chemical spill cleanup	Multiple hazards.	Call for EH&S assistance	All personal evacuate lab
☐	☐	C12. Working with known or suspect human carcinogens (GHS H350, H351)	Spills, splashes, ingestion, inhalation, absorption. High hazard cancer-causing agents.	✓ Safety glasses ✓ Chemical-resistant gloves ✓ Lab coat	In adjacent area within ___meters: ✓ Safety glasses ✓ Lab coat
☐	☐	C13. Working with reproductive hazards (GHS H340, H341, H360, H361)	Spills, splashes, ingestion, inhalation, absorption. Agents that affect reproductive capabilities, cause mutation and adversely affect fetal development.	✓ Safety glasses ✓ Chemical-resistant gloves ✓ Lab coat	In adjacent area within ___meters: ✓ Safety glasses ✓ Lab coat

Appendix 1b - Laboratory Hazard Assessment Tool

Activity performed		Chemical Hazards			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	C14. Working with engineered nanomaterials.	Inhalation, exposure, dermal exposure.	✓ Chemical Splash goggles ✓ Chemical-resistant gloves ✓ Lab coat	All personnel in laboratory room: ✓ Safety glasses ✓ Lab coat

Appendix 1b - Laboratory Hazard Assessment Tool

Activity performed		Physical Hazards			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	P01. Working with cryogenic liquids.	Major skin, tissue, or eye damage.	✓ Safety glasses (goggles for large volumes) ✓ Face shield ✓ Cryogenic protective gloves ✓ Lab coat	N/A
☐	☐	P02. Removing freezer vials from liquid nitrogen.	Vials may explode upon rapid warming. Cuts to face/neck and frostbite to hands.	✓ Safety glasses ✓ Face shield ✓ Cryogenic protective gloves ✓ Lab coat	N/A
☐	☐	P03. Working with very cold equipment or dry ice.	Frostbite, hypothermia.	✓ Safety glasses ✓ Cryogenic protective gloves ✓ Lab coat (possibly warm clothing)	N/A
☐	☐	P04. Working with scalding liquids or hot equipment (e.g. autoclave, water bath, oil bath).	Burns resulting in skin or eye damage.	✓ Safety glasses (goggles for large volumes) ✓ Thermal protective gloves (impermeable insulated gloves for liquids and steam) ✓ Lab coat	N/A
☐	☐	P05. Glassware washing.	Lacerations, chemical splash.	✓ Safety glasses ✓ Heavy rubber gloves ✓ Lab coat	N/A
☐	☐	P06. Working with loud equipment, noises, sounds, alarms, etc.	Potential ear damage and hearing loss.	✓ Earplugs or ear muffs as necessary	✓ Earplugs or ear muffs as necessary
☐	☐	P07. Working with a centrifuge.	Imbalanced rotor can lead to broken vials, cuts, exposure.	✓ Safety glasses ✓ Disposable gloves ✓ Lab coat	N/A
☐	☐	P08. Working with a sonicator.	Ear damage, exposure.	✓ Safety glasses ✓ Disposable gloves ✓ Earplugs or ear muffs as necessary ✓ Lab coat	N/A

Appendix 1b - Laboratory Hazard Assessment Tool

Activity performed		Physical Hazards			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	P09. Working with sharps (e.g. needles and razor blades.)	Cuts, exposure.	✓ Safety glasses ✓ Cut resistance gloves ✓ Lab coat	N/A

Appendix 1b - Laboratory Hazard Assessment Tool

Biological Hazards

Activity performed		☐ I have a BUA that addresses all of these items. Skip to next section.			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	B01. Working with human or non-human primate blood, body fluids, tissues, cells or other potentially infectious material (OPIM) which may contain human blood borne pathogens (BBP).	Exposure to infectious material, sharps injuries.	✓ Eye and mucous membrane protection (as appropriate for operations) ✓ Disposable gloves ✓ Disposable lab coat impervious to fluids	In adjacent area within ___meters: ✓ Safety glasses ✓ Lab coat
☐	☐	B02. Working with microbial agents (bacteria, virus, parasites, yeast, fungi, prions), recombinant DNA and/ or biological materials (cells, tissues, fluids) exposed to or likely to contain Risk Group 1 microbial agents or recombinant DNA. (BSL-1)	Eye irritation, sharps injury. Exposure of infectious material to those who may have personal health issues which make them more susceptible to infection; cross contamination of animal or extra laboratory areas.	✓ Safety glasses ✓ Disposable gloves ✓ Lab coat	In adjacent area within ___meters: ✓ Safety glasses ✓ Lab coat
☐	☐	B03. Working with microbial agents, recombinant DNA and/or biological materials (cells, tissues, fluids) exposed to or likely to contain Risk Group 2 microbial agents or recombinant DNA. (BSL-2)	Exposure to infectious material, particularly through broken skin or mucous membranes, sharps injuries.	✓ Safety glasses ✓ Double layer of disposable gloves ✓ Lab coat	All personnel in laboratory room: ✓ Safety glasses ✓ Lab coat.
☐	☐	B04. Working microbial agents, recombinant DNA and/or biological materials (cells, tissues, fluids) exposed to or likely to contain Risk Group 2 microbial agents or recombinant DNA for which Biosafety Level 3 practices are required. (BSL-2+)	Exposure to infectious materials with high risk of exposure by contact with skin or mucous membranes and/ other potential or unknown routs of entry and or increased consequences of exposure. Sharps injuries.	✓ Safety glasses ✓ Double layer disposable gloves ✓ Lab coat or disposable lab coat	All personnel in laboratory room: ✓ Safety glasses ✓ Lab coat or disposable lab coat.

Appendix 1b - Laboratory Hazard Assessment Tool

Activity performed		**Biological Hazards** ☐ I have a BUA that addresses all of these items. Skip to next section.			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	B05. Working with microbial agents, recombinant DNA and/or biological materials (cells, tissues, fluids) exposed to or likely to contain Risk Group 3 microbial agents or recombinant DNA. (BSL-3)	Exposure to infectious materials with high risk of exposure, particularly through the inhalation route.	✓ Safety glasses ✓ Double layer disposable gloves ✓ Shoe cover or dedicated shoe ✓ Full back closing disposable gown or coveralls (preferred)	All personnel in laboratory room: ✓ Safety glasses ✓ Double layer disposable gloves ✓ Shoe cover or dedicated shoe ✓ Full back closing disposable gown or coveralls (preferred)
☐	☐	B06. Working with live animals-alone or in conjunction with Risk Group 1 microbial agents or recombinant DNA. (ASBL-1)	Animal bites, allergies, eye irritation, sharps injury. Exposure of infectious material to those who may have personal health issues which make them more susceptible to infection; cross contamination of animal or extra laboratory areas.	✓ Safety glasses ✓ Disposable gloves ✓ Lab coat Additional PPE (e.g. puncture resistant gloves) may be required based on risk assessment by the IBC & IACUC. Additional gowning (shoe covers, face mask) may be required for animal welfare purposes.	All personnel in laboratory room: ✓ Safety glasses ✓ Lab coat
☐	☐	B07. Working infected or potentially infectious live animals—alone or in conjunction with Risk Group 2 microbial agents or recombinant DNA (or materials exposed to RG-2 agents). (ABSL-2)	Animal bites, exposure to infectious material, allergies, sharps injury.	✓ Safety glasses ✓ Disposable gloves ✓ Bouffant ✓ Lab coat Additional PPE (e.g. puncture resistant gloves) may be required based on risk assessment by the IBC & IACUC. Additional gowning (shoe covers, face mask) may be required for animal welfare purposes.	All personnel in laboratory room: ✓ Safety glasses ✓ Bouffant ✓ Lab coat

Appendix 1b - Laboratory Hazard Assessment Tool

Radiological Hazards

		☐ I have a RUA and/or MUA that addresses all these. Skip to next section.			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	R01. Working with unsealed radioactive materials including generally licensed radioactive material or devices (e.g., uranyl acetate, uranyl nitrate, thorium, nitrate).	Cell damage, potential spread of radioactive materials.	✓ Safety glasses ✓ Impermeable gloves or chemical resistant gloves ✓ Lab coat	In adjacent area of ___meters. ✓ Safety glasses ✓ Lab coat
☐	☐	R02. Working with unsealed radioactive materials in hazardous chemicals (corrosives, flammables, liquids, powders, etc.).	Cell damage or spread of contamination plus hazards for the specific chemical.	✓ Safety glasses (goggles for splash hazard) ✓ Chemical-resistant gloves ✓ Lab coat *Note: Select gloves for applicable chemical hazards above.*	In adjacent area of ___meters. ✓ Safety glasses ✓ Lab coat
☐	☐	R03. Working with radioactive sealed sources or devices containing sources of radioactive materials (e.g., liquid scintillation counters, gas chromatographs/electron capture detectors, static eliminators, etc.)	If sealed source is compromised due to removal from equipment or physical abuse: cell damage, potential spread of radioactive materials.	PPE is not necessary under normal operating instructions. *Note: Source may not be removed form device except by EH&S or manufacturer.*	N/A

Appendix 1b - Laboratory Hazard Assessment Tool

Activity performed		Non ionizing Radiation Hazards			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	N01. Working with ultraviolet radiation.	Conjunctivitis, corneal damage, skin redness.	✓ UV face-shield with correct OD value ✓ Opaque gloves ✓ Lab coat	In adjacent area within ___meters with direct line of sight. ✓ UV face-shield with correct OD value ✓ Lab coat
☐	☐	N02. Working with infrared emitting equipment (e.g. glass blowing).	Cataracts, burns to cornea.	✓ Appropriate shaded glasses ✓ Lab coat	In adjacent area within ___meters with direct line of sight. ✓ Appropriate shaded glasses ✓ Lab coat

Appendix 1b - Laboratory Hazard Assessment Tool

Activity performed		**Laser Hazards** ☐ I have a LUA that addresses all these. Skip to next section.			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	L01. Open Beam- Performing alignment, trouble-shooting or maintenance that requires working with an open beam and/or defeating the interlock (s) on any Class 3 or Class 4 laser system.	Eye damage	✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters.	All personnel in laser use room: ✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters.
☐	☐	L02. Open Beam- Viewing a Class 3R laser beam with magnifying optics.	Eye damage	✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters.	N/A
☐	☐	L03. Open Beam- Working with a Class 3B laser open beam system with the potential for producing direct or specular reflections.	Eye damage	✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters.	All personnel in laser use room: ✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters. Appropriate skin protection.
☐	☐	L04. Open Beam- Working with a Class 4 laser open beam system with the potential for producing direct, specular or diffuse reflections.	Eye damage, skin damage	✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters. ✓ Appropriate skin protection.	All personnel in laser use room: ✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters. Appropriate skin protection.
☐	☐	L05. Non-Beam - Handling dye laser materials, such as powdered dyes, chemicals, and solvents.	Cancer, explosion, fire.	✓ Gloves, safety glasses, flame-resistant lab coat or coveralls.	In adjacent area within ___meters. ✓ Safety glasses ✓ Lab coat
☐	☐	L06. Non-Beam- Maintaining and repairing power sources for large Class 3B and Class 4 laser.	Electrocution, explosion fire	✓ Electrical isolation mat, ✓ Flame-Resistant NEC 70E APC rated lab coat or coveralls.	N/A
☐	☐	L07. Enclosed Beam- Using a Class 1 device housing a Class 3B or Class 4 enclosed or embedded laser with the potential for beam exposure during a Service Event.	Eye damage, skin damage	✓ Appropriate protective eyewear, wave length and optical density based on individual beam parameters, appropriate skin protection.	All personnel in laser use room: ✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters. Appropriate skin protection.

Appendix 1b - Laboratory Hazard Assessment Tool

Activity performed		**Unique or Lab Specific Activities** If your lab conducts any additional or unique activities that are not listed above, identify the potential hazards and appropriate PPE then add these activities to the table below. If a lab activity is similar to but somewhat different than one of the common activities listed, include it in this section as well.			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐				
☐	☐				
☐	☐				
☐	☐				
☐	☐				
☐	☐				
☐	☐				
☐	☐				
☐	☐				
☐	☐				

Appendix 1b - Laboratory Hazard Assessment Tool

Hazard Assessment Certification: This 'certifies' that you have conducted the hazard assessment. Maintain a copy of the signed hazard assessment (this document) in the lab safety records.

Name and title of person conducting assessment

Name: _____ **Title:** _____

Date assessment completed: _____

Appendix 1b - Laboratory Hazard Assessment Tool

The following Employees have reviewed the EHS Activity Hazard Assessment Tool specific to this lab and have received the following training:

1. When PPE is necessary
2. What PPE is required
3. How to properly don, doff, adjust and wear PPE
4. The Limitations of PPE
5. The proper care, maintenance, useful life, and disposal of PPE
6. General PPE safety practices of (e.g. not wearing PPE outside the lab)

Worker Name	UID	Training Date	Trainer	Worker Signature

UCDAVIS SAFETY SERVICES Environmental Health and Safety http://safetyservices.ucdavis.edu	**Workplace** **PPE Selection Guide** **One Shields Ave • Davis, CA 95616** **Phone: (530)752-1493 • Fax: (530)752-4527** **E-mail**: ehsdesk@ucdavis.edu

This document is intended as a supplement to the Hazard Assessment Tools in the selection of appropriate personal protective equipment (PPE). PPE selection should be based on risk assessments, which includes evaluation of hazards and applicable procedures and work practices, in consultation with area supervision and campus EH&S personnel as needed. This PPE Selection Guide is not intended to be a comprehensive resource on PPE.

PPE Categories

Fall Protection

Foot Protection

Hand Protection

Head Protection

Hearing Protection

Respiratory Protection

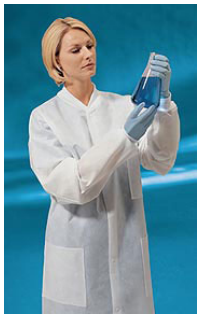
Skin & Body Protection

Vision & Face Protection

Skin & Body Protection

Laboratory coats, scrubs, uniforms, and disposable body coverings provide a level of protection from splash hazards. Special hazards and material qualities such as flame resistance, specific chemical resistance, physical strength (*e.g.,* leather) and visibility should be considered when selecting PPE for skin and body protection.

PPE	Specific Type (example)	Characteristics	Applications
Disposable sleeves		Disposable clothing and skin protection, protection from particulates	Working with particulates or potent compounds
Disposable Gowns		Clothing and skin protection, manufactured from variety of materials depending upon needed application	Working with Biohazards and animals
Scrubs		Provides a layer of protection for the skin and/or clothing from contact with biological and chemical fluids	Working in clinical, medical and surgical settings as needed
Tyvek Gown/Coveralls		Clothing and skin protection, tear resistant, protection from particulates	Working with biohazards, chemicals, animals or airborne particulates
Safety (Visibility) Vest		Colorful and/or reflective	Construction sites, traffic hazard areas, emergency response

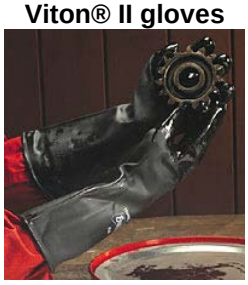
PPE	Specific Type (example)	Characteristics	Applications
Lab Coats (Knee Length)	**Cotton** 	Protects skin and clothing from dirt, inks, non-hazardous chemicals, biohazards without aerosol exposure	General use; Chemical, Biological, Radiation, Physical and Animal Hazards
	Barrier 	Does not permit blood or other potentially infectious materials to pass through due to 3-layer construction	Working with human blood, body fluids, tissues, cells or other potentially infectious material which may contain human bloodborne pathogens
	Flame Resistant(FR) 	Flame resistant (e.g. Nomex or flame-resistant cotton)	Working with water or air reactive chemicals, flammable solvents, potentially explosive chemicals
Flame Resistant Coveralls		Flame resistant (e.g. Nomex or flame-resistant cotton)	Working with water or air reactive chemicals, flammable solvents, potentially explosive chemicals, welding, or electrical systems
Leather Apron, Jacket, Coveralls and Sleeves		Leather clothing	Welding or other shop work with potential sparks or projectiles

PPE	Specific Type (example)	Characteristics	Applications
Aprons	**Flame Resistant (FR) Apron** 	Flame resistant (e.g. Nomex or flame-resistant Cotton)	Working with flammable solvents, welding or electrical systems.
	Rubber-coated wash apron 	Chemical splash protection, good abrasion resistance	Working with apparatus under pressure, splash potential of hazardous liquids
	Neoprene apron and sleeves 	Chemical resistant, tear resistant; splash protection	Working with apparatus under pressure, splash potential of hazardous liquids

Hand Protection

Gloves should be selected for each procedure to provide protection from the hazards. In some circumstances there may be several hazards and glove selection may involve different gloves for different steps of the procedure and/or several layers of gloves may be needed to address all hazards. For example, when injecting radioactive materials into a research animal one may need a layer of disposable gloves for protection from the radioactive liquid augmented with a metal mesh glove for protection from animal bites.

PPE	Specific Type (example)	Characteristics	Applications
Disposable Gloves, thin-gauge* (< 8 – 10 mils)	**Disposable latex gloves** 	Powdered or un-powdered, some chemical resistance – consult glove resistance chart, incidental chemical contact only	Working with biological hazards (known or potentially infectious materials including work with animals)
	Disposable vinyl gloves 	Economical and thin	Working with biological hazards, **not** for chemical handling
	Disposable nitrile gloves 	Some chemical resistance – consult glove resistance chart, incidental chemical contact only	Working with biological hazards and chemical hazards of small quantity
Leather Gloves		Protect and comfort hands from moderate temperatures, sharp objects, damage by friction,	Handling sharp objects and metal, field work, welding
Wire Mesh Gloves		Cut resistant	Working with sharp instruments or live animals

PPE	Specific Type (example)	Characteristics	Applications
Chemical Resistant Gloves, multi-use*	**Natural rubber latex** 	Good resistance to biological or water-based materials, poor organic solvent resistance – consult glove resistance chart	Working with small volumes of aqueous-based low hazard chemicals
	Nitrile gloves 	Chemical resistant for incidental contact – consult glove resistance chart	Working with larger volumes of chemicals
	Butyl gloves 	Generally good chemical resistance to many chemicals – consult glove resistance chart	Working with larger volumes of chemicals, hazardous material spills
	Viton® II gloves 	Generally good chemical resistance to many chemicals, consult glove resistance chart	Working with larger volumes of chemicals, hazardous material spills
	Silver Shield gloves 	Generally good chemical resistance to many chemicals, consult glove resistance chart, may need overglove for manual dexterity	Working with larger volumes of chemicals, hazardous material spills, good resistance to methylene chloride (dichloromethane)

PPE	Specific Type (example)	Characteristics	Applications
Insulated Gloves	**Terrycloth autoclave gloves** 	Heat resistant	Working with hot equipment
	Flame Resistant (FR) gloves and glove liners  	Heat resistant due to fabric construction and properties, some typical materials include Nomex® and leather, Nomex® and lycra blend, Rhovyl/ESD carbon filament, and acrylic/FR rayon knit. Gloves may be referred to as “flight gloves”.	Some pyrophorics handling, liners can be worn under chemical-resistant gloves, flight gloves can be worn over chemical-resistant gloves. Consult EH&S for the best FR glove for your needs and materials.
	Cryogen gloves 	Water resistant protection against ultra-cold temperatures	Cryogenics handling
Electrical Safety Gloves		Insulated voltage-rated rubber, gauntlet length, leather gloves worn over	Electrical safety applications with higher hazard/risk or unknown

*-Always check the manufacturer’s chemical resistance guides before selecting chemical-resistant gloves. Contact EH&S for additional information.

Head Protection

Head protection may be something as simple as a disposable bouffant surgical cap to protect the head from aerosols during surgical operations, or a hard hat to protect from overhead hazards. Electrical work may require arc flash protection of the head, face, hands and body; please consult with your supervisor or EH&S safety staff for guidance.

PPE	Specific Type (example)	Characteristics	Applications
Bouffant Cap		Economical protection for hygienic work environments; protection from dirt, dust	Working with biohazards, surgical applications, animal facilities
Flame Resistant Balaclava		Specialized electrical safety equipment	Electrical safety applications with higher hazard/risk or unknown
Bump Cap		Light-weight plastic cap used to project against scraping or bumping one's head.	Designed for use in areas with low head clearance. Recommended for areas where protection is needed from head bumps and lacerations. These are not designed to protect against falling or flying objects and are not ANSI approved.

Head Protection continued on following page →

Hard Hat		Light-weight, metal or reinforced plastic to protect against overhead hazards, incorporates a suspension to dissipate impact from falling objects	Hard hats are divided into three industrial classes: **Class A** hard hats provide impact and penetration resistance along with limited voltage protection (up to 2,200 volts). **Class B** hard hats provide the highest level of protection against electrical hazards, with high-voltage shock and burn protection (up to 20,000 volts). They also provide protection from impact and penetration hazards by flying/falling objects. **Class C** hard hats provide lightweight comfort and impact protection but offer no protection from electrical hazards.

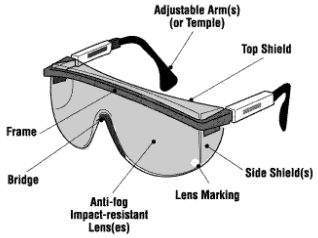
Hearing Protection

In general, if a workplace noise is loud enough that you could not hold a conversation with a person one arm length away, then a noise assessment must performed by EH&S prior to PPE selection. Some exposures may require enrollment in the campus Hearing Conservation Program managed by Occupational Health Services.

PPE	Specific Type (example)	Characteristics	Applications
Ear Plugs		Disposable, inexpensive	Working with loud equipment, noises, sounds, alarms, etc…
Canal Caps		Inexpensive, easy to insert, not as effective as ear plugs, but easier to insert with soiled hands	Working with loud equipment, noises, sounds, alarms, etc.
Ear Muffs		Reusable, not as effective when worn with safety glasses	Working with loud equipment, noises, sounds, alarms, etc…

Vision & Face Protection

Safety glasses, safety goggles, laser eyewear, face shields, and helmets provide a level of protection as designated by the manufacturer. The hazard and the protection standards for each piece of vision and face protection PPE must be considered when during selection. The PPE must protect against the posed hazard(s).

PPE	Specific Type (example)	Characteristics	Applications
Safety glasses		Polycarbonate lens, side shields for eye protection Personnel with corrective lenses will need prescription safety glasses or overglasses	Working with chemical, biological, radiation, physical hazards
Goggles		Protects eyes from impact, spray, paint, chemicals, flying, chips, dust particles	Working with chemical liquids with likely splash probability or high splash hazard
Laser Eyewear		Appropriately shaded goggles; optical density based on beam parameters	Working with Class 3 or Class 4 lasers, consult laser use authorization for specific applications.
Surgical / Procedure Mask		Protects nose and mouth from direct contact with biological and chemical fluids; prevent spread of aerosolized infectious biological agents	Anatomical, surgical, medical and clinical settings
Face Shield		Impact and chemical resistant face shield, must be combined with safety glasses or goggles	For use with potential chemical splash or projectiles, apparatus under pressure or vacuum, cryogenics handling

PPE	Specific Type (example)	Characteristics	Applications
Optical Face Shield		Face shield with special optical density (OD) value for ultraviolet radiation (UV) or infrared shielding	Working with UV or infrared emitting equipment
Welder's Goggles		Impact resistant lenses and available in graduated shades of light filtration	Welding with potential sparking, scaling, harmful light rays
Welder's Helmet		Durable helmet with filtered lens	Welding to protect eyes and face against heat, sparks, flash burn, ultraviolet or infrared light
Arc-Rated Face Shield		Specialized electrical safety equipment for facial protection	Electrical safety applications with higher hazard/risk or unknown

Respiratory Protection

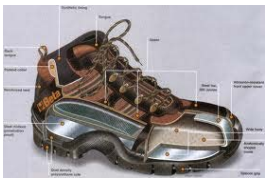
In a laboratory, airborne contaminants are kept very low through exhaust ventilation and by working with open containers of volatile materials inside a chemical fume hood. When airborne contaminants cannot be adequately controlled by fume hoods and ventilation, then respiratory protection may be needed. The use of respiratory protection has very stringent regulatory requirements. For this reason, UC Davis has a Respiratory Protection Program to meet the requirements and provide the necessary training and documentation.

PPE	Specific Type (example)	Characteristics	Applications
Dust Mask		May protect against dusts, fumes, mists, microorganisms including animal allergens	Dusty environments, working with live animals or potentially infectious materials
N95 Respirator		Protects against dusts, fumes, mists, microorganisms including animal allergens	Dusty environments, working with live animals or potentially infectious materials
Cartridge Respirator	**Half face Air-Purifying** 	Protects against variety of particulates, vapors, dust, mists, fumes, or a combination of these; depends on filter or cartridge used	Dusty environments, potentially infectious materials, chemical vapors; particulates, and select gases (cartridge dependent)
	Full face, Air-Purifying 	Similar to half-face, but with greater protection factor, and greater protection of eyes and face; depends on filter or cartridge used	Dusty environments, potentially infectious materials, chemical vapors; particulates, and select gases (cartridge dependent)

PPE	Specific Type (example)	Characteristics	Applications
Powered Air-Purifying Respirator (PAPR)		Powered air purifying respirator; delivers steady supply of filtered air with loose fitting hood; can be used with HEPA filters or chemical cartridges.	Working in some BSL – 3 environments; high levels of chemical vapors, particulates;
Self-Contained Breathing Apparatus (SCBA)		Bulky, limited operation time, highly protective. (Mostly used by UCD Fire Department)	Used in oxygen deficient atmospheres, Immediately Dangerous to Life or Health (IDLH) or areas of high concentrations or unknown airborne contaminants.

Foot Protection

Foot protection may be something as simple as a disposable shoe covers to minimize spread of contamination. In food service and vivariums, slip resistant shoes may reduce the risk of slips, trips, and falls. In shops and industrial activities, the supervisor must evaluate the hazards and select foot protection accordingly.

PPE	Specific Type (example)	Characteristics	Applications
Shoe Cover		Protection from dirt, dust; maintenance of hygienic work environments. Non-slip soles	Working with biohazards, animal facilities, or potential floor contaminants
Foot/Shin Guards		Typically strap on to legs or feet.	Use of high-pressure washers, or protection of shins and feet when handling heavy materials.
Slip Resistant Shoes		Shoe with sole designed to enhance traction in slippery work environments	Working in animal facilities, custodial applications, food service facilities, medical/clinical settings, and shops
Safety Shoes		Toe, metatarsal, foot protection, steel reinforcements and inserts. There are numerous types of safety shoes for specific applications.	Handling heavy items, construction, warehouse applications, agricultural field work

Fall Protection

A fall protection system is needed where there is a potential for injury due to falling while working at elevated height. Consult with EH&S prior to procurement of any items for a fall protection system. Fall protection regulations are contained in both General Industry Standards and Construction Standards. Proper training and inspection of equipment is required under these regulations. Consult EH&S for additional information.

PPE	Specific Type (example)	Characteristics	Applications
Full Body Harness		Provides protection from injury while falling from heights	Working at heights (> 6 feet) and confined space retrieval
Locking Carabiner		Connect components of a fall protection system	Working at heights (> 6 feet) and confined space retrieval
Shock Absorbing Lanyard		Provides connection from harness to anchor point with ability to lessen fall force factor, working length of 6 feet	Working at heights (> 18.5 feet of fall clearance) for fall arrest situations
Self-Retracting Lifeline w/Swivel		Provides connection from harness to anchor, shorter activation distance reduces fall force factor	Working at heights movement for fall arrest situations where greater worker movement flexibility is needed
Anchor		Primary point of attachment for a fall protection system, minimum 5,000 pound breaking strength	Working at heights (> 6 feet) and confined space retrieval

University of California Policy

Minors in Laboratories and Shops

Responsible Officer:	Chief Risk Officer
Responsible Office:	RK - Risk / EH&S
Issuance Date:	June 12, 2013
Effective Date:	October 31, 2013
Scope:	Faculty, Academic Appointees, Staff, and Volunteers who work with Minors

Contact:	Ken Smith
Email:	Ken.Smith@ucop.edu
Phone #:	510-987-0170

I. POLICY SUMMARY

This policy governs the presence of minors in any University laboratory or shop that uses hazardous chemicals, biohazardous or infectious materials, radioactive materials or radiation-producing equipment, or where there are physical hazards including (but not limited to) compressed gases, high voltage, extreme temperatures, excessive noise, or lasers.

The policy does not apply to students enrolled in courses listed in a campus course catalog having a laboratory component or in any of the University of California's educational outreach programs. Outreach programs include students working on science fair projects and other campus or department sponsored events in which minors are participating as part of a larger group.

This policy applies to all minors involved in summer internships, volunteering in research projects and participating in scheduled assignment in a laboratory setting.

This policy sets restrictions on minors' participation based on age ranges. Minors under the age of 14 are not permitted in University of California laboratories or shops, except when participating in an approved and supervised tour. This prohibition extends to the minor children related to laboratory personnel.

This policy sets minimum requirements; each campus may develop more stringent policies and procedures as deemed necessary.

II. DEFINITIONS

Biological Agents: Living organisms or products of living organisms such as viruses, bacteria, fungi, prions & parasites.

Biosafety Level (BSL) Containment Protocols: Biosafety Levels 1-4 as defined by the National Institutes for Health guidelines, describe containment practices for hazardous chemicals and dangerous materials, based on advice from the federal Centers for Disease Control and Prevention. Containment strategy is linked to the type of facility, appropriate engineering controls, safe work practices, and use of personal protective equipment.

Biosafety Level 1 containment is prescribed for agents that are not known to cause disease in healthy adult humans.

Biosafety Level 2 containment is prescribed for agents linked to human disease, but the disease is rarely serious; treatment is often available.

Biosafety Level 3 containment is prescribed for agents that are linked to serious or lethal human disease; treatment may be available.

Biosafety Level 4 containment is prescribed for agents that are linked to serious or lethal human disease; treatment is rarely available.

Controlled Substances: Narcotic and non-narcotic substances that are regulated under the federal Controlled Substances Act and the California Uniform Controlled Substances Act including but not limited to those substances listed in 21 CFR 1308.11-1308.15

Laboratory: As used in this Policy, “laboratory” refers to any part of a building used or intended to be used by the University for scientific or technical activities which may be hazardous; this includes teaching laboratories as well as research laboratories. This policy also covers off-campus facilities, on-and off-campus clinical facilities, and fieldwork locations where approved educational activities are conducted.

Minor: An individual under 18 years of age (California Family Code §6500-6502).

Personal Protective Equipment (PPE): Personal protective equipment is equipment worn to minimize exposure to a variety of hazards. Examples of PPE include such items as lab coats, gloves, foot protection (steel-toed shoes),eye protection (safety glasses or goggles), protective hearing devices (earplugs, muffs), hard hats, respirators, fall protection harnesses, etc.

Shop: As used in this Policy, a place where machinery and tools are used. “Shops” include but are not limited to engineering shops, art workshops, and other sites.

Vivarium: A facility where live animals or plants are housed.

III. POLICY TEXT

The University of California is committed to providing a healthy and safe environment for all members of the campus community and visiting members of the public.

This policy is meant to protect both the safety of minors and of other laboratory personnel. The principles underlying this policy are:

- Minors may be more susceptible to certain toxic agents and chemicals,
- Minors may be less aware of the potential risks and hazards in laboratories,
- Minors may require supervision and oversight.

The policy does not apply to students enrolled in courses listed in a campus course catalog having a laboratory component or in any of the University of California's educational outreach programs. Outreach programs include students working on science fair projects and other campus or department sponsored events in which minors are participating as part of a larger group.

This policy is intended as a minimum requirement; each campus may develop more restrictive policies and procedures as deemed necessary. Exceptions to this policy may be granted on a case-by-case basis according to local guidelines, pending review and written approval by the campus Research Vice Chancellor (or designee).

A. Minor children of laboratory personnel are not permitted in laboratories or shops except under one of the following conditions:
    1. In accordance with requirements of Section III.C, or
    2. Laboratory/technical areas which have been designated and posted as free of physical or chemical hazards, or
    3. As part of a campus/department sponsored event, or
    4. For the purpose of escorting a minor child to/from an enclosed office/breakroom located within a laboratory or shop.

B. Minors are never permitted in any setting where research involving controlled substances is being performed, even if they are enrolled students. Persons under age 18 are not permitted in University of California vivaria unless their participation has been reviewed and approved by the campus Institutional Animal Care and Use Committee (IACUC) and the responsible vivarium facility manager based upon criteria established by the campus.

C. Minors between the ages of 14 and 18 are allowed in laboratory settings only when:

    1. They are students enrolled in courses listed in a campus course catalog or part of an approved and supervised tour, **or**

2. They have written consent from their parent(s) or guardian(s); and,
   They have received the appropriate University of California safety training and the campus has documented that training; and
   They agree to strictly adhere to the campus or laboratory-specific requirements concerning Personal Protective Equipment (PPE); and,
   They are at all times under the direct supervision of a qualified adult designated for this responsibility.

D. Before their scheduled assignment in a laboratory begins, minors must be trained on specific hazards to which they may be exposed in the laboratory/shop, how to recognize those hazards, and how to protect themselves from those hazards. Minors must be trained on the contents of the laboratory-specific chemical hygiene plan and the standard operating procedures and emergency procedures applicable to their scheduled assignment. Additional training may be required for tasks that involve hazardous chemicals, biological agents, radioactive materials, research animals, and physical hazards. All training must be documented. Refer to the Policy on Laboratory Safety Training.

E. Legal Restrictions Regarding Certain Chemicals , Biological Materials and Radiation

   Regulations prohibit minors from using certain chemical, biological, or radiological materials. There are also specific training requirements based on the materials a minor will be handling and/or exposed to**.** Restrictions on chemical, biological, and radiological materials are as follows.

   1. Chemical Safety Restrictions: Minors are not allowed to work with:
      a) Highly hazardous materials, including pyrophorics, explosives, large quantities of flammable materials (i.e., 4 liters or more), and compounds having a rat oral LD_{50} less than or equal to 50 mg/Kg (e.g., hydrofluoric acid, acrylonitrile, osmium tetroxide, etc.)
      b) International Agency for Research on Cancer (IARC) Group 1 or 2A carcinogens or Cal/OSHA-regulated carcinogens
   2. Biological Safety Restrictions: Minors may never work with or be present in circumstances requiring BSL-3 or BSL-4 containment. Restrictions for handling potentially biohazardous substances depend on age group:
      a) Persons ages 14 to 16:
         - Are prohibited from handling biohazardous materials that require containment above BSL-1.

- May enter a BSL-1 in a large open bay laboratory where BSL-2 work may be taking place, providing they have no contact with the BSL-2 work.

b) Persons ages 16 to 18:

- Are prohibited from handling biohazardous materials that require containment above BSL-2.
- May enter a BSL-2 with appropriate training and medical surveillance (if applicable).

3. Radiation Safety Restrictions: Minors are not allowed to handle radioactive materials or radiation-producing machines. PIs must apply to their campus EH&S Radiation Safety Officer ("RSO") for exceptions. Exceptions must be documented in writing.

IV. COMPLIANCE / RESPONSIBILITIES

Chancellor / Laboratory Director (or Designee)	The Chancellor or LBNL Director or designee is responsible for implementing this policy and location-specific procedures
Laboratory Supervisor or Principal Investigator	The University academic or staff employee who sponsors a non-student minor's educational activity must certify adherence to this policy and local implementing procedures on the Minors Performing Research Registration Form. The PI or supervisor must make an evaluation of each physical hazard present in the work environment (e.g., compressed gases, high voltage, extreme temperatures, excessive noise, lasers, etc.) the minor may encounter as part of their scheduled assignment in the laboratory and (1) review the physical hazards with the minor, (2) review safe operating procedures for the equipment with the minor, (3) review emergency procedures for the equipment with the minor, and (4) establish specific and explicit instructions for the scheduled assignment the minor is allowed to perform
Location EH&S Personnel	The local EH&S Office is responsible for assisting laboratory personnel in maintaining and monitoring health and safety requirements.
Human Resources Office	Any policy covered UC employee who oversees minors must have a criminal background check conducted in accordance with University policy and local procedures. Noncompliance with the policy is handled in accordance with Personnel Policies for Staff Members (PPSM) policies 62-65 pertaining to disciplinary actions, Academic Personnel Manual

	(APM) policies 015-016 pertaining to the Faculty Code of Conduct and administration of discipline; APM 140 and 150 pertaining to Non-Senate Academic Appointees, or Collective Bargaining Agreement.
Under Age 18-Participant	The participant must undergo required training and complete campus required registration forms.
Participant's Parent or Guardian	Parent/guardian must sign campus required registration form, including a release of liability and hold-harmless agreement.

V. PROCEDURES

Principal Investigators or activity sponsors must follow these steps to obtain advance authorization and parental permission before allowing a minor to participate in research activities, and must ensure that minors under their supervision receive appropriate training about hazardous materials handling requirements and restrictions. Failure to do so will result in corrective action.

A. Obtain written authorization before the minor begins scheduled assignment in the lab in accordance with location- specific policies and procedures, using appropriate forms (e.g., Waiver of Liability, Assumption of Risk and Indemnity Agreement.

B. Provide direct supervision of the minor in the laboratory environment by a qualified adult laboratory supervisor at all times. Ensure supervision requirements are observed. "Direct supervision" means while entering, leaving or in the laboratory, the minor is physically accompanied at *all* times by a trained and knowledgeable supervisor.

C. Review emergency procedures with the minor. Show the minor the following emergency equipment and locations: (Refer to the *Laboratory Site Safety Orientation* in the Policy on Laboratory Safety Training)
   - Telephone and emergency phone numbers,
   - First-aid kit,
   - Eye wash and emergency shower,
   - Fire alarm pull stations and fire extinguishers,
   - Building exits,
   - Where to assemble outside in case of building evacuation.

D. Provide general and laboratory specific safety training.

   As the Principal Investigator / Supervisor you must confirm that the minor receive appropriate laboratory safety training by doing the following:
   - Assure that the minor completes campus-specific safety training before the minor begins scheduled assignment,

- Explain hazards specific to your lab, equipment, and the materials the minor may handle; e.g.
  - Show the minor how to access and understand Safety Data Sheets (SDS) for the chemicals with which they will utilize.
  - Explain possible routes of exposure, as appropriate (e.g., skin absorption, ingestion, inhalation) and precautionary measures precautions to limit exposures,
  - Evaluate each potential hazard present in the work environment (e.g., compressed gases, high voltage, extreme temperatures, excessive noise, lasers, etc.) the minor may encounter as part of their scheduled assignment in the laboratory and
    (1) review the potential hazards,
    (2) review safe operating procedures for the equipment,
    (3) review emergency procedures for the equipment, and
    (4) establish specific and explicit written instructions (Standard Operating Procedures) for the work the minor is allowed to perform.
  - Provide appropriate PPE and engineering controls, and train the minor in their proper use.
  - Maintain all safety training documentation and *Release of Liability* forms in the lab's files in accordance with campus policy.

VI. RELATED INFORMATION

Minors in Labs Registration Packet (samples)

Release of Liability, Waiver of Claims, Express Assumption of Risks and Hold Harmless Agreement (form)

Notification of Possible Hazards to Minors Performing Research ("Potential Hazard Information Sheet")

Rules for Minors in Laboratories and Shops

Minors Research Proposal Project Registration Form

University Policy on Management of Health, Safety and the Environment

Centers for Disease Control, Biosafety in Microbiological and Biomedical Laboratories (http://www.cdc.gov/biosafety/publications/bmbl5/index.htm

Personnel Policies for Staff Members 62, 63, 64, 65, and 67

VII. FREQUENTLY ASKED QUESTIONS

Not Applicable.

VIII. REVISION HISTORY

This is the first version of this Policy.

RELEASE OF LIABILITY, WAIVER OF CLAIMS, EXPRESS ASSUMPTION OF RISKS, AND HOLD HARMLESS AGREEMENT

I HAVE READ, UNDERSTAND, and INITIALED the documents Rules for a Minors Working in Laboratories and Shops and Potential Hazard Information Sheet describing the potential risks and dangers associated with my child's research project. I fully understand that there are potential risks and hazards associated with exposure to hazardous materials or substances.

I AGREE TO ALLOW my minor child to participate on a scheduled assignment in the University of California laboratories and freely accept and assume all associated risks and hazards. I ALSO AGREE AND UNDERSTAND that my child's research project may be suspended at any time, at the discretion of the University of California and its officers, agents, and employees, if the safety of my child, University of California employees and/or other volunteers at the University of California become a concern.

I, for myself and my estate, heirs, administrators, executors, and assigns, hereby release and hold harmless the State of California, the UC Board of Regents, and their officers, directors, employees, representatives, agents, and volunteers (collectively, the "Releases"), from any and all liability and responsibility whatsoever, however caused, for any and all damages, claims, or causes of action that I, my estate, heirs, administrators, executors, or assigns may have for any loss, illness, personal injury, death, or property damage arising out of, connected with, or in any manner pertaining to my child's scheduled assignment in the University of California laboratories, whether caused by the negligence of Releases or otherwise. I further hereby agree to defend, indemnify and hold harmless the Releases from any judgment, settlement, loss, liability, damage, or costs, including court costs and attorney fees that Releases may incur.

In signing this agreement, I acknowledge and represent that I have read and understand it and that I sign it voluntarily and for full and adequate consideration, fully intending to be bound by the same.

_____
Printed Name of Minor Child

_____ _____
Signature of Parent/Legal Guardian Printed Name of Parent/Legal Guardian

_____
Date

I have read, understand, and will adhere to the University of California Minors in Laboratories and Shops Policy. I understand that failure to comply with this Policy is dangerous to my health and safety and that I may be removed from the facility immediately for any failures or deviations in compliance.

_____
Signature of Minor

_____

Date

Potential Hazard Information Sheet			
Type	**Characteristics/potential hazards**		**Examples**
Chemicals	Refined compound that may be in the form of a solid, liquid or gas. These may or may not be hazardous. Some compounds may have numerous hazard classifications (e.g., flammable, toxin & carcinogen)	Carcinogens: may cause cancer with long term exposure - usually many years in the future	Benzene
		Teratogens: known to affect the reproductive system of males /females & may cause birth defects in the developing fetus.	Alcohol, thalidomide, X-rays
		Neurotoxins: may affect the nervous system.	Ethidium bromide, snake venom
		Flammables: may burn or explode	Acetone, Xylene, Alcohol
		Reactives: may react explosively	Peroxides, acrylamide
		Corrosives: may cause tissue damage through inhalation or direct contact with eyes, skin, etc.	Acids & Bases
		Toxins: may cause illness or death on exposure.	Cyanide
Compressed Gases	Gases frequently housed in large & heavy high-pressure cylinders. The gas itself may be harmless, toxic, corrosive, flammable	Physical hazard: Explosion hazard upon rupture Asphyxiant hazard if gasses enter workplace & displace oxygen	Asphyxiant: nitrogen, helium, any other non-oxygen gas Flammable: hydrogen Toxic: ammonia
Radiation / Radioactive Materials	High energy particles (alpha & beta) or photon (X-rays, gamma)	Tissue & Organ damage with high doses	Uranium, Phosphorus-32, Sodium-35, X-rays
Physical Hazards	Exposure to noise, machinery, heat, cold, etc.	Tissue damage, hearing loss	Scrapes, cuts Cold: liquid nitrogen, dry ice Heat: burners
Lasers	Light Amplification by Stimulated Emission of Radiation	Eye damage and possible skin damage	Class IIIB and IV, and open beam laser operation

Biological Agents	Living organisms or products of living organisms such as viruses, bacteria, fungi, prions & parasites. Hazards from infection are organism dependent & may range from mild treatable to severe untreatable. Hazards are classified according to recommended containment protocol.	Biosafety Level 1 - No hazard	Baker's yeast & E. coli K12
		Biosafety Level 2 - Mild to severe illness	Influenza, Polio & Salmonella
		Biosafety Level 3 – Severe illness & possible death	Tuberculosis & AIDS
		Biosafety Level 4 – Fatal disease	Hemorrhagic fever
Recombinant DNA	Genetically modified organisms.	Scant scientific knowledge as to effects once introduced to the human body.	Viral vectors such as Adeno & Adeno-associated viruses used to transfect or express genes.
Toxins – Microbial, Plant, Animal	Poisonous substances produced by plants, living organisms or animals.	Tissue & organ damage or death.	Plants – Ricin Animals – fish / Reptile venom Microbials – Staphyloccus, Tetanus

Parent/Legal Guardian signature: _____ Date: _____

RULES FOR MINORS IN LABORATORIES AND SHOPS

1. Never participate on a scheduled assignment alone in any laboratory environment without direct, immediate adult supervision from the sponsor or someone designated by the sponsor.

2. Complete and follow safety training specific to the hazards in the laboratory**.**

3. Always wear the personal protective equipment as directed and dispose of it appropriately. This personal protective equipment (PPE) includes goggles, gloves, coats/gowns, and other face/body protection as dictated by the hazard being worked with or around. Always remove PPE when leaving the work area.

4. Always follow the instructions of the sponsor or laboratory supervisor.

5. Always report any accident (regardless of severity) immediately to the sponsor or laboratory supervisor.

6. Always keep your hands away from your face and wash them well with soap and water prior to leaving any laboratory area and after removing gloves.

7. Never eat, drink, chew gum, apply lip balm, or touch contact lenses while in any laboratory environment.

8. Always wear closed-toe shoes while in any laboratory.

9. Always tie back long hair to keep it out of all the hazards listed above.

10. Always wear clothing that reduces the amount of exposed skin.

11. Always ask questions if you don't understand the safety requirements.

_____
Printed Name of Minor Child

_____
Signature of Minor

_____ _____
Signature of Parent/Legal Guardian Printed Name of Parent/Legal Guardian

_____
Date

Minors Research Proposal Registration Form

Proposals are due to the Department Chair at least 2 weeks prior to the beginning of the project.

Principal Investigator/Sponsor Name _____ Department: _____
Phone: _____ Email: _____
Student/Minor Name: _____ Date of Birth: _____

The nature of this project is (check one) □ Student Intern □ Volunteer □ Other (specify) _____ ☐ Part of a University of California Sponsored Program (which program?) _____	Project Title: _____ Project Start Date: _____ Project End Date: _____ Project Description (attach separate sheet if necessary): _____ _____ Location: Bldg. _____ Room(s) _____

Materials and Equipment to be Used
Check and List all that apply:

Chemicals	Biological Material	Equipment
□ Flammable	□ Recombinant DNA	□ Fume Hood
□ Reactive	□ Bacteria	□ Biosafety Cabinet
□ Carcinogenic	□ Viruses	□ Laminar Clean Bench
□ Toxic	□ Fungi	□ Autoclave
□ Corrosive	□ Parasites	□ Centrifuge
□ Oxidizer	□ Human Source Material	□ Analytical Instruments
□ Cryogen	□ Insects	□ Industrial Machinery
□ Pharmaceuticals	□ Plants	□ Noise Producing Equip.
□ Gasses	□ Animals	□ Other Equipment _____

I AGREE TO SPONSOR (MINOR'S NAME)
_____, AND BY MY SIGNATURE BELOW, AGREE THAT:

- I have read, understand, and will adhere to the "Minors in Laboratories and Shops" Policy. The potential hazard information signature sheet is attached.
- I will ensure that this Minor's Hazard Specific Safety Training is completed and documented.
- Personal protective equipment appropriate for, and specific to, laboratory hazards will be provided.
- This individual will be supervised at all times while in the laboratory and never left alone.
- My laboratory is in full compliance with all applicable University of California safety programs and regulations
- I understand that my failure to adhere to the "Minors in Laboratories and Shops" Policy may result in my receiving corrective action or discipline, up to and including dismissal.

_____ _____
Printed Name of PI/Sponsor Date Signature of PI/Sponsor Date

Department Chair Approval (if required)

_____ _____
Printed Name of Department Chair Date Signature of Department Chair Date

Retain for 3 years

University of California Policy

Personal Protective Equipment

Responsible Officer:	Chief Risk Officer
Responsible Office:	RK - Risk / EH&S
Issuance Date:	June 12, 2013
Effective Date:	March 31, 2014
Scope:	This policy and regulatory standards require the supervisor to select Personal Protective Equipment (PPE) for workers under their supervision based on an assessment of hazards in the workplace which those workers are likely to encounter. Supervisors are required to inform such workers of the selection decisions, and to have their workers follow those decisions when obtaining PPE. PPE will be provided to workers at no cost. Full implementation of this policy shall occur 60 days past receipt of PPE scheduled delivery per policy requirement. This policy applies to students enrolled in academic courses in which PPE is required by the instructor and/or indicated in the course syllabus.

Contact:	Ken Smith
Email:	Ken.Smith@ucop.edu
Phone #:	(510) 987- 0170

I. POLICY SUMMARY

The University of California is committed to providing a healthy and safe working environment for all members of the campus community. This Personal Protective Equipment (PPE) policy is designed to prevent workplace injuries and illnesses for all academic appointees, staff, students, and visitors.

II. DEFINITIONS

Hazardous Materials: Hazardous materials, for the purposes of this policy, are chemical or biological agents that have been generally accepted as a health or physical hazard. Unsealed radioactive materials are also included as "hazardous materials." Additional guidance is included in Appendix A.

Laboratory/Technical Areas: For the purposes of this policy, a laboratory/technical area is a location where the use or storage of hazardous materials occurs or where equipment may present a physical or chemical hazard. It includes, but is not limited to:

Research laboratories	Waste accumulation areas/locations
Teaching laboratories	Cold rooms
QA/QC and analytical laboratories	Machine and other Workshops
Stock rooms	Vivaria
Storage rooms	Visual/performing arts studios and shops

Personal Protective Equipment (PPE): Personal protective equipment is worn to minimize exposure to a variety of hazards. Examples of PPE include such items as lab coats, gloves, foot protection (steel-toed shoes),eye protection (safety glasses or goggles), protective hearing devices (earplugs, muffs), hard hats, respirators, fall protection harnesses, etc.

Physical Hazards: Physical hazards are identified as substances, equipment, or activities that can threaten physical safety. Physical hazards can include but are not limited to: impact (falling objects), fall hazards, extreme pressures, temperature extremes (heat/cold), radiation (ionizing and non-ionizing), noise, vibration, electrical, light (optical), welding, cutting, brazing.

Student: An individual enrolled in an academic class.

Supervisor: An employee who may have authority to hire personnel, evaluate performance, direct work assignments, apply progressive discipline, direct resources to correct identified safety issues. This includes a Principal Investigator, area manager, unit manager, project manager, superintendent, and foreman/person. Unless specified in writing, the default "supervisor" in laboratory/technical areas is the Principal Investigator.

Use or Storage: For the purposes of this Policy, "use or storage" includes those operations where workers are directly manipulating hazardous materials, adjacent to or in proximity to a hazard or in areas where there is a reasonable risk of exposure. Reasonable risk of exposure includes all activities identified in the hazard assessment that pose an exposure risk to the worker.

Worker: For purposes of this policy, a worker is an individual who actively performs work functions with hazardous materials or equipment in a laboratory/technical area. A "worker" may be faculty, staff, student volunteer assisting in a non-academic class, or visitor/visiting scholar. For the purpose of this definition, "worker" excludes individuals who only passively participate in tours, lectures, conferences, etc.

III. POLICY TEXT

Hazards exist in every University workplace and can take many different forms: sharp edges, falling objects, flying sparks, chemicals, noise, and a myriad of other potentially dangerous situations. This policy requires that the University protect its workers from workplace hazards that can cause injury.

Controlling a hazard at its source is the best way to protect employees. Depending on the hazard or workplace conditions, the preferred solution is the use of engineering or work practice (administrative) controls to manage or eliminate hazards to the greatest extent possible. When engineering or administrative (work practice) controls are not feasible or do not provide sufficient protection, supervisors must provide personal protective equipment (PPE) to their workers and ensure its use.

Failure/refusal to wear required PPE is a basis for discipline, in accordance with locally-established procedures. A student not wearing course required PPE in a laboratory/technical area may not participate in lab activities until such PPE is worn.

This policy sets minimum systemwide requirements; each campus may develop policies and procedures which meet or exceed this policy standard.

A. General Program Requirements

1. For workers:

a. Perform Hazard Assessment

Each supervisor shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). This assessment must evaluate both the hazards to the individuals performing the work and assess the hazards to individuals who occupy the room or space where the work is being performed.

Each supervisor shall verify that the required workplace hazard assessment has been performed through a written certification that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment and identifies the document as being a certification of hazard assessment. Hazard assessments that indicate less than the minimum PPE for a laboratory/technical area as stated in section B require review and approval from campus Environment(al) Health and Safety (EH&S) in accordance with local procedures (See section B3).

A completed standard operating procedure, job hazard analysis, or other similar document which includes a workplace hazard assessment can be used to satisfy this requirement.

b. Identify Required PPE

Each supervisor, based upon the hazard assessment, shall ensure that the appropriate personal protective equipment has been identified and is provided for each user. The PPE must be the proper fit and design for the user and not interfere with the ability of the worker to work safely. The PPE will be provided to the worker at no cost.

c. Training

Each supervisor will assure workers know how to properly wear, adjust and maintain assigned PPE. Workers will demonstrate understanding of the proper use of assigned PPE. The training must cover these elements: When PPE is necessary; What PPE is necessary; How to properly don, doff, adjust, and wear PPE; The limitations of the PPE, and; The proper care, maintenance, useful life and disposal of the PPE. Training will be documented.

d. Maintenance and Replacement

Each worker is responsible for properly wearing required PPE. Each worker is responsible for informing their supervisor when worn or damaged PPE needs to be replaced.

e. Evaluating the Appropriateness of Identified PPE

Each supervisor is responsible for periodically re-evaluating the selection and use of PPE in work areas under their control. The hazard assessment should be repeated when new hazards are identified or introduced into the workplace or at least every three (3) years.

2. For students:

Academic courses which include laboratory, shop or field work are required to indicate PPE requirements (including specifications of the type of PPE) as part of the course syllabus. These PPE items shall be the responsibility of the student to obtain and wear as part of the class. Common communal PPE such as thermal protective, welding aprons, face shields, etc., will be provided by the sponsoring department. The instructor of record for a course, or designee, is responsible for ensuring that students are familiar with and properly using required protective devices

B. Minimum Attire and Personal Protective Equipment Requirements for Laboratories/Technical Areas

The following minimum attire and PPE requirements pertain to all laboratories/technical areas where use or storage of hazardous materials occurs or a physical hazard exists. This section should be used as the basis for developing the required PPE elements to include in the course

syllabus for laboratory classes. The wearing of required PPE may only be modified as determined by a standard operating procedure or the laboratory hazard assessment. (See section III.A.1.a).

1. Attire when occupying a Laboratory/Technical Area

a. Full length pants (or equivalent) and closed toe/heel shoe attire must be worn at all times by all workers who are occupying or entering a laboratory/technical area. The area of skin between the pants and shoe should not be exposed.

2. PPE when working with, or adjacent to, hazardous material use areas within a Laboratory/Technical Area

a) Laboratory coats (or equivalent protective garments) and protective eyewear are required to be worn by all workers working with hazardous materials. In addition, laboratory personnel occupying the adjacent area, who have the potential to be exposed to chemical splashes or other hazards as determined by SOP requirements and/or the laboratory hazard assessment, are required to wear laboratory coats (or equivalent protective garments) and protective eyewear.

i. Laboratory coats must be appropriately sized (and if necessary fitted) for the worker. Coats must be buttoned/snapped to their full length. Laboratory coat sleeves must be of a sufficient length to prevent direct skin exposure while wearing gloves.

ii. Flame Resistant (FR-rated) laboratory coats must be worn when working with any amount of pyrophoric materials. FR-rated lab coats are also required when working with flammable liquids in laboratories using open flames or other potential ignition sources; or as determined by the hazard assessment.

iii. Laboratory coats shall not be laundered at private residences or public laundry facilities. Any protective clothing that becomes contaminated with hazardous materials must be decontaminated prior to being laundered or appropriately discarded. Campuses are responsible for providing suitable laundry services to maintain required laboratory coats.

iv. All protective eyewear must meet American National Standards Institute (ANSI) standards and be appropriate for the work being done. Typical prescription spectacles are not suitable eye protection. Prescription safety glasses/goggles are available through individual campus procurement offices. Protective eyewear may be removed when using optical microscopes or similar instruments, requiring close contact between the eyes and the eyepieces.

b) Protective gloves must be worn while using any hazardous materials, hot or cold liquids (including cryogenics), objects that pose a risk of thermal burns, items having physical hazards, or equipment that may cause hand injury. These gloves must be appropriate for the material or process being used and must not interfere with the ability of the worker to work safely. The Safety Data Sheet (SDS) for the material and the manufacturer-specific glove selection guide should be referenced to determine appropriate glove type.

c) Some operations and procedures may warrant additional PPE, as indicated by the Safety Data Sheet (SDS), the Standard Operating Procedures (SOP), facility policies, regulatory requirements, or the hazard assessment. These might include face shields, aprons, respiratory protection, hearing protection, etc.

3. Exceptions

a) The minimum personal protective equipment requirements for Laboratories/Technical Areas (sections III.B.1-2) will not apply to:

   i. Laboratories/technical areas which have been designated and posted as free of physical or chemical hazards. Examples: Laboratories/technical areas that house only operations with no inherent physical or chemical hazards during normal, reasonably foreseeable upset (unexpected occurrence), or routine maintenance activities. Examples include some electron microscope rooms, precision measurement rooms, etc.

b) Exceptions that require written approval from their campus Environment(al) Health and Safety (EH&S) Department or EH&S approved department designees. EH&S has the final authority for determining this risk assessment.

   i. The establishment of a level of personal protective equipment below the minimum specified in sections III.B.1-2 to a laboratory/technical area that uses hazardous materials or includes a physical hazard.

   ii. The establishment of non-PPE required corridors that may be delineated within technical areas provided that the corridor does not pass near any potential exposure hazard.

   iii. Non-hazardous work areas (e.g., offices, work stations) that are within laboratory/technical areas but are clearly delineated by distance or physical barrier (e.g., walls, doors, or cubicle dividers). It must be clear that the area is intended to be a self-contained, dedicated area. Readily movable

furniture does not constitute a physical barrier as envisioned here.

1. Exceptions for individual desks or work spaces within a Technical Area are discouraged.

c) This policy does not apply to College of American Pathologists (CAP) accredited laboratories, which meet equivalent safety standards through CAP accreditation requirements.

IV. COMPLIANCE / RESPONSIBILITIES

The Chancellor has overall responsibility for compliance with health and safety requirements at all facilities and programs under her/his control.

Vice Chancellors/Directors/Deans/Departments Chairs are responsible for communicating, promoting and enforcing the Policy in areas under their control.

The Campus or School Laboratory and/or Chemical Safety Committee is responsible for promoting a safe working environment in all research and teaching laboratories on campus.

Supervisors are responsible for complying with this policy and ensuring their staff complies with this policy. Supervisors are also responsible for ensuring their staff receives both the required PPE identified in the hazard assessment, and documents their training on the proper use of their PPE. Noncompliance with the policy is handled in accordance with Personnel Policies for Staff Members (PPSM) policies 62-65 pertaining to disciplinary actions and Academic Personnel Manual (APM) policies 015-016 pertaining to the Faculty Code of Conduct and administration of discipline; and APM 140 and 150 pertaining to Non-Senate Academic Appointees.

Workers are responsible for knowing the PPE requirements for areas in which they work or enter, and for properly wearing PPE as established in this policy and in the hazard assessment. All workers are responsible for completing training, for knowing how to use PPE, for knowing how to properly put on and take off required PPE, and for knowing how to care for and maintain PPE. They are responsible for informing others in the area of these requirements and reporting unsafe conditions to their supervisor, or EH&S. Workers are NOT responsible for purchasing their own PPE. As applicable, a staff employee may address issues of noncompliance with this Policy through the complaint resolution processes described in PPSM 70 and II-70 (Complaint Resolution) and PPSM 71 and II-70 (Resolution of Concerns) or Collective Bargaining Agreement.

Students are responsible for obtaining course required PPE as noted in the course syllabus and wearing as directed by the instructor.

The Office of Environment(al), Health & Safety (EH&S) is responsible for providing interpretation and clarification regarding this Policy. EH&S will also provide consultation and tools to assist supervisors in performing the hazard assessment and with developing training. In cases where work activities pose an immediate danger to life or

health, designated EH&S staff have the responsibility and authority to order the temporary cessation of the activity until the hazardous condition is abated.

The Academic Personnel or Staff Human Resources Offices are responsible for all employee and labor relations issues, including interpretation and clarification of Personnel Policies and Collective Bargaining Agreements related to this Policy.

V. PROCEDURES

Not applicable

VI. RELATED INFORMATION

Appendix A – Hazardous Materials

Appendix B – Laboratory Hazard Assessment Tool (LHAT)

8 CCR 3380 Personal Protective Devices: (http://www.dir.ca.gov/title8/3380.html)

8 CCR 5191 Laboratory Standard: (http://www.dir.ca.gov/title8/5191.html)

8 CCR 5194 Hazard Communication: (http://www.dir.ca.gov/title8/5194.html)

8 CCR 3203 IIPP: (http://www.dir.ca.gov/title8/3203.html)

8 CCR 5209: Listed Carcinogens (http://www.dir.ca.gov/title8/5209.html)

VII. FREQUENTLY ASKED QUESTIONS

Not applicable.

VIII. REVISION HISTORY

This is the first version of this policy.

Appendix A
Hazardous Materials

Hazardous materials may be described using the following characteristics or regulatory definitions. This list is to be used as a guideline and allows for some laboratory/ technical areas to be classified as non-hazardous materials areas. It does not supersede Cal/OSHA regulations or accepted safe work practices for specific materials. The container label and the Safety Data Sheet for the material should be consulted to determine the hazard classification(s) of a particular substance.

a) Corrosives. Any chemical that causes visible destruction of, or irreversible alterations in, living tissue at the site of contact. *Examples: hydrochloric acid, sulfuric acid, sodium hydroxides, potassium hydroxides.*

b) Materials recognized as readily absorbed through the skin. *Examples: phenol, THF, DMSO, benzene, carbon disulfide, toluene.*

c) Skin or eye irritants are chemicals which are not corrosive, but which cause a reversible inflammatory effect on living tissue by chemical action at the site of contact. *Examples: xylenes, formamide, many amines like triethanolamine, carbon tetrachloride, perchloroethylene, many inorganic salts like cobalt and nickel sulfate.*

d) Flammable liquids having a flash point not more than 93°C. *Examples: organic solvents, ethers, alcohols, toluene, pentane, acetone.*

e) Violently air-reactive or water-reactive chemicals, including pyrophorics (substances that spontaneously ignite in air). *Examples: sodium or potassium metal, diethyl zinc, lithium aluminum hydride, t-butyl lithium, aluminum alkyls, calcium carbide, phosphine.*

f) Carcinogens or Mutagens. *Examples: formaldehyde, dichloromethane, benzene, chloroform.*

g) Reproductive Hazards. *Examples: acrylamide, Cd, Pb, Hg, Cr(VI), carbon disulfide, toluene, chloroform, ethylene glycol ethers*.

h) Toxic or Highly Toxic Chemical. A material likely to be fatal or toxic if inhaled, ingested or by skin contact.

i) Oxidizing Agents. A material not necessarily combustible, but may, generally by yielding oxygen, cause or contribute to the combustion of other material. *Examples: nitric and perchloric acids, chromates, nitrates, nitrites, hydrogen peroxide, chlorates.*

j) Any unsealed radioactive material.

k) Biological materials classified as Risk Group 2, or greater.

l) Centers for Disease Control Select Agent Toxins

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

This Laboratory Hazard Assessment Tool facilitates the identification of hazards and appropriate Personal Protective Equipment (PPE) to ensure the safety of lab personnel during work activities. The LHAT must be updated as hazards and personnel change, and at least once every 12 months, irrespective of changes to hazards or personnel.

The process is as follows:

1. Lab Personnel – Identify all lab personnel associated with the PI. This includes researchers, post-docs, graduate students, lab helpers, undergraduates and volunteers. Begin the LHAT with this step
2. Attend PPE Distribution Event with receipt of LHAT completion and type(s) PPE needed for individual
3. Fit PPE @ Event
4. Issue PPE @ Event
5. Training and Documentation of Training @ Event

What is a Lab Group?

Most PIs create a separate Lab Group for each lab they oversee. However, Lab Groups are designed to be flexible to allow PIs to create them in a manner that is intuitive to them. Please note that an LHAT Survey must be completed for each Lab Group created.

This tool is based on a model developed and used at the UCLA campus.

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

This form must be completed by the PI, Lab Manager, or their designee at least once each calendar year to conduct an activity hazard assessment specific to activities in their laboratories. The Activity Hazard Assessment identifies hazards to employees and specifies personal protective equipment (PPE) to protect employees during work activities. The person(s) conducting the assessment must verify that it is complete and that training has been conducted.

EH&S personnel are available to assist you with completing your Activity Hazard Assessment form or with reviewing it after you've completed it. EH&S may also be consulted for specific questions regarding PPE requirements. Contact your EH&S representative.

Principal Investigator:		
Department:		
PI Phone:		
PI e-mail:		
Laboratory Safety Contact:		
Laboratory Safety Phone:		
Laboratory Safety e-mail:		
Name of Person(s) conducting Assessment		
Assessor e-mail:		
Assessor Phone Number		
Date Assessment Completed		
Lab Locations: Building(s) / Room(s):		

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

Provide a listing of all of your Laboratory Personnel using the format below.

	First Name	Last Name	E-mail	Role (Principal Investigator (PI), Lab Manager (LM), Lab Worker (LW))
Laboratory Personnel:				

Role: LW = Lab Worker, PI = Principal Investigator

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

Activity Hazard Assessment

In this section, you will:

- Conduct a hazard assessment of this lab group to identify activities when PPE is needed to protect the lab personnel;
- Certify the hazard assessment for the laboratory.

Note: In all cases chemical splash goggles can be substituted for safety glasses. For splash or impact protection, either safety goggles or safety glasses respectively need to be worn under face shields.

The final assessment report will identify PPE applicable to each hazard identified in the lab. **For activities that are described in a laboratory specific SOP or for activities where a Use Authorization(s) (UA) has been issued by a campus safety committee, the PPE specified in that SOP/UA shall take precedence.**

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

Activity performed		**All Laboratories** ☐ Laboratory has been approved and posted as free of physical or chemical hazards Skip all other sections.			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher Attire (direct manipulation)**	**Adjacent Individuals Attire**
☐	☐	E01. Entering laboratory	Many	✓ Long pants or equivalent ✓ Closed-toed/heel shoes ✓ Long hair tied back Note: Tights & panty hose are considered undergarments	All personnel in laboratory room: ✓ Long Pants ✓ Closed toed/heel shoes

Under UC Policy full length pants (or equivalent), and closed toe/heel shoe attire must be worn at all times by all individuals who are occupying or entering a laboratory/technical area.

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

Activity performed		Chemical Hazards			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	C01. Working with small volumes of corrosive (e.g. acids, caustics, etc.) liquids or solids.	Eye or skin damage. Low probability for a splash hazard.	✓ Safety glasses ✓ Chemical-resistant gloves ✓ Lab coat	In adjacent area within ___meters: ✓ Safety glasses ✓ Lab coat
☐	☐	C02. Working with corrosive or acutely toxic liquids or other materials which creates a splash hazard.	Poisoning, increased potential for eye and skin damage.	✓ Safety goggles ✓ Chemical-resistant gloves ✓ Lab coat and ✓ Chemical-resistant apron	In adjacent area within ___meters: ✓ Safety glasses ✓ Lab coat
☐	☐	C03. Working with small volumes of flammable solvents/materials when no reasonable ignition sources are present.	Skin or eye damage, potential poisoning through skin contact.	✓ Safety glasses ✓ Chemical-resistant gloves ✓ Lab coat	In adjacent area within ___meters: ✓ Safety glasses ✓ Lab coat
☐	☐	C04. Working with flammable materials (including solvents): When using a large quantity; or, any quantity when there is a risk of ignition; or, areas where flammable vapors or gas are may be present.	Major Fire. Major skin or eye damage, potential poisoning through skin contact.	✓ Safety glasses ✓ Flame-Resistant (FR) outer gloves ✓ Chemical-resistant inner gloves ✓ NFPA 2112 rated Flame-Resistant (**FR) lab coat**	All personnel in laboratory room: ✓ Safety glasses ✓ NFPA 2112 rated Flame-Resistant (FR) lab coat
☐	☐	C05. Working with toxic or hazardous chemicals (solid, liquid, or gas). (including but not limited to GHS H301, H302, H311, H312, H331 H332)	Skin or eye damage, potential poisoning through skin contact.	✓ Safety glasses (chemical splash goggles for large quantities) ✓ Chemical-resistant gloves ✓ Lab coat	In adjacent area within ___meters. ✓ Safety glasses ✓ Lab coat
☐	☐	C06. Working with Acutely Toxic Chemicals. (GHS H300, H310, H330)	Spills, splashes, ingestion, inhalation, absorption. Chemicals pose a high level of immediate health risk.	✓ Safety glasses ✓ Chemical resistant gloves ✓ Lab coat (plus chemical protective apron for H330)	All personnel in laboratory room: ✓ Safety glasses ✓ Lab coat
☐	☐	C07. Working with an apparatus with contents under pressure or vacuum.	Eye or skin damage.	✓ Safety glasses ✓ Face shield (for high risk activities) ✓ Chemical-resistant gloves ✓ Lab coat ✓ Chemical-resistant apron (for high risk activities)	In adjacent area within ___meters. ✓ Safety glasses ✓ Lab coat

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

Activity performed		Chemical Hazards			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	C08. Working with pyrophoric (air reactive) chemicals or chemicals that in contact with water releases flammable gasses (water reactive). (GHS H25x and H26x)	Severe skin and eye damage. Fire.	For work outside glove boxes: ✓ Safety glasses ✓ Face shield ✓ FR rated outer gloves ✓ Chemical-resistant inner gloves ✓ NFPA 2112 Flame Resistant **(FR) lab coat.** Work in inert atmosphere when possible.	All personnel in laboratory room: ✓ Safety glasses ✓ NFPA 2112 Flame Resistant (FR) lab coat
☐	☐	C09. Working with potentially explosive chemicals. (e.g. Nitrates, Perchlorates, Azides, Nitrites etc.)	Splash, detonation, flying debris, skin and eye damage, fire.	✓ Safety glasses ✓ Face shield, and/or use blast shield ✓ Chemical-resistant gloves ✓ **NFPA 2112 Flame Resistant (FR) lab coat**	All personnel in laboratory room: ✓ Safety glasses (or goggles) ✓ NFPA 2112 Flame Resistant (FR) lab coat
☐	☐	C10. Minor chemical spill cleanup	Skin or eye damage, respiratory damage.	✓ Safety glasses ✓ Chemical-resistant gloves ✓ Shoe covers ✓ Chemical-resistant apron ✓ Lab coat	In adjacent area within ___meters: ✓ Safety glasses ✓ Lab coat
☐	☐	C11. Major chemical spill cleanup	Multiple hazards.	Call for EH&S assistance	All personal evacuate lab
☐	☐	C12. Working with known or suspect human carcinogens (GHS H350, H351)	Spills, splashes, ingestion, inhalation, absorption. High hazard cancer-causing agents.	✓ Safety glasses ✓ Chemical-resistant gloves ✓ Lab coat	In adjacent area within ___meters: ✓ Safety glasses ✓ Lab coat
☐	☐	C13. Working with reproductive hazards (GHS H340, H341, H360, H361)	Spills, splashes, ingestion, inhalation, absorption. Agents that affect reproductive capabilities, cause mutation and adversely affect fetal development.	✓ Safety glasses ✓ Chemical-resistant gloves ✓ Lab coat	In adjacent area within ___meters: ✓ Safety glasses ✓ Lab coat

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

Activity performed		Chemical Hazards			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	C14. Working with engineered nanomaterials.	Inhalation, exposure, dermal exposure.	✓ Chemical Splash goggles ✓ Chemical-resistant gloves ✓ Lab coat	All personnel in laboratory room: ✓ Safety glasses ✓ Lab coat

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

Activity performed		Physical Hazards			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	P01. Working with cryogenic liquids.	Major skin, tissue, or eye damage.	✓ Safety glasses (goggles for large volumes) ✓ Face shield ✓ Cryogenic protective gloves ✓ Lab coat	N/A
☐	☐	P02. Removing freezer vials from liquid nitrogen.	Vials may explode upon rapid warming. Cuts to face/neck and frostbite to hands.	✓ Safety glasses ✓ Face shield ✓ Cryogenic protective gloves ✓ Lab coat	N/A
☐	☐	P03. Working with very cold equipment or dry ice.	Frostbite, hypothermia.	✓ Safety glasses ✓ Cryogenic protective gloves ✓ Lab coat (possibly warm clothing)	N/A
☐	☐	P04. Working with scalding liquids or hot equipment (e.g. autoclave, water bath, oil bath).	Burns resulting in skin or eye damage.	✓ Safety glasses (goggles for large volumes) ✓ Thermal protective gloves (impermeable insulated gloves for liquids and steam) ✓ Lab coat	N/A
☐	☐	P05. Glassware washing.	Lacerations, chemical splash.	✓ Safety glasses ✓ Heavy rubber gloves ✓ Lab coat	N/A
☐	☐	P06. Working with loud equipment, noises, sounds, alarms, etc.	Potential ear damage and hearing loss.	✓ Earplugs or ear muffs as necessary	✓ Earplugs or ear muffs as necessary
☐	☐	P07. Working with a centrifuge.	Imbalanced rotor can lead to broken vials, cuts, exposure.	✓ Safety glasses ✓ Disposable gloves ✓ Lab coat	N/A
☐	☐	P08. Working with a sonicator.	Ear damage, exposure.	✓ Safety glasses ✓ Disposable gloves ✓ Earplugs or ear muffs as necessary ✓ Lab coat	N/A

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

Activity performed		Physical Hazards			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	P09. Working with sharps (e.g. needles and razor blades.)	Cuts, exposure.	✓ Safety glasses ✓ Cut resistance gloves ✓ Lab coat	N/A

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

Activity performed		**Biological Hazards** ☐ I have a BUA that addresses all of these items. Skip to next section.			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	B01. Working with human or non-human primate blood, body fluids, tissues, cells or other potentially infectious material (OPIM) which may contain human blood borne pathogens (BBP).	Exposure to infectious material, sharps injuries.	✓ Eye and mucous membrane protection (as appropriate for operations) ✓ Disposable gloves ✓ Disposable lab coat impervious to fluids	In adjacent area within ___meters: ✓ Safety glasses ✓ Lab coat
☐	☐	B02. Working with microbial agents (bacteria, virus, parasites, yeast, fungi, prions), recombinant DNA and/ or biological materials (cells, tissues, fluids) exposed to or likely to contain Risk Group 1 microbial agents or recombinant DNA. (BSL-1)	Eye irritation, sharps injury. Exposure of infectious material to those who may have personal health issues which make them more susceptible to infection; cross contamination of animal or extra laboratory areas.	✓ Safety glasses ✓ Disposable gloves ✓ Lab coat	In adjacent area within ___meters: ✓ Safety glasses ✓ Lab coat
☐	☐	B03. Working with microbial agents, recombinant DNA and/or biological materials (cells, tissues, fluids) exposed to or likely to contain Risk Group 2 microbial agents or recombinant DNA. (BSL-2)	Exposure to infectious material, particularly through broken skin or mucous membranes, sharps injuries.	✓ Safety glasses ✓ Double layer of disposable gloves ✓ Lab coat	All personnel in laboratory room: ✓ Safety glasses ✓ Lab coat.
☐	☐	B04. Working microbial agents, recombinant DNA and/or biological materials (cells, tissues, fluids) exposed to or likely to contain Risk Group 2 microbial agents or recombinant DNA for which Biosafety Level 3 practices are required. (BSL-2+)	Exposure to infectious materials with high risk of exposure by contact with skin or mucous membranes and/ other potential or unknown routs of entry and or increased consequences of exposure. Sharps injuries.	✓ Safety glasses ✓ Double layer disposable gloves ✓ Lab coat or disposable lab coat	All personnel in laboratory room: ✓ Safety glasses ✓ Lab coat or disposable lab coat.

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

Activity performed		**Biological Hazards** ☐ I have a BUA that addresses all of these items. Skip to next section.			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	B05. Working with microbial agents, recombinant DNA and/or biological materials (cells, tissues, fluids) exposed to or likely to contain Risk Group 3 microbial agents or recombinant DNA. (BSL-3)	Exposure to infectious materials with high risk of exposure, particularly through the inhalation route.	✓ Safety glasses ✓ Double layer disposable gloves ✓ Shoe cover or dedicated shoe ✓ Full back closing disposable gown or coveralls (preferred)	All personnel in laboratory room: ✓ Safety glasses ✓ Double layer disposable gloves ✓ Shoe cover or dedicated shoe ✓ Full back closing disposable gown or coveralls (preferred)
☐	☐	B06. Working with live animals-alone or in conjunction with Risk Group 1 microbial agents or recombinant DNA. (ASBL-1)	Animal bites, allergies, eye irritation, sharps injury. Exposure of infectious material to those who may have personal health issues which make them more susceptible to infection; cross contamination of animal or extra laboratory areas.	✓ Safety glasses ✓ Disposable gloves ✓ Lab coat Additional PPE (e.g. puncture resistant gloves) may be required based on risk assessment by the IBC & IACUC. Additional gowning (shoe covers, face mask) may be required for animal welfare purposes.	All personnel in laboratory room: ✓ Safety glasses ✓ Lab coat
☐	☐	B07. Working infected or potentially infectious live animals—alone or in conjunction with Risk Group 2 microbial agents or recombinant DNA (or materials exposed to RG-2 agents). (ABSL-2)	Animal bites, exposure to infectious material, allergies, sharps injury.	✓ Safety glasses ✓ Disposable gloves ✓ Bouffant ✓ Lab coat Additional PPE (e.g. puncture resistant gloves) may be required based on risk assessment by the IBC & IACUC. Additional gowning (shoe covers, face mask) may be required for animal welfare purposes.	All personnel in laboratory room: ✓ Safety glasses ✓ Bouffant ✓ Lab coat

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

		Radiological Hazards ☐ I have a RUA and/or MUA that addresses all these. Skip to next section.			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	R01. Working with unsealed radioactive materials including generally licensed radioactive material or devices (e.g., uranyl acetate, uranyl nitrate, thorium, nitrate).	Cell damage, potential spread of radioactive materials.	✓ Safety glasses ✓ Impermeable gloves or chemical resistant gloves ✓ Lab coat	In adjacent area of ___meters. ✓ Safety glasses ✓ Lab coat
☐	☐	R02. Working with unsealed radioactive materials in hazardous chemicals (corrosives, flammables, liquids, powders, etc.).	Cell damage or spread of contamination plus hazards for the specific chemical.	✓ Safety glasses (goggles for splash hazard) ✓ Chemical-resistant gloves ✓ Lab coat *Note: Select gloves for applicable chemical hazards above.*	In adjacent area of ___meters. ✓ Safety glasses ✓ Lab coat
☐	☐	R03. Working with radioactive sealed sources or devices containing sources of radioactive materials (e.g., liquid scintillation counters, gas chromatographs/electron capture detectors, static eliminators, etc.)	If sealed source is compromised due to removal from equipment or physical abuse: cell damage, potential spread of radioactive materials.	PPE is not necessary under normal operating instructions. *Note: Source may not be removed form device except by EH&S or manufacturer.*	N/A

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

Activity performed		Non ionizing Radiation Hazards			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	N01. Working with ultraviolet radiation.	Conjunctivitis, corneal damage, skin redness.	✓ UV face-shield with correct OD value ✓ Opaque gloves ✓ Lab coat	In adjacent area within ___meters with direct line of sight. ✓ UV face-shield with correct OD value ✓ Lab coat
☐	☐	N02. Working with infrared emitting equipment (e.g. glass blowing).	Cataracts, burns to cornea.	✓ Appropriate shaded glasses ✓ Lab coat	In adjacent area within ___meters with direct line of sight. ✓ Appropriate shaded glasses ✓ Lab coat

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

Activity performed		**Laser Hazards** ☐ I have a LUA that addresses all these. Skip to next section.			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐	L01. Open Beam- Performing alignment, trouble-shooting or maintenance that requires working with an open beam and/or defeating the interlock (s) on any Class 3 or Class 4 laser system.	Eye damage	✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters.	All personnel in laser use room: ✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters.
☐	☐	L02. Open Beam- Viewing a Class 3R laser beam with magnifying optics.	Eye damage	✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters.	N/A
☐	☐	L03. Open Beam- Working with a Class 3B laser open beam system with the potential for producing direct or specular reflections.	Eye damage	✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters.	All personnel in laser use room: ✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters. Appropriate skin protection.
☐	☐	L04. Open Beam- Working with a Class 4 laser open beam system with the potential for producing direct, specular or diffuse reflections.	Eye damage, skin damage	✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters. ✓ Appropriate skin protection.	All personnel in laser use room: ✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters. Appropriate skin protection.
☐	☐	L05. Non-Beam - Handling dye laser materials, such as powdered dyes, chemicals, and solvents.	Cancer, explosion, fire.	✓ Gloves, safety glasses, flame-resistant lab coat or coveralls.	In adjacent area within ___meters. ✓ Safety glasses ✓ Lab coat
☐	☐	L06. Non-Beam- Maintaining and repairing power sources for large Class 3B and Class 4 laser.	Electrocution, explosion fire	✓ Electrical isolation mat, ✓ Flame-Resistant NEC 70E APC rated lab coat or coveralls.	N/A
☐	☐	L07. Enclosed Beam- Using a Class 1 device housing a Class 3B or Class 4 enclosed or embedded laser with the potential for beam exposure during a Service Event.	Eye damage, skin damage	✓ Appropriate protective eyewear, wave length and optical density based on individual beam parameters, appropriate skin protection.	All personnel in laser use room: ✓ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters. Appropriate skin protection.

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

Activity performed		**Unique or Lab Specific Activities** If your lab conducts any additional or unique activities that are not listed above, identify the potential hazards and appropriate PPE then add these activities to the table below. If a lab activity is similar to but somewhat different than one of the common activities listed, include it in this section as well.			
Yes	**No**	**Activity in lab**	**Potential Hazard**	**Active Researcher PPE (Direct Manipulation)**	**Adjacent Individuals PPE**
☐	☐				
☐	☐				
☐	☐				
☐	☐				
☐	☐				
☐	☐				
☐	☐				
☐	☐				
☐	☐				
☐	☐				

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

Hazard Assessment Certification: This 'certifies' that you have conducted the hazard assessment. Maintain a copy of the signed hazard assessment (this document) in the lab safety records.

Name and title of person conducting assessment

Name: _____ **Title:** _____

Date assessment completed: _____

Appendix B - Laboratory Hazard Assessment Tool
(Non-Mandatory)

The following Employees have reviewed the EHS Activity Hazard Assessment Tool specific to this lab and have received the following training:

1. When PPE is necessary
2. What PPE is required
3. How to properly don, doff, adjust and wear PPE
4. The Limitations of PPE
5. The proper care, maintenance, useful life, and disposal of PPE
6. General PPE safety practices of (e.g. not wearing PPE outside the lab)

Worker Name	UID	Training Date	Trainer	Worker Signature

University of California Policy LabSafetyTraining

Laboratory Safety Training

Responsible Officer:	Chief Risk Officer
Responsible Office:	RK - Risk / EH&S
Issuance Date:	June 12, 2013
Effective Date:	October 31, 2013
Scope:	This policy establishes minimum requirements for all University workers which individual campuses, departments/units, and work groups may exceed as they deem necessary. It applies to workers regardless of their title; e.g., student, graduate student, postdoctoral scholar, faculty or other academic appointee, staff, visitor, volunteer, etc.

Contact:	Ken Smith
Email:	Ken.Smith@ucop.edu
Phone #:	(510) 987- 0170

I. POLICY SUMMARY

The University of California is committed to providing a safe and healthy working environment for all members of the campus community. This laboratory safety training policy is designed to prevent workplace injuries and illnesses for all faculty, staff, students, volunteers, and visitors. A primary means to achieve this goal is through safety training. Safety training is particularly important for those who work with hazardous materials, equipment, and processes in research and teaching. Safety training is done within departments, work groups, shops, laboratories, and/or centrally by Environment(al) Health and Safety (EH&S).

This policy identifies minimum training requirements applicable to all workers. A laboratory safety training needs assessment and fundamentals of laboratory safety training shall be completed. Based on the needs assessment, additional safety training may be needed for specific hazardous work activities.

II. DEFINITIONS

Documented Training: Training records shall include at minimum:

- the name of the individual trained;
- name of the individual(s) providing the training for instructor-led training;
- date of the training;
- and brief description of the training topics covered.

Laboratory/Technical Areas: A laboratory/technical area is any location where the use or storage of hazardous materials or equipment may present a potential hazard are used or stored. It includes, but is not limited to:

Research laboratories	Waste accumulation areas/locations
Teaching laboratories	Cold rooms
QA/QC and analytical laboratories	Machine and other Workshops
Stock rooms	Vivaria
Storage rooms	

Student: An individual enrolled in an academic class.

Supervisor: An employee who may have authority to hire personnel, evaluate performance, direct work assignments, apply progressive discipline, direct resources to correct identified safety issues. This includes a Principal Investigator, area manager, unit manager, project manager, superintendent, and foreman/person. Unless specified in writing, the default "supervisor" in laboratory/technical areas is the Principal Investigator.

Training Needs Assessment: Assessment of the training requirements of a target group in terms of (1) risk of hazards present in work activities, (2) their educational and professional background, (3) regulatory requirements for training. The training needs assessment must be documented.

Worker: For purposes of this policy, a worker is an individual who actively performs work functions with hazardous materials or equipment in a laboratory/technical area. A "worker" may be faculty, staff, student volunteer assisting in a non-academic class, or visitor/visiting scholar. For the purpose of this definition, "worker" excludes individuals who only passively participate in tours, lectures, conferences, etc. and enrolled undergraduate students in a teaching laboratory.

Training needs assessment: An assessment of specific laboratory safety training needs will occur and be documented for all workers before the worker undertakes their work duties. The supervisor shall be responsible for accomplishing the needs assessment. See Appendix C for list of potential training areas relative to current regulations.

The extent of Safety Training will depend on the type of work. See "Procedures" Section V for details.

III. COMPLIANCE / RESPONSIBILITIES

The Chancellor has overall responsibility for compliance with health and safety requirements at all facilities and programs under her/his control.

Vice Chancellors/Directors/Deans/Departments Chairs are responsible for communicating, promoting, and enforcing the Policy in areas under their control.

The campus or unit Laboratory and/or Chemical Safety Committee is responsible for promoting a safe working environment in all research and teaching laboratories on campus.

Supervisors are responsible for complying with this Policy and ensuring their staff comply with this Policy. Supervisors are responsible for conducting and documenting the laboratory safety training needs assessment or reviewing and approving the assessment if conducted by others. They are also responsible for ensuring their staff receive the required training. Noncompliance with the policy is handled in accordance with Personnel Policies for Staff Members (PPSM) policies 62-65 pertaining to disciplinary actions and Academic Personnel Manual (APM) policies 015-016 pertaining to the Faculty Code of Conduct and administration of discipline; and APM 140 and 150 pertaining to Non-Senate Academic Appointees.

Workers are responsible for knowing the training requirements for areas in which they work or enter. All workers are responsible for completing required training. They are responsible for informing others in the area of these requirements and reporting unsafe conditions to the supervisor, or EH&S. As applicable, a staff employee may address issues of noncompliance with the policy through the complaint resolution processes described in PPSM 70 and II-70 (Complaint Resolution) and PPSM 71 and II-70 (Resolution of Concerns) or Collective Bargaining Agreement.

The Office of Environment(al), Health & Safety (EH&S) is responsible for providing interpretation and clarification regarding this Policy. EH&S will also provide consultation and tools to assist supervisors in performing the laboratory safety training needs assessment and with developing training.

The Academic Personnel or Staff Human Resources Offices are responsible for all employee and labor relations issues, including interpretation and clarification of Personnel Policies and Collective Bargaining Agreements related to this Policy.

IV. PROCEDURES

A. Fundamentals of Laboratory Safety Training

Before any worker is granted unescorted access to laboratory/technical areas, they shall successfully complete a “Fundamentals of Laboratory Safety” training as offered/managed by their local EH&S department. Campuses may offer this training via instructor-led, web-based, or both. Minimum training topics are noted in Appendix A. Where offered and applicable, web-based training can be completed in the interim period before the next live training is offered. (If no web-based training option is available, in the interim period before the next live

training is offered, the worker may begin work so long as the PI/laboratory supervisor provides and documents one-on-one safety training and closely supervises the new worker.) *Target audience:* workers whose primary work location is in laboratory/technical areas.

The completion of the "Fundamentals of Laboratory Safety" training requirement does not apply to undergraduate students taking laboratory courses offered in the course catalog of that campus, unless the student is considered to be a "worker" as defined above;.however, the teaching laboratory instructor, teaching assistant, and/or classroom laboratory manager is still responsible for conveying the necessary information for students to work safely.

Refresher training for Fundamentals of Laboratory Safety will be provided at a minimum of every three (3) years. More frequent refresher training requirements will be at the discretion of individual campuses.

B. Safety Training - General Requirements

All required safety training shall be completed and documented for each affected worker. All reasonable efforts shall be made to complete required training before the individual begins work with the material, process or equipment in question.

Given the wide diversity of UC activities, any required training may occur at the individual workplace level, centrally through EH&S, or both. Each campus shall determine how the various requirements will be addressed, but in general if needed training is not available centrally through EH&S, the worker's supervisor is responsible to ensure that appropriate training has been completed. General responsibilities of personnel are addressed in Section III.

C. Laboratory Site Safety Orientation

Laboratory workers are required to receive a safety orientation specific to their unique laboratory work location and the processes common to their laboratory worksite. A "Laboratory Site Safety Orientation" shall be performed by the supervisor on the first day the worker is granted access to or assigned work activities in the laboratory. A sample *Laboratory Site Safety Orientation* checklist can be found in Appendix B. This training orientation will be documented.

D. Hazard-Specific Safety Training

Based on the laboratory safety training needs assessment, workers shall attend training on the specific additional hazards that may be present in the work place. This training may be provided by EH&S, supervisor, or other qualified person. This hazard-specific training might include lock out/tag out, vivarium operations, general radiation or biological safety training. Refer to Appendix C for more information.

E. Site-Specific Operating Procedure Safety Training

This training is most appropriately provided by the supervisor or departmental staff and is focused on the specific procedures and activities unique to the worker's primary work place. These operating procedures might include work with particularly hazardous substances, pyrophoric chemicals, radioisotopes,

biological agents, lasers, machine tools, autoclaves, etc. This type of training is intended to address specific topics not covered by the trainings described above.

F**.** 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; date of the training; and a brief description of the training topics covered.

Training records shall be maintained for a minimum of one year after the worker 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 3 years from the date of the accident or one year after the worker leaves the University or as required by the terms of a grant, whichever period is longer.

V. RELATED INFORMATION

Appendix A Laboratory Safety Fundamentals Training Topics

Appendix B Laboratory Site Safety Orientation

Appendix C Federal and State Safety Training Mandates

California Code of Regulations, Title 8, General Industry Safety Orders:

Section 3203 – Injury and Illness Prevention Program;

Section 5191 – Occupational Exposure to Hazardous Chemicals in Laboratories;

Section 5194 – Hazard Communication

Section 3380 – Personal Protective Devices;

Section 5154.1 – Ventilation Requirements for Laboratory-Type Hood Operations;

Section 3221 – Fire Prevention Plan

California Health & Safety Code, Ch. 6.95, 25504

Resource Conservation and Recovery Act, Title 40, Federal Code of Regulations

University Policy on Management of Health, Safety and the Environment (October 2005)

VI. FREQUENTLY ASKED QUESTIONS

Not applicable

VII. REVISION HISTORY

This is the first version of this policy.

Appendix A
Laboratory Safety Fundamentals Training Topics

Per this policy, laboratory workers subject to the Cal/OSHA standard entitled: Occupational Exposure to Hazardous Chemicals in Laboratories: (Title 8, California Code of Regulations, Section 5191) shall complete a Laboratory Safety Fundamentals Training. This training generally includes, but is not limited to, the following topics:

- A Culture of Safety
- Chemical Hygiene Plan
- Analyze Hazards--Laboratory Physical Hazards
- Analyze Hazards--Chemical Hazards
- Analyze Hazards--Biological Hazards
- Analyze Hazards--Radiological Hazards
- Develop Controls--Administrative
- Develop Controls--Engineering
- Develop Controls--Personal Protective Equipment (PPE)
- Perform Work—Prudent Practices
- Perform Work—Recognition of Exposure
- Perform Work--Emergencies
- Rights and Responsibilities

Based on local campus conditions, additional campus training topics may be added as appropriate.

Appendix B (Non-Mandatory)
Laboratory Site Safety Orientation

Before completing this form all laboratory personnel need to have successfully complete the UC *Laboratory Safety Fundamentals* course

Initial	Training Topic
	Emergency Procedures
_____	**Fire alarm pull station:** Location of and demonstrate how to activate.
_____	**Eye wash/safety showers:** Location of and demonstrate how to activate.
_____	**First aid kits:** Locations of and contents.
_____	**Phone:** Locations of, phone dialing instructions and posting of '911' dialing instructions.
_____	**Emergency Procedures Guide:** Locations of flipchart, and discuss actions for each of the scenarios listed.
_____	**Shelter-in-Place:** Review procedures for securing the lab for shelter-in-place orders.
_____	**Primary and Secondary Routes of Egress:** Walk both pathways to Emergency Assembly Area. Review evacuation procedures for disabled employees.
_____	**Emergency Assembly Area:** Review Lab gathering point and evacuation procedures.
_____	**Reverse 911:** Enroll in campus emergency alert system.
	Engineering Controls
_____	**Chemical fume hoods:** Demonstration of proper use and instruction on adjustable controls.
_____	**Biological safety cabinets:** Demonstration of proper use and instruction on adjustable controls.
_____	**Chemical storage locations**: Locations and segregation rules.
_____	**Other engineering controls (glove boxes, gas cabinets):** Demonstration of proper use and instruction on adjustable controls Describe:
	Administrative Controls
_____	**Laboratory Safety Manual (**including **Chemical Hygiene Plan):** Location of and content description.
_____	**SDS:** Demonstrate electronic access to Safety Data Sheet repository.
_____	**Laboratory Standard Operating Procedures (SOPs):** Location of written SOPs, describe the required approvals needed.
_____	Identification of Chemical Processes / Areas that require specific SOP use.
_____	Determine additional Hazard-Specific Safety Training courses needed. Enroll in courses.
	Personal Protective Equipment
_____	**Lab Coat**: Provide at no cost a fitted lab coat. Certain labs require flame resistant lab coats Type: ☐FR ☐Normal Size: _____
_____	**Eye protection**:

Provide at no cost a fitted pair(s) of safety glasses. Safety glasses must be of the type and adjusted accordingly to be worn comfortably and stay securing in place. For laboratory where goggles must be worn provide pair(s) of fitted chemical splash goggles.

Corrective Prescription Y/N Model: _____

_____ **Gloves**:
Location of, knowledge to select the correct type and instructions on how to properly don and doff.

_____ Other:

Waste Disposal

_____ **Hazardous Waste Accumulation Area**: Demonstrate Location, proper labeling, proper storage requirements, and process to request pick-up.

Other

_____ Understands safety procedures for specific operations (e.g., UV light, laser, safe use of specialized equipment, high voltage equipment, confined space, etc.). Describe:

Appendix C
Federal and State Safety Training Mandates

Safety training clearly fosters a safer work environment and reduces the likelihood of injuries, property damage, hazardous materials releases, etc. However, *documented* safety training is also a regulatory requirement within numerous state and federal regulatory frameworks, such as OSHA, Health & Safety Code, Fire Code, etc. These training requirements intersect a host of specific research-related activities.

Below is a list of the major research safety training issues mandated by various regulatory agencies. The list is *not* comprehensive, but attempts to convey the breadth of the major requirements.

Cal-OSHA, Title 8 General Industry Safety Orders	**Section**	**Typical Job Classification**	**Frequency**
Injury & Illness Prevention Program	3203	All employees	Initial w/ updates
Fume hoods	5154.1	Users	Initial
Chemical Hygiene Plan	5191	Chemical users	Initial w/ updates
Regulated Carcinogens	5200-5220	Exposed employees	Initial
Personal Protective Equipment	3380	PPE users	Initial
Bloodborne Pathogens	5193	Potentially exposed employees	Initial, annual
Aerosol Transmittable Diseases	5199	Potentially exposed employees	Initial, annual
Emergency Action Plan	3220	Impacted employees	Initial w/ updates
Fire Extinguishers	6151	Assigned employees	Initial, annual
Material Safety Data Sheets	5194	Chemical users	Initial
Haz. Waste Ops. & Emerg. Response	5192	Assigned employees	Initial, annual
Heat stress (field operations)	3395	Exposed employees	Initial
Laser equipment	1801	Operators	Initial
Control of Haz. Energy (lockout/blockout)	3314	Affected employees	Initial
Respiratory Protection	5144	Users	Initial, annual
Permissible Exposure Limits	5155	Chemical users	Initial
Confined Spaces	5157	Affected employees	Initial

Beyond meeting training mandates on specific issues, Cal-OSHA also has broad language/ authority under their *Injury & Illness Prevention Program* regulation regarding training:

Every employer shall establish, implement and maintain an effective Injury and Illness Prevention Program. The Program shall... provide training and instruction:

(A) When the program is first established;

(B) To all new employees;

(C) To all employees given new job assignments for which training has not previously been received;

(D) Whenever new substances, processes, procedures or equipment are introduced to the workplace and represent a new hazard;

(E) Whenever the employer is made aware of a new or previously unrecognized hazard; and,

(F) For supervisors to familiarize themselves with the safety and health hazards to which employees under their immediate direction and control may be exposed.

For more information see the Cal-OSHA website:
http://www.dir.ca.gov/dosh/dosh_publications/TrainingReq.htm

Or see the UC Systemwide Training and Education Workgroup training matrix (includes non-lab training mandates):http://stew.ucdavis.edu/Matrix/

Other Research-related Areas that Mandate Training (not comprehensive)

- Infectious biological materials (Biosafety in Microbiological and Biomedical Laboratories - NIH/CDC Guidelines)

  Training on safe work practices to obtain/maintain PI-authorization from local Institutional Biosafety Committee

- Ionizing radiation or radiation producing equipment (California Code of Regulations, Title 17, Div. 1, Ch. 5)

  Training on safe work practices to obtain/maintain PI-authorization from local Radiation Safety Committee

- Research animals (Association for Assessment and Accreditation of Laboratory Animal Care - AAALAC)

  Training on proper and ethical animal handling to maintain institutional accreditation and PI-authorization from local animal care committee

- Chemical waste generators (CA Health and Safety Code 25200.3.1(b)(1))

  Waste accumulation area is managed by personnel who have received training commensurate with their responsibilities and authority for managing hazardous wastes

- Hazardous materials users (California Health & Safety Code, Section 25504c. - Business Plan)

  Initial and annual training on emergency response procedures for workers potentially affected by hazardous materials

- Hazardous materials users (California Fire Code, Section 2703.9.1 - Hazardous Materials General Provisions)

  Affected workers shall be familiar with chemical nature of materials and mitigating actions in event of fire, leak, spill

- Receive/package/ship hazardous materials (Code of Federal Regulations, 49, Part 172, Subpart H)

  Training on regulations and procedures

University of California
Agriculture and Natural Resources

Appendix 2a - BIOLOGICAL SAFETY & CONTAINMENT SOP

Document Overview

A biosafety plan describes scope of work, types of activities and materials involved, assessment of hazards, description of hazard controls, responsible parties, and authorized personnel on a project. The plan is reviewed annually and whenever changes occur to work, staff or locations. The plan can also be used as training document for employees who are authorized to work on a project or in a facility. A current and accurate Biological Use Authorization (BUA) that has been reviewed and approved by a UC campus Institutional Biosafety Committee (IBC) may serve as the project biosafety plan. Similarly, a current and accurate Animal care and Use Protocol which has been reviewed and approved by a UC campus Institutional Animal Care and Use Committee (IACUC) may serve as the project biosafety plan.

How to use this document: Complete each section with project-specific information.

Project Summary

[Goal/purpose of research activities, biological materials involved, source of materials]

Locations of work

[Include what activities occur in each space and what types of equipment are used in each space. INCLUDE COPIES OF SITE MAPS AND FLOOR PLANS AS NEEDED]:

Location	Building	Room	Activities and materials stored or used

Inventory of Biological Materials

[Project leaders must maintain a current inventory of stored cultures and samples that are stored and used in the lab. This would be a detailed listing of what is mentioned in project summary with level of detail depending upon level of risk]

Authorized Personnel

[Who is responsible for oversight of the project? Who works on the project and when did they receive training on the topics presented in the biosafety plan? You may attach or refer to separate training records as needed]

Personnel	*Role in Lab*	*Training Topic(s)*	*Training Dates*

Identify principal investigator/director/supervisor of research activities and their UC affiliation (UC ANR title/role and any UC campus departmental appointment).

Identify any individuals who serve as technical/administrative contacts and local safety managers on behalf of the research director/supervisor (lab managers, senior lab staff, site superintendents, co-investigators, administrative contacts).

Maintain current accurate roster of authorized lab users/members, job title, and date of most recent lab safety training.

Practices and procedures

[Describe the activities which pose risk for human exposure or disease risk for susceptible host populations – attach specific SOPs if useful and relevant.]

Biological containment and waste management

[How are samples contained and transported, what type of waste is generated and how will it be treated?]

Risk assessment and risk minimization:

[Use prompts below as a guide for content]

This work poses a risk to [human, animal, plant health] if [personal exposure, animal exposure, insect escape, environmental release] occurs.

The following controls are in place to minimize risk…

Examples of risk minimization practices for biological materials:

- ❑ Annual documented employee training in project-specific safety information (fume hoods use, autoclave use, sharps use, animal handling, microbiological culture techniques, machine operations)
- ❑ Creating and implementing a written safety plan
- ❑ Biological spill control training/materials
- ❑ Use of lab coats and gloves
- ❑ Prohibition on eating, drinking, smoking, or applying cosmetics in the lab
- ❑ PPE decontamination procedures for lab coats and foot wear
- ❑ Proper storage and disposal of PPE, research materials, and waste
- ❑ Notification and on-going communications with local and state ag authorities
- ❑ Acquisition of USDA/CDFA permit for research or diagnostic activities
- ❑ Adherence to conditions of regulatory permit including maintenance of current and accurate inventory of pests
- ❑ Cleaning of work surfaces before and after each use
- ❑ Use of a biosafety cabinet for microbiological cultures with chance of airborne dissemination

Expand upon above mentioned practices in context of risk control.

Appendix 2b – Determination of Need for Animal Use Protocol

Institutional Animal Care and Use Committee
University of California, Merced

Federal regulations require that all activities involving the use of animals in research, teaching and/or testing be reviewed by the Institutional Animal Care and Use Committee (IACUC). This review occurs is through the Animal Use Protocol (AUP). In order to determine whether an AUP and IACUC review are needed, please provide the following information and return to Leslie Teixeira, Office of Research, (lteixeira@ucmerced.edu).

Contact Information

UCM Principal Investigator:	
Department/School:	
Phone Number:	
e-mail:	

Project Information

Funding Source:	□ Grant/Subaward □ Contract/subcontract □ Departmental/Campus □ Other:
Project Type:	□ Research □ Teaching □ Testing □ Observational
Species to be used:	
Species status:	□ Live □ Dead
Source of species:	
Will species be handled/restrained?	□ Yes □ No

Summary of Procedures (short 2-5 sentences)

Additional Information

For IACUC Staff Use

□ Activities described do not need AUP and IACUC review. Describe reason below:
□ Activities described do need AUP and IACUC review
IACUC Staff or Chairperson Date

Appendix 2c – Facility guidelines for biological safety (engineering controls)

Biosafety Level (BSL)	Examples of lab facilities and required features	Allowances and restrictions
BSL - 1	Passive ventilation through windows or mechanical ventilation system with ducting that is shared with non-lab spaces may be used. Recirculation of air between lab and non-lab space is allowable. A sink for handwashing must be available. The laboratory should be designed so that it can be easily cleaned. Carpets and rugs in laboratories are not appropriate. Bench tops must be impervious to water and resistant to heat, organic solvents, acids, alkalis, and other chemicals. Chairs used in laboratory work should be covered with a non-porous material that can be easily cleaned and decontaminated with appropriate disinfectant.	Lab suitable for use or storage of plant materials, insects, and microorganisms NOT KNOWN TO CAUSE SERIOUS DISEASE IN HEALTHY ANIMALS OR PLANTS. Standard microbiological practices are followed by all lab users and should be sufficient to provide human health protection. A safety plan and specific training are required for use of sharps (needles and scalpels). Eating, drinking, smoking, handling contact lenses, applying cosmetics, and storing food for human consumption must not be permitted in laboratory areas. Food must be stored outside the laboratory area in cabinets or refrigerators designated and used for this purpose. Research use of live animals, unfixed animal carcasses/tissues, or pathogens of plants or animals is prohibited. Use or storage of genetically engineered organisms requires EHS review and may require approval from an Institutional Biosafety Committee (IBC).
BSL -1 Enhanced	Mechanical ventilation system with ducting may be shared with non-lab spaces. Recirculation of air between lab and non-lab space may be allowable. Access control for lab is required (lockable door). A sink for hand washing is required. Operable windows must have insect exclusion screens. The laboratory should be designed so that it can be easily cleaned. Carpets and rugs in laboratories are not appropriate. Bench tops must be impervious to water and resistant to heat, organic solvents, acids, alkalis, and other chemicals. Chairs used in	Lab suitable for use or storage of plants, insects, microorganisms, plant pathogens, and untreated animal tissues NOT KNOWN TO CAUSE SERIOUS DISEASE IN HEALTHY HUMANS. Standard microbiological practices are followed by all lab users and should be sufficient to provide human health protection. A safety plan and specific training are required for use of sharps (needles and scalpels). Eating, drinking, smoking, handling contact lenses, applying cosmetics, and storing food for human consumption must not be permitted in laboratory areas. Food must be stored outside the laboratory area in cabinets or refrigerators designated and used for

Appendix 2c – Facility guidelines for biological safety (engineering controls)

Biosafety Level (BSL)	Examples of lab facilities and required features	Allowances and restrictions
BSL -1 Enhanced (continued)	laboratory work should be covered with a non-porous material that can be easily cleaned and decontaminated with appropriate disinfectant. Isolation devices and/or special practices may be required for containment of plant pests, potentially infested/infected plant materials, and potential sources of airborne pathogens. See USDA-APHIS guidelines, CDC Guidelines, or regulatory permit conditions, or consult EHS for requirements. Special treatment may be required for disposal of biological materials. Collection and treatment of water effluent from experiments may be required.	this purpose. Personal items such as backpacks and purses can pose a containment risk and should not be stored in labs. An SOP, containment, or biosafety plan is required for use or storage of regulated plant materials, plant pests that pose a threat to other co-located research, or unfixed animal carcasses or tissues. Research use of live animals, human pathogens or untreated human blood/tissues is prohibited. Use or storage of plant pathogens, genetically-engineered organisms, or pathogens that only affect (non-human) animals requires EHS review and may require approval from an Institutional Biosafety Committee (IBC).
BSL - 2	**Specific approval and authorizations are required for BSL 2 labs at ANR.** **Contact EHS for more information.** Mechanical ventilation system with differential airflow is required. No operable windows allowed (operable windows must be secured to prevent use). Recirculation of air between lab and non-lab space is NOT allowable. Special equipment, practices, and training are required for human health protection.	Lab suitable for use or storage of known human pathogens, human blood, or other potentially infectious materials (OPIM). Research use of live animals requires approval from an Institutional Animal Care and Use Committee (AICUC). Use or storage of pathogens or genetically engineered organisms requires approval from an Institutional Biosafety Committee (IBC). A medical waste management plan and contract with waste vendor is required for any treatment or disposal of biological waste or contaminated sharps.
BSL - 3	**Specialized biological research facility.** **No labs at ANR meet this criteria.**	Required for work with airborne biohazards and high-hazard pathogens. BSL-3 facilities may be available at UC campuses.
BSL - 4	**Specialized biological research facility.** **No labs at UC meet this criteria.**	Required for work with airborne biohazards and high-hazard pathogens. No BSL-4 facilities are available at UC.

Appendix 2c – Facility guidelines for biological safety (engineering controls)

Reference documents and applicable guidelines

Centers for Disease Control and Prevention, & National Institutes of Health. (2009). *Biosafety in microbiological and biomedical laboratories (BMBL)* 5th ed. Department of Health and Human Services. Available at: https://www.cdc.gov/biosafety/publications/bmbl5/

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Appendix 2d - List of Aerosol-Transmissible Diseases/Pathogens

Subchapter 7. General Industry Safety Orders
Group 16. Control of Hazardous Substances
Article 109. Hazardous Substances and Processes
Aerosol Transmissible Diseases/Pathogens
§5199. Appendix A.

This appendix contains a list of diseases and pathogens which are to be considered aerosol transmissible pathogens or diseases for the purpose of Section 5199. Employers are required to provide the protections required by Section 5199 according to whether the disease or pathogen requires airborne infection isolation or droplet precautions as indicated by the two lists below.

Diseases/Pathogens Requiring Airborne Infection Isolation

Aerosolizable spore-containing powder or other substance that is capable of causing serious human disease, e.g.
Anthrax/*Bacillus anthracis*
Avian influenza/Avian influenza A viruses (strains capable of causing serious disease in humans)
Varicella disease (chickenpox, shingles)/Varicella zoster and Herpes zoster viruses,
Measles (rubeola)/Measles virus
Monkeypox/Monkeypox virus
Novel or unknown pathogens
Severe acute respiratory syndrome (SARS)
Smallpox (variola)/Varioloa virus
Tuberculosis (TB)/*Mycobacterium tuberculosis*
Any other disease for which public health guidelines recommend airborne infection isolation

Diseases/Pathogens Requiring Droplet Precautions

Diphtheria pharyngeal
Epiglottitis, due to *Haemophilus influenzae* type b
Haemophilus influenzae Serotype b (Hib) disease/*Haemophilus influenzae* serotype b -- Infants and children
Influenza, human (typical seasonal variations)/influenza viruses
Meningitis
Meningococcal disease sepsis, pneumonia (see also meningitis)
Mumps (infectious parotitis)/Mumps virus
Mycoplasmal pneumonia
Parvovirus B19 infection (erythema infectiosum)
Pertussis (whooping cough)
Pharyngitis in infants and young children/Adenovirus, Orthomyxoviridae, Epstein-Barr virus, Herpes simplex virus,
Pneumonia (Adenovirus, Haemophilus influenzae Serotype b, infants and children, Meningococcal, *Mycoplasma, primary atypical*, *Streptococcus Group A)*
Pneumonic plague/*Yersinia pestis*
Rubella virus infection (German measles)/Rubella virus
Severe acute respiratory syndrome (SARS)
Streptococcal disease (group A streptococcus)

Viral hemorrhagic fevers due to Lassa, Ebola, Marburg, Crimean-Congo fever viruses (airborne infection isolation and respirator use may be required for aerosol-generating procedures)

Any other disease for which public health guidelines recommend droplet precautions

Appendix 2c - List of Select Agents and Toxins

The following biological agents and toxins have been determined to have the potential to pose a severe threat to both human and animal health, to plant health, or to animal and plant products. An attenuated strain of a select agent or an inactive form of a select toxin may be excluded from the requirements of the Select Agent Regulations.

HHS and USDA Select Agents and Toxins 7CFR Part 331, 9 CFR Part 121, and 42 CFR Part 73

HHS SELECT AGENTS AND TOXINS

Abrin
Bacillus cereus Biovar *anthracis**
Botulinum neurotoxins*
Botulinum neurotoxin producing species of *Clostridium**
Conotoxins (Short, paralytic alpha conotoxins containing the following amino acid sequence $X_1CCX_2PACGX_3X_4X_5X_6CX_7$)[1]
Coxiella burnetii
Crimean-Congo haemorrhagic fever virus
Diacetoxyscirpenol
Eastern Equine Encephalitis virus[3]
Ebola virus*
*Francisella tularensis**
Lassa fever virus
Lujo virus
Marburg virus*
Monkeypox virus[3]
Reconstructed forms of the 1918 influenza virus
Ricin
Rickettsia prowazekii
SARS-associated coronavirus (SARS-CoV)
Saxitoxin
South American Haemorrhagic Fever viruses:
Staphylococcal enterotoxins A,B,C,D,E subtypes
T-2 toxin
Tetrodotoxin
Tick-borne encephalitis complex (flavi) viruses:
Far Eastern subtype & Siberian subtype
Kyasanur Forest disease virus
Omsk hemorrhagic fever virus
Variola major virus (Smallpox virus)*
Variola minor virus (Alastrim)*
*Yersinia pestis**

OVERLAP SELECT AGENTS AND TOXINS

*Bacillus anthracis**
Bacillus anthracis Pasteur strain
Brucella abortus, Brucella melitensis, Brucella suis
*Burkholderia mallei**, *Burkholderia pseudomallei**
Hendra virus
Nipah virus
Rift Valley fever virus
Venezuelan equine encephalitis virus[3]

USDA SELECT AGENTS AND TOXINS

African horse sickness virus
African swine fever virus
Avian influenza virus[3]
Classical swine fever virus
Foot-and-mouth disease virus*
Goat pox virus
Lumpy skin disease virus
Mycoplasma capricolum[3], *Mycoplasma mycoides*[3]
Newcastle disease virus[2,3]
Peste des petits ruminants virus
Rinderpest virus*
Sheep pox virus
Swine vesicular disease virus

USDA PLANT PROTECTION AND QUARANTINE (PPQ)SELECT AGENTS AND TOXINS

Peronosclerospora philippinensis (P. sacchari)
Phoma glycinicola (formerly Pyrenochaeta glycines)
Ralstonia solanacearum
Rathayibacter toxicus
Sclerophthora rayssiae
Synchytrium endobioticum
Xanthomonas oryzae

Appendix 3a – Facility guidelines for chemical safety (ventilation controls)

Lab Ventilation Design Level	Examples of lab facilities and required features	Allowances and restrictions
LVDL - 0	Standard office, kitchen, or residential space. Passive ventilation through windows or mechanical ventilation system with ducting that is shared with non-lab spaces may be used. Recirculation of air between lab and non-lab space is allowable.	Negligible amounts of consumer chemicals only. GHS “hazard” chemicals are prohibited. SOP required for use of volatile or corrosive chemicals that cause irritation or drowsiness.
LVDL -1	Field lab, temporary lab space, sample prep rooms, technical rooms. Passive ventilation (operable windows) may be augmented with use of fans, isolation devices, and SOPs when low hazard volatile or corrosive chemicals are in use. Mechanical ventilation system with ducting may be shared with non-lab spaces, but recirculation of air between lab and non-lab space is NOT allowable.	Moderate amounts of consumer and disinfectant chemicals (bleach, ethyl alcohol, isopropanol) only. Use of chemicals with the following GHS codes is prohibited unless there is a fume hood and adequate storage available: H333, H334, H226, H227, H229. Small amounts of low hazard chemicals (acetone, kit reagents) allowable with specific permission and written SOP. Use of chemicals with the following GHS codes is prohibited: H330, H331, H332, H224, H225.

Appendix 3a – Facility guidelines for chemical safety (ventilation controls)

Lab Ventilation Design Level	Examples of lab facilities and required features	Allowances and restrictions
LVDL - 2	Low-tech lab space, sample prep rooms, technical rooms. Mechanical ventilation system augmented with fume hood or special isolation device for *removal* of hazardous vapors and gases. No operable windows or windows kept closed at all times. Recirculation of air between lab and non-lab space is NOT allowable. Occupied minimum exhaust ventilation rate of 4 – 6 air changes per hour (ACH) based on hazard review by EHS. May be lower if supported by documented hazard assessment by EHS or other qualified entity. Differential pressure or air volume offset control required during normal operation mode. Differential pressure (inward airflow from non-lab towards lab area) should be verified. Room construction should be sufficiently tight to meet differential pressure needs. Fume hoods must meet regulatory requirements and may be shared among labs. Potential for upgrade to LVDL -3 with increase of ACH (capacity of air handling system must be considered).	Moderate to large amounts of volatile or corrosive chemicals with the following GHS codes are allowable if there is a fume hood and adequate storage available. If no fume hood is available, use of these chemicals may be restricted if unsafe conditions of flammability, respiratory irritation, drowsiness or toxicity are possible: H333, H334, H335, H226, H227. Use of chemicals with the following GHS codes is prohibited unless there is a fume hood and adequate storage available: H331, H332, H336. Use of chemicals with the following GHS codes is allowable only with specific permission and written SOP: H229, H242, H261. Carcinogen storage and use requires a written SOP. Use of volatile carcinogens requires a fume hood. Use of chemicals with the following GHS codes is prohibited: H330, H204, H205, H220, H224, H240, H241, H250, H260.

Appendix 3a – Facility guidelines for chemical safety (ventilation controls)

Lab Ventilation Design Level	Examples of lab facilities and required features	Allowances and restrictions
LVDL – 3	Multi-zoned mechanical ventilation system with differential airflow possible (i.e., functional control system). Recirculation of air between lab and non-lab space is NOT allowable. Special isolation units are used to contain all emission sources of concern and adequate air mixing/distribution is available from general ventilation system. Typical occupied minimum exhaust ventilation rate of 6 air changes per hour (ACH) based on hazard review by EHS. May be increased or lowered if supported by documented hazard assessment by EHS or other qualified entity. Unoccupied minimum exhaust ventilation rate typically 4 ACH. May be increased or lowered if supported by documented hazard assessment by EHS or other qualified entity. Differential pressure or air volume offset control required during normal operation mode. Differential pressure (inward airflow from non-lab towards lab area) should be verified. Room construction should be sufficiently tight to meet differential pressure needs. Vestibule should be considered for special environmental conditions or cascading pressures. Fume hoods must meet regulatory requirements and are available in each lab space or dedicated for single project. Dispersion modeling should be performed to assess reentrainment of exhausted vapors and gases.	Moderate to large amounts of volatile or corrosive chemicals with the following GHS codes are allowable if there is a fume hood and adequate storage available: H226, H227, H229. Use of chemicals with the following GHS codes is prohibited unless specific permission is obtained and effective hazard controls are in place for the work: H330, H331, H204, H205, H220, H224, H240, H250, H260.

Appendix 3a – Facility guidelines for chemical safety (ventilation controls)

Lab Ventilation Design Level	Examples of lab facilities and required features	Allowances and restrictions
LVDL - 4	**Special high hazard chemical research facility. No labs at ANR meet this criteria.** Multi-zoned mechanical ventilation system with differential airflow and special controls for high hazard chemicals. Typically 8-10 ACH with special isolation dev ices in use.	Designed and dedicated for use of chemicals with the following hazard codes (in addition to chemicals allowable at lower levels): H330. H331, H204, H205, H220, H224, H240, H250, H260

University of California
Agriculture and Natural Resources

Insert Title

STANDARD OPERATING PROCEDURE (SOP)

Type of SOP: ☐ Process/Equipment ☐ Hazardous Chemical ☐ Hazardous Class

All personnel who are subject to these SOP requirements must review a completed SOP and sign the associated training record. Completed SOPs must be kept with the UC Davis Laboratory Safety Manual or be otherwise readily accessible to laboratory personnel. Electronic access is acceptable. SOPs must be reviewed, and revised where needed, as described in the UC Davis Laboratory Safety Manual. The unique properties of each chemical must be considered when preparing a SOP.

Date SOP Written:	Click here to enter a date.	Approval Date:	Click here to enter a date.
SOP Prepared by:	**REQUIRED - Insert Preparer's Name** **CLSC SOP Task Force**		
SOP Reviewed and Approved by (name/signature):	**REQUIRED - Insert Approver's Name & Signature**		
Department:	**REQUIRED - Insert Department**		
Principal Investigator/ Laboratory Supervisor:	**REQUIRED - Insert Name**	Phone:	**REQUIRED - Insert Phone#**
Lab Manager/ Safety Coordinator:	**REQUIRED - Insert Name**	Phone:	**REQUIRED - Insert Phone#**
Emergency Contact(s):	**REQUIRED - Insert Name**	Phone:	**REQUIRED - Insert Phone#**
Location(s) covered by SOP:	Building: **REQUIRED - Insert Name** Room #(s): **REQUIRED - Insert Number**	Lab Phone:	**REQUIRED - Insert Phone#**

1. HAZARD OVERVIEW

REQUIRED - Insert brief description of the laboratory process involving hazardous chemicals, single hazardous chemical, or class of hazardous chemicals covered by this SOP.

2. HAZARDOUS CHEMICAL(S)/CLASS OF HAZARDOUS CHEMICAL(S)

REQUIRED - List (or attach) the chemical(s) or class of chemical(s), and describe important properties and signs/symptoms of exposure. List (or attach) hazardous chemical(s) and expected by-product(s) produced if this SOP covers a laboratory process.

3. ENGINEERING/VENTILATION CONTROLS

REQUIRED - Insert descriptions of lab-specific engineering or ventilation controls used to reduce chemical exposures (*e.g.,* fume hoods, snorkels, glove boxes, reverse flow laminar benches, biosafety cabinets, etc.) or specific equipment safety features.

4. ADMINISTRATIVE CONTROLS

The following elements are required:

1. Complete the UC Laboratory Safety Fundamentals (or approved equivalent) training prior to working in the laboratory;
2. Complete laboratory-specific safety orientation and training on laboratory-specific safety equipment, procedures, and techniques to be used, including any applicable laboratory-specific Laboratory Safety Plan(s), prior to receiving unescorted access to the laboratory;
3. Demonstrate competency to perform the procedures to the Principal Investigator (PI), Laboratory Supervisor, laboratory-specific Safety Officer, and/or trainer;
4. Be familiar with the location and content of any applicable Safety Data Sheets (SDSs) for the chemicals to be used (online SDSs can be accessed from UC SDS);
5. Implement good laboratory practices, including good workspace hygiene;
6. Inspect all equipment and experimental setups prior to use;
7. Follow best practices for the movement, handling, and storage of hazardous chemicals (see Chapters 5 and 6 of Prudent Practices in the Laboratory for more detail). An appropriate spill cleanup kit must be located in the laboratory. Chemical and hazardous waste storage must follow an appropriate segregation scheme and include appropriate labeling. Hazardous chemical waste must be properly labelled, stored in closed containers, in secondary containment, and in a designated location;
8. Do not deviate from the instructions described in this SOP without prior discussion and approval from the PI and/or Laboratory Supervisor;
9. Notify the PI or Laboratory Supervisor of any accidents, incidents, near-misses, or upset condition (*e.g.,* unexpected rise or drop in temperature, color or phase change, evolution of gas) involving the process, hazardous chemical(s), or hazardous chemical class described in this SOP; and
10. Abide by the laboratory-specific working alone SOP, if applicable.

REQUIRED - Insert descriptions of any additional administrative controls (*e.g.,* restrictions on procedure/quantity/work equipment/work locations/unattended operations/etc.), including controls that may be chemical-specific (*e.g.,* peroxide formers).

INSERT IF APPLICABLE- Descriptions of any special handling or storage requirements.

5. PERSONAL PROTECTIVE EQUIPMENT (PPE)

At a minimum, long pants (covered legs) and closed toe/closed heel shoes (covered feet) are required to enter a laboratory or technical area where hazardous chemicals are used or stored.

In addition to the minimum attire required upon entering a laboratory, the following PPE is required for all work with hazardous chemicals:

A. Eye Protection:
   i. Eye protection must be ANSI Z87.1-compliant.
   ii. At a minimum safety glasses are necessary.
   iii. Splash goggles may be substituted for safety glasses, and are required for processes where splashes are foreseeable or when generating aerosols.
   iv. Ordinary prescription glasses will NOT provide adequate protection unless they also meet the Z87.1 standard and have compliant side shields.

B. Body Protection: At a minimum a chemically-compatible laboratory coat that fully extends to the wrist is necessary.
   i. If a risk of fire exists, a flame-resistant laboratory coat that is NFPA 2112-compliant should be worn.
   ii. For chemicals that are corrosive and/or toxic by skin contact/absorption additional protective clothing (*e.g.,* face shield, chemically-resistant apron, disposable sleeves, etc.) are required where splashes or skin contact is foreseeable.

C. Hand Protection: Hand protection is needed for the activities described in this SOP. Define the type of glove to be used based on the following:
   i. Chemical(s) being used;
   ii. Anticipated chemical contact (e.g. incidental, immersion, etc.);
   iii. Manufacturers' permeation/compatibility data; and
   iv. Whether a combination of different gloves is needed for any specific procedural step or task.

REQUIRED - Insert descriptions of PPE and hygiene practices used with each process, hazardous chemical(s), or hazardous chemical class, including any specialized PPE needed for a procedural step/task.

6. SPILL AND EMERGENCY PROCEDURES

Follow the guidance for chemical spill cleanup from SafetyNet #13 and/or the UC Davis Laboratory Safety Manual, unless specialized cleanup procedures are described below. Emergency procedure instructions for the UC Davis campus and UCD Medical Center are contained in the UC Davis Laboratory Safety Manual, campus Emergency Response Guide (ERG), and UCD Health System ERG. The applicable ERG must be posted in the laboratory. All other locations must describe detailed emergency procedure instructions below.

INSERT - Descriptions of any specialized spill clean up procedures for the hazardous chemicals used in this SOP (*e.g.,* hydrofluoric acid, pyrophorics, phenol, etc.). Additional details of lab-specific spill cleanup should be provided if applicable.

INSERT IF APPLICABLE - Descriptions of any specialized emergency procedures for locations outside of the UC Davis main campus and the UCD Medical Center campus.

7. WASTE MANAGEMENT AND DECONTAMINATION

Hazardous waste must be managed according to Safety Net #8, and must be properly labeled. In general, hazardous waste must be removed from your laboratory within 9 months of the

accumulation start date; refer to the accumulation time for waste disposal to ensure compliance. Hazardous waste pick up requests must be completed using WASTe.

Note: See the WASTe Factsheet for instructions on how to complete a label.

REQUIRED - Insert descriptions of laboratory-specific information on the waste streams generated, storage location, and any special handling/storage requirements.

REQUIRED - Insert descriptions of decontamination procedures for equipment, glassware, and controlled areas (*e.g.,* glove boxes, restricted access hoods, perchloric/hot acid fume hoods, or designated portions of the laboratory).

Upon completion of work with hazardous chemicals and/or decontamination of equipment, remove gloves and/or PPE to wash hands and arms with soap and water. Additionally, upon leaving a designated hazardous chemical work area remove all PPE worn and wash hands, forearms, face and neck as needed. Contaminated clothing or PPE should not be worn outside the lab. Soiled lab coats should be sent for professional laundering. Grossly contaminated clothing/PPE and disposable gloves must not be reused.

8. DESIGNATED AREA

INSERT - Description(s) of designated area(s) for your laboratory. Designated areas are required for "Particularly Hazardous Substances". The entire laboratory, fume hood, or a portion of the laboratory may be used, and must be labeled with the hazards.

9. DETAILED PROTOCOL

REQUIRED - Insert or attach detailed laboratory-specific procedures for the process, hazardous chemical(s), or hazard class. You may also include any relevant supporting resources such as SafetyNets, journal citations, etc. that are applicable.

TEMPLATE REVISION HISTORY

Version	Date Approved	Author	Revision Notes:
1.0	12/1/2014	CLSC Task Force	New template
1.1	4/16/2015	Chris Jakober	Changed SDS link, language relating to soiled PPE
1.2	5/11/2016	Chris Jakober	Updated URLs following website redesign, added URL to UCDHS ERG
1.3	11/30/2016	Lindy Gervin	Unlocked editable fields
1.4	3/13/2017	Lindy Gervin	Updated links in section 7 to WASTe system
1.5	12/6/2017	Chris Jakober	Reformatted hand protection PPE language, added "Equipment" into SOP category type checkbox.

LAB-SPECIFIC REVISION HISTORY

Version	Date Approved	Author	Revision Notes:

Documentation of Standard Operating Procedure Training

(Signature of all users is required)

- ✓ Prior to using **Insert SOP Title**, laboratory personnel must be trained on the hazards involved in working with this SOP, how to protect themselves from the hazards, and emergency procedures.
- ✓ Ready access to this SOP and to a Safety Data Sheet for each hazardous material described in the SOP must be made available.
- ✓ The Principal Investigator (PI), or the Laboratory Supervisor if the activity does not involve a PI, must ensure that their laboratory personnel have attended appropriate laboratory safety training or refresher training within the last three years.
- ✓ Training must be repeated following **any** revision to the content of this SOP. Training must be documented. This training sheet is provided as one option; other forms of training documentation (including electronic) are acceptable but records must be accessible and immediately available upon request.

Designated Trainer: *(signature is required)*

I have read and acknowledge the contents, requirements, and responsibilities outlined in this SOP:

Name	Signature	Trainer Initials	Date

HEAT ILLNESS PREVENTION PLAN

UNIVERSITY OF CALIFORNIA
AGRICULTURE AND NATURAL RESOURCES
INJURY AND ILLNESS PREVENTION PROGRAM

Applicability

This attachment is intended to comply with California Code of Regulations Title 8, Section 3395, Heat Illness Prevention (May 2015). The heat illness prevention standard is applicable to any outdoor workplace, whenever environmental risk factors for heat illness are present. Environmental risk factors for heat illness are defined in the regulation as working conditions that affect the possibility that heat illness could occur, including air temperature, relative humidity, radiant heat from the sun, and other sources, conductive heat sources such as the ground, air movement, workload severity and duration, protective clothing and personal protective equipment worn by employees.

In the course of their work duties, employees in the classifications listed below may be exposed to environmental risk factors for heat illness.

Written plans and procedures

Employers are required to have a written heat illness plan available at each outdoor worksite where heat illness procedures may be required. These written plans and procedures are reviewed with employees in training and pre-shift meetings.

The written plan shall include:

1. Procedures for provision of water and shade
2. High heat procedures
3. Emergency response procedures
4. Acclimatization methods and procedures

Employers shall implement effective emergency response plan and procedures including: ensuring that there is an effective means of contacting supervisor or emergency medical services at the worksite, ensuring proper first aid or emergency response to signs and symptoms of heat illness, ensuring that clear and precise directions to the work site are available to emergency responders, and (if necessary) ensuring that injured workers are transported to a place where they can be reached by emergency responders. If an electronic device will not provide reliable reception in the work area, alternative means of monitoring and communication with employees must be identified.

New employees must have close supervision by a supervisor or designee for the first 14 days of employment. Specific acclimatization methods and procedures must be described in the written plan.

Employer responsibility and worker rights
Employers are responsible for monitoring weather conditions at the worksite and ensuring that heat illness procedures (as described in this plan) are implemented when required. Employees are free to exercise their rights under the standard without fear of reprisal or retaliation.

Provision of Water
Clean, fresh, and cool potable water shall be readily available to employees as close as practicable to the worksite. Whenever environmental risk factors for heat illness exist, drinking water will be provided in sufficient quantities to provide one quart per employee per hour for the entire shift (at least 2 gallons per employee for an 8-hour shift). Supervisors are responsible to ensure that employees have an adequate supply of drinking water. Smaller quantities of water may be provided at the beginning of the shift if there are effective procedures for replenishing the water supply during the shift as needed to allow employees to drink at least one quart per hour. Employees are encouraged to drink water frequently.

Shade Up Provisions
When the temperature exceeds 80 ^{o}F a shaded area will be provided that employees may use when they are suffering from heat illness symptoms or believe they need a recovery period ("cool-down break") to prevent heat illness. When the temperature is less than 80 ^{o}F , shade must be provided in a timely manner if an employee requests a "cool-down" break. Supervisors are responsible to ensure that employees have access to a shaded area located as close as possible to work area. The shaded area shall be open to the air or ventilated and cooled and access shall be permitted at all times while employees are present. Canopies, umbrellas or other temporary structures may be used to provide shade, provided they block direct sunlight. The shade shall accommodate the number of the employees on break at any time for cool-down recovery or onsite meal breaks. Employees must be able to sit in a normal posture fully in the shade without having to be in physical contact with each other.

Individuals who take preventative cool-down breaks in the shade shall be monitored for signs or symptoms of heat illness, encouraged to remain in the shade, and not ordered back to work until at least 5 minutes have passed or signs and symptoms have abated. Employees who report signs and symptoms of heat illness must be provided first aid or emergency response as needed.

High-Heat Procedures
When the outdoor temperature equals or exceeds 95 ^{o}F , employers shall ensure effective observation and monitoring of employees by one of the following means: direct supervision of 20 or fewer employees onsite, mandatory buddy system, regular communication with sole employee by radio or cellular phone, or other means of effective observation. One or more employees at each worksite must be designated and authorized to contact emergency services when needed.

Pre-shift meetings must be conducted before commencement or work to review high-heat procedures, encourage water consumption, and remind employees of their right to take cool-down rest breaks of no less than 5 minutes whenever needed.

Employee must take a minimum preventative cool-down break of ten minutes for every two hours of work above 95°F. Required meal breaks or other rest periods may serve as preventative cool-down breaks.

Acclimatization Procedure
Acclimatization is the gradual exposure to work in hot conditions to allow a person's body to adjust to working in heat. Acclimatization is particularly important for employees who are returning to work after a prolonged absence, recent illness, or recently moving from a cool to hot climate. Acclimatization is also a concern during heat wave events where temperatures exceed 80 °F and are at least ten degrees higher than the average daily high temperature for the preceding days.

Employees who are newly assigned to a high heat area shall be closely observed by a supervisor or other responsible party for the first fourteen days of employment above 80°F. Acclimatization is fully achieved in most people within 4 to 14 days of regular work involving at least 2 hours per day in the heat. Best practices include finding ways to lessen the intensity of employees' work during a heat wave and during 2-week break-in periods of new employees. For heavy work under very hot conditions, a period of 4-10 days of progressively increasing work time is recommended, starting with about 2 hours work per day. For less severe conditions, 2-3 days of increasing work activity and duration are recommended.

Training
All employees who may work outdoors in conditions where there are environmental risk factors for heat illness shall be provided training on the information contained in this plan, including recognizing and responding to the various types of heat-related illnesses. Employees shall also be reminded that they have the right to exercise their rights under the heat illness protection standard without fear of retaliation from employers. In addition to standard employee training, supervisors must be trained on provisions for monitoring employees and for anticipating weather conditions which trigger heat illness requirements. All employees must be aware of and able to implement emergency response procedures (as appropriate for their position).

Additional information about prevention of heat illness can be found at the following resources:
Cal/OSHA websites: http://www.dir.ca.gov/dosh/HeatIllnessInfo.html
http://99calor.org/english.html
http://99calor.org/espanol/

ANR EH&S website: http://ucanr.edu/heatillness.

Recognizing Heat Illness Risk Factors

Environmental risk factors for heat illness include air temperature, relative humidity, radiant heat from the sun and other sources, conductive heat sources such as the ground, air movement, workload severity and duration, protective clothing and personal protective equipment worn by employees.

Personal risk factors for heat illness include age, degree of acclimatization, general health, water consumption, and use of medications, caffeine, or alcohol which can affect the body's water retention or other physical response to heat.

Supervisors must evaluate work conditions before sending employees to perform outdoor work in hot conditions. Typically, temperatures above 80 ºF , especially with heavy physical work activities, would represent conditions where there is a risk of heat illness. Other factors, such as high humidity or work activities that restrict the body's ability to cool itself, such as protective clothing, could result in a risk of heat illness at lower temperatures.

The National Weather Service Heat Index guideline (attached) may be used to assess the environmental risk of heat illness, based on temperature and relative humidity. The Heat Index table categorizes the risk or degree of heat illness with increasing heat index values. Provision of water and shade as described above should be implemented whenever the Heat Index exceeds 80ºF.

Identifying Heat Illness

Heat illness is a group of serious and escalating medical conditions that can result from the body's inability to cope with a particular heat load, and includes heat fatigue, heat cramps, heat exhaustion, and heat stroke.

The National Institute of Occupational Safety and Health (NIOSH) publication *Working in Hot Environments* describes the symptoms and response measures for several types of heat illness, as follows:

Transient Heat Fatigue –

Transient heat fatigue refers to the temporary state of discomfort and mental or psychological strain arising from prolonged heat exposure. Workers unaccustomed to the heat are particularly susceptible and can suffer, to varying degrees, a decline in task performance, coordination, alertness, and vigilance. The severity of transient heat fatigue will be lessened by a period of gradual adjustment to the hot environment (heat acclimatization).

Heat Rash –

Heat rash, also known as prickly heat, is likely to occur in hot, humid environments where sweat is not easily removed from the surface of the skin by evaporation and the skin remains wet most of the time. The sweat ducts become plugged, and a skin rash soon appears. When the rash is extensive or when it is complicated by infection, prickly heat can be very uncomfortable and may reduce a worker's performance. The worker can prevent this condition by resting in a cool place part of each day and by regularly bathing and drying the skin.

Fainting –

A worker who is not accustomed to hot environments and who stands erect and immobile in the heat may faint. With enlarged blood vessels in the skin and in the lower part of the body due to the body's attempts to control internal temperature, blood may pool there rather than return to the heart to be pumped to the brain. Upon lying down, the worker should soon recover. By moving around, and thereby preventing blood from pooling, the patient can prevent further fainting.

Heat Cramps –

Heat cramps are painful spasms of the muscles that occur among those who sweat profusely in heat, drink large quantities of water, but do not adequately replace the body's salt loss. The drinking of large quantities of water tends to dilute the body's fluids, while the body continues to lose salt. Shortly thereafter, the low salt level in the muscles causes painful cramps. The affected muscles may be part of the arms, legs, or abdomen, but tired muscles (those used in performing the work) are usually the ones most susceptible to cramps. Cramps may occur during or after work hours and may be relived by taking salted liquids by mouth.

CAUTION Persons with heart problems or those on a low sodium diet who work in hot environments should consult a physician about what to do under these conditions.

Heat Exhaustion–

Heat exhaustion includes several clinical disorders having symptoms which may resemble the early symptoms of heat stroke. Heat exhaustion is caused by the loss of large amounts of fluid by sweating, sometimes with excessive loss of salt. A worker suffering from heat exhaustion still sweats but experiences extreme weakness or fatigue, giddiness, nausea, or headache. In more serious cases, the victim may vomit or lose consciousness. The skin is clammy and moist, the complexion is pale or flushed, and the body temperature is normal or only slightly elevated.

In most cases, treatment involves having the victim rest in a cool place and drink plenty of liquids. Victims with mild cases of heat exhaustion usually recover spontaneously with this treatment. Those with severe cases may require extended care for several days. There are no known permanent effects.

CAUTION Persons with heart problems or those on a low sodium diet who work in hot environments should consult a physician about what to do under these conditions.

Heat Stroke –

Heat stroke is the most serious of health problems associated with working in hot environments. It occurs when the body's temperature regulatory system fails and sweating becomes inadequate. The body's only effective means of removing excess heat is compromised with little warning to the victim that a crisis stage has been reached.

A heat stroke victim's skin is hot, usually dry, red or spotted. Body temperature is usually 105^{o}F or higher, and the victim is mentally confused, delirious, perhaps in convulsions, or unconscious. Unless the victim receives quick and appropriate treatment, death can occur.

Any person with signs or symptoms of heat stroke requires immediate hospitalization. However, first aid should be immediately administered. This includes removing the victim to a cool area, thoroughly soaking the clothing with water, and vigorously fanning the body to increase cooling. Further treatment at a medical facility should be directed to the continuation of the cooling process and the monitoring of complications which often accompany the heat stroke. Early recognition and treatment of heat stroke are the only means of preventing permanent brain damage or death.

For more information, see the following documents on the ANR EH&S web site: *Protecting Workers from Heat Stress* and *Safety Note #20, Heat Illness Awareness*.

Any employee who recognizes symptoms or signs of heat illness in themselves or in co-workers should immediately report this condition to their supervisor.

Heat Index

About 237 Americans succumb to the taxing demands of heat every year*. Our bodies dissipate heat by varying the rate and depth of blood circulation, by losing water through the skin and sweat glands, and as a last resort, by panting, when blood is heated above 98.6°F. Sweating cools the body through evaporation. However, high relative humidity retards evaporation, robbing the body of its ability to cool itself. When heat gain exceeds the level the body can remove, body temperature begins to rise, and heat related illnesses and disorders may develop.

The **Heat Index** (HI) is the temperature the body feels when heat and humidity are combined. The chart below shows the HI that corresponds to the actual air temperature and relative humidity. (This chart is based upon shady, light wind conditions. **Exposure to direct sunlight can increase the HI by up to 15°F.)**

(Due to the nature of the heat index calculation, the values in the tables below have an error +/- 1.3F.)

HI	Possible Heat Disorder
80°F – 90°F	Fatigue possible with prolonged exposure and physical activity
90°F – 105°F	Sunstroke, heat cramps and heat exhaustion possible
105°F – 130°F	Sunstroke, heat cramps, and heat exhaustion likel, and heat stroke possible
130°F or greater	Heat stroke highly likely with continued exposure, death possible

Temperature (°F) versus Relative Humidity (%)						
°F	90%	80%	70%	60%	50%	40%
80	86	84	83	82	81	80
85	101	97	93	90	86	84
90	122	113	106	100	95	91
95		133	123	113	105	99
100			142	129	118	109
105				148	134	122
110						136

Temperature (°F) versus Dewpoint							
°F	55	60	65	70	75	80	85
80	80	80	81	83	84	87	
85		84	86	89	93	99	107
90			91	95	100	107	117
95				101	106	114	125
100					113	121	131
105						127	138
110						134	145

* 10-year average of heat related fatalities from 1994-2003. U.S. Natural Hazard Statistics.

source: National Weather http://www.nws.noaa.gov/os/heat/index.shtml Last modified: August 26, 2011

First Aid and Emergency Response

Employees who report signs and symptoms of heat illness must be provided first aid or emergency response as needed.

If signs of heat illness occur in an employee:

- Move the person to a shaded area for a recovery period of at least five minutes.
- Monitor their health by asking them how they feel or observing symptoms.
- Provide first aid as needed (cool-down methods, removal from heat, small sips of water).
- If the condition appears to be severe or the employee does not recover, then emergency medical care is needed.

- Emergency medical care shall be provided by the following method:
  - Call 911.
  - Be ready to provide emergency response personnel with clear and precise directions to work location (street names and addresses).
  - Notify your supervisor that emergency services have been called for an employee illness and provide any other incident information.

The following people are authorized to call for emergency services when needed:

(designate individual who is always present at worksites or authorize each employee)

Directions to worksite(s):

(must include map-based street names and addresses for each worksite)

Transport of employees from remote worksites:

(describe means of moving employees from remote field locations to locations accessible by ambulance or emergency responders)

Location of nearest hospital or urgent care center (for each worksite):

(must include address and phone number of facility near each worksite)

How to Respond to Heat-related Emergencies

If workers report or supervisors observe signs or symptoms of heat-related illness, stop activity immediately. Take action while waiting for help. HEAT STROKE IS A MEDICAL EMERGENCY. CALL 911 immediately if a worker shows any signs of heat stroke.

Illness	Symptoms	First Aid*
Heat stroke	• Confusion • Fainting • Seizures • Excessive sweating or red, hot, dry skin • Very high body temperature	• Call 911 While waiting for help: • Place worker in shady, cool area • Loosen clothing, remove outer clothing • Fan air on worker; cold packs in armpits • Wet worker with cool water; apply ice packs, cool compresses, or ice if available • Provide fluids (preferably water) as soon as possible • Stay with worker until help arrives
Heat exhaustion	• Cool, moist skin • Heavy sweating • Headache • Nausea or vomiting • Dizziness • Light headedness • Weakness • Thirst • Irritability • Fast heart beat	• Have worker sit or lie down in a cool, shady area • Give worker plenty of water or other cool beverages to drink • Cool worker with cold compresses/ice packs • Take to clinic or emergency room for medical evaluation or treatment if signs or symptoms worsen or do not improve within 60 minutes. • Do not return to work that day
Heat cramps	• Muscle spasms • Pain • Usually in abdomen, arms, or legs	• Have worker rest in shady, cool area • Worker should drink water or other cool beverages • Wait a few hours before allowing worker to return to strenuous work • Have worker seek medical attention if cramps don't go away
Heat rash	• Clusters of red bumps on skin • Often appears on neck, upper chest, folds of skin	• Try to work in a cooler, less humid environment when possible • Keep the affected area dry

* Remember, if you are not a medical professional, use this information as a guide only to help workers in need.

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Insert Title

STANDARD OPERATING PROCEDURE (SOP)

Type of SOP: ☐ Process/Equipment ☐ Hazardous Chemical ☐ Hazardous Class

All personnel who are subject to these SOP requirements must review a completed SOP and sign the associated training record. Completed SOPs must be kept with the UC Davis Laboratory Safety Manual or be otherwise readily accessible to laboratory personnel. Electronic access is acceptable. SOPs must be reviewed, and revised where needed, as described in the UC Davis Laboratory Safety Manual. The unique properties of each chemical must be considered when preparing a SOP.

Date SOP Written: Click here to enter a date. Approval Date: Click here to enter a date.

SOP Prepared by: **REQUIRED - Insert Preparer's Name**
CLSC SOP Task Force

SOP Reviewed and Approved by (name/signature): **REQUIRED - Insert Approver's Name & Signature**

Department: **REQUIRED - Insert Department**

Principal Investigator/ Laboratory Supervisor: **REQUIRED - Insert Name** Phone: **REQUIRED - Insert Phone#**

Lab Manager/ Safety Coordinator: **REQUIRED - Insert Name** Phone: **REQUIRED - Insert Phone#**

Emergency Contact(s): **REQUIRED - Insert Name** Phone: **REQUIRED - Insert Phone#**

Location(s) covered by SOP: Building: **REQUIRED - Insert Name** Lab Phone: **REQUIRED - Insert Phone#**
Room #(s): **REQUIRED - Insert Number**

---

1. **HAZARD OVERVIEW**

   REQUIRED - Insert brief description of the laboratory process involving hazardous chemicals, single hazardous chemical, or class of hazardous chemicals covered by this SOP.

2. **HAZARDOUS CHEMICAL(S)/CLASS OF HAZARDOUS CHEMICAL(S)**

REQUIRED - List (or attach) the chemical(s) or class of chemical(s), and describe important properties and signs/symptoms of exposure. List (or attach) hazardous chemical(s) and expected by-product(s) produced if this SOP covers a laboratory process.

3. ENGINEERING/VENTILATION CONTROLS

REQUIRED - Insert descriptions of lab-specific engineering or ventilation controls used to reduce chemical exposures (*e.g.,* fume hoods, snorkels, glove boxes, reverse flow laminar benches, biosafety cabinets, etc.) or specific equipment safety features.

4. ADMINISTRATIVE CONTROLS

The following elements are required:

1. Complete the UC Laboratory Safety Fundamentals (or approved equivalent) training prior to working in the laboratory;
2. Complete laboratory-specific safety orientation and training on laboratory-specific safety equipment, procedures, and techniques to be used, including any applicable laboratory-specific Laboratory Safety Plan(s), prior to receiving unescorted access to the laboratory;
3. Demonstrate competency to perform the procedures to the Principal Investigator (PI), Laboratory Supervisor, laboratory-specific Safety Officer, and/or trainer;
4. Be familiar with the location and content of any applicable Safety Data Sheets (SDSs) for the chemicals to be used (online SDSs can be accessed from UC SDS);
5. Implement good laboratory practices, including good workspace hygiene;
6. Inspect all equipment and experimental setups prior to use;
7. Follow best practices for the movement, handling, and storage of hazardous chemicals (see Chapters 5 and 6 of Prudent Practices in the Laboratory for more detail). An appropriate spill cleanup kit must be located in the laboratory. Chemical and hazardous waste storage must follow an appropriate segregation scheme and include appropriate labeling. Hazardous chemical waste must be properly labelled, stored in closed containers, in secondary containment, and in a designated location;
8. Do not deviate from the instructions described in this SOP without prior discussion and approval from the PI and/or Laboratory Supervisor;
9. Notify the PI or Laboratory Supervisor of any accidents, incidents, near-misses, or upset condition (*e.g.,* unexpected rise or drop in temperature, color or phase change, evolution of gas) involving the process, hazardous chemical(s), or hazardous chemical class described in this SOP; and
10. Abide by the laboratory-specific working alone SOP, if applicable.

REQUIRED - Insert descriptions of any additional administrative controls (*e.g.,* restrictions on procedure/quantity/work equipment/work locations/unattended operations/etc.), including controls that may be chemical-specific (*e.g.,* peroxide formers).

INSERT IF APPLICABLE- Descriptions of any special handling or storage requirements.

5. PERSONAL PROTECTIVE EQUIPMENT (PPE)

At a minimum, long pants (covered legs) and closed toe/closed heel shoes (covered feet) are required to enter a laboratory or technical area where hazardous chemicals are used or stored.

In addition to the minimum attire required upon entering a laboratory, the following PPE is required for all work with hazardous chemicals:

A. Eye Protection:
   i. Eye protection must be ANSI Z87.1-compliant.
   ii. At a minimum safety glasses are necessary.
   iii. Splash goggles may be substituted for safety glasses, and are required for processes where splashes are foreseeable or when generating aerosols.
   iv. Ordinary prescription glasses will NOT provide adequate protection unless they also meet the Z87.1 standard and have compliant side shields.

B. Body Protection: At a minimum a chemically-compatible laboratory coat that fully extends to the wrist is necessary.
   i. If a risk of fire exists, a flame-resistant laboratory coat that is NFPA 2112-compliant should be worn.
   ii. For chemicals that are corrosive and/or toxic by skin contact/absorption additional protective clothing (*e.g.,* face shield, chemically-resistant apron, disposable sleeves, etc.) are required where splashes or skin contact is foreseeable.

C. Hand Protection: Hand protection is needed for the activities described in this SOP. Define the type of glove to be used based on the following:
   i. Chemical(s) being used;
   ii. Anticipated chemical contact (e.g. incidental, immersion, etc.);
   iii. Manufacturers' permeation/compatibility data; and
   iv. Whether a combination of different gloves is needed for any specific procedural step or task.

REQUIRED - Insert descriptions of PPE and hygiene practices used with each process, hazardous chemical(s), or hazardous chemical class, including any specialized PPE needed for a procedural step/task.

6. SPILL AND EMERGENCY PROCEDURES

Follow the guidance for chemical spill cleanup from SafetyNet #13 and/or the UC Davis Laboratory Safety Manual, unless specialized cleanup procedures are described below. Emergency procedure instructions for the UC Davis campus and UCD Medical Center are contained in the UC Davis Laboratory Safety Manual, campus Emergency Response Guide (ERG), and UCD Health System ERG. The applicable ERG must be posted in the laboratory. All other locations must describe detailed emergency procedure instructions below.

INSERT - Descriptions of any specialized spill clean up procedures for the hazardous chemicals used in this SOP (*e.g.,* hydrofluoric acid, pyrophorics, phenol, etc.). Additional details of lab-specific spill cleanup should be provided if applicable.

INSERT IF APPLICABLE - Descriptions of any specialized emergency procedures for locations outside of the UC Davis main campus and the UCD Medical Center campus.

7. WASTE MANAGEMENT AND DECONTAMINATION

Hazardous waste must be managed according to Safety Net #8, and must be properly labeled. In general, hazardous waste must be removed from your laboratory within 9 months of the

accumulation start date; refer to the accumulation time for waste disposal to ensure compliance. Hazardous waste pick up requests must be completed using WASTe.

Note: See the WASTe Factsheet for instructions on how to complete a label.

REQUIRED - Insert descriptions of laboratory-specific information on the waste streams generated, storage location, and any special handling/storage requirements.

REQUIRED - Insert descriptions of decontamination procedures for equipment, glassware, and controlled areas (*e.g.,* glove boxes, restricted access hoods, perchloric/hot acid fume hoods, or designated portions of the laboratory).

Upon completion of work with hazardous chemicals and/or decontamination of equipment, remove gloves and/or PPE to wash hands and arms with soap and water. Additionally, upon leaving a designated hazardous chemical work area remove all PPE worn and wash hands, forearms, face and neck as needed. Contaminated clothing or PPE should not be worn outside the lab. Soiled lab coats should be sent for professional laundering. Grossly contaminated clothing/PPE and disposable gloves must not be reused.

8. DESIGNATED AREA

INSERT - Description(s) of designated area(s) for your laboratory. Designated areas are required for "Particularly Hazardous Substances". The entire laboratory, fume hood, or a portion of the laboratory may be used, and must be labeled with the hazards.

9. DETAILED PROTOCOL

REQUIRED - Insert or attach detailed laboratory-specific procedures for the process, hazardous chemical(s), or hazard class. You may also include any relevant supporting resources such as SafetyNets, journal citations, etc. that are applicable.

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TEMPLATE REVISION HISTORY

Version	Date Approved	Author	Revision Notes:
1.0	12/1/2014	CLSC Task Force	New template
1.1	4/16/2015	Chris Jakober	Changed SDS link, language relating to soiled PPE
1.2	5/11/2016	Chris Jakober	Updated URLs following website redesign, added URL to UCDHS ERG
1.3	11/30/2016	Lindy Gervin	Unlocked editable fields
1.4	3/13/2017	Lindy Gervin	Updated links in section 7 to WASTe system
1.5	12/6/2017	Chris Jakober	Reformatted hand protection PPE language, added "Equipment" into SOP category type checkbox.

LAB-SPECIFIC REVISION HISTORY

Version	Date Approved	Author	Revision Notes:

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Documentation of Standard Operating Procedure Training

(Signature of all users is required)

- ✓ Prior to using **Insert SOP Title**, laboratory personnel must be trained on the hazards involved in working with this SOP, how to protect themselves from the hazards, and emergency procedures.
- ✓ Ready access to this SOP and to a Safety Data Sheet for each hazardous material described in the SOP must be made available.
- ✓ The Principal Investigator (PI), or the Laboratory Supervisor if the activity does not involve a PI, must ensure that their laboratory personnel have attended appropriate laboratory safety training or refresher training within the last three years.
- ✓ Training must be repeated following **any** revision to the content of this SOP. Training must be documented. This training sheet is provided as one option; other forms of training documentation (including electronic) are acceptable but records must be accessible and immediately available upon request.

Designated Trainer: *(signature is required)*

I have read and acknowledge the contents, requirements, and responsibilities outlined in this SOP:

Name	Signature	Trainer Initials	Date

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Job Safety Analysis (Part I)

Instructions:

1. Select assessment category.
2. List tasks/activities: Develop a list of activities, tasks, equipment/tools (group similar tasks/activities).
3. Identify and list potential hazards: for each task, activity or equipment/tools, list and describe the potential hazards.
4. Identify and list controls: for each task, activity, equipment/tools, document controls (i.e. training, equipment, written procedures, PPE…).
5. ***If PPE is required, complete Part II- PPE Hazard Assessment and Certification.***
6. Train affected employees on the final assessment and document the training.

Repeat assessment when new hazards are identified or introduced into the workplace or at least every three (3) years.
Laboratory workers must use the online Laboratory Hazard Assessment Tool (LHAT) for PPE hazard assessment.

I am reviewing (check the appropriate box)	☐ A worksite	Specify location:
	☐ A single employee's job description	Name of employee:
		Position title:
	☐ A job description for a class of employees	Position titles:
		Location:
	Hazard Evaluator	Signature/Date:

TASK/ACTIVITY	POTENTIAL HAZARD	CONTROL	PPE Required? Y/N

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Job Safety Analysis (Part I)

Training Record

Designated Trainer: (signature is required)

I have read and acknowledge the contents, requirements, and responsibilities outlined in this document:

Name	Signature	Date

University of California
Agriculture and Natural Resources

PPE Hazard Assessment & Certification

Instructions:

1. Select assessment category.
2. List ***tasks/activities***: List tasks identified in Part I (or any other JSA document) that require PPE and list the activity on the form.
3. Identify ***body parts*** that may be injured.
4. Identify and list specific ***required PPE***.
5. Provide necessary PPE to employee.
6. Train affected employees on the final assessment, PPE specific training and document the training.

Repeat assessment when new hazards are identified or introduced into the workplace or at least every three (3) years.
Laboratory workers should use the Laboratory Hazard Assessment Tool (LHAT) ***for PPE hazard assessment/certification.***

I am reviewing (check the appropriate box)	☐ A worksite	Specify location:
	☐ A single employee's job description	Name of employee:
		Position title:
	☐ A job description for a class of employees	Position titles:
		Location:

Task/Activity	Head	Ears*	Eyes	Face	Lungs *	Trunk	Whole Body	Arms	Hands	Knees	Feet	Required PPE

I certify the above hazard assessment was performed to the best of my knowledge and ability, based on the hazards present on this date. Compliance reference-8 CCR §3380.

Evaluator Name:		Department:
Evaluator Signature:		Date:

***Note:** Protection of ears and lungs are covered under 8 CCR §5097 and 8 CCR §5144, respectively, but are listed in this document for inclusion purposes. See specific program details for employees who are required to participate in Hearing Conservation or Respiratory Protection Program.

University of California
Agriculture and Natural Resources

PPE Hazard Assessment & Certification

Training Record

Designated Trainer: (signature is required)

I have read and acknowledge the contents, requirements, and responsibilities outlined in this document. I have been provided the necessary PPE and have received training on the proper selection, use and maintenance of PPE:

Name	Signature	Date

(SHOP NAME)

Shop Safety Plan

SHOP SAFETY PLAN
TABLE OF CONTENTS

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1.0 STATEMENT OF PURPOSE

This Shop Safety Plan documents the commitment of this department to comply with the requirements of PPM 290-58. It has been developed by the Shop Manager and it will be reviewed annually or when new or modified equipment is introduced into the shop. A complete list of Authorized Users will be kept current.

Documentation including shop policies, inventories of equipment, standard operating procedures, training materials and training records will be kept in a central location and readily available for review.

Signature, Department Chair Date

2.0 GENERAL SHOP INFORMATION

Shop Name: _____

☐ Machine Shop ☐ Wood Shop ☐ Combination ☐ Hot Work Operations

Department: _____ Lab: _____

Building : _____ Location: _____

Supervisor: _____ Phone: _____

Email Address: _____

Shop Manager: _____ Phone: _____

Email Address: _____

Primary Use:
☐ Maintenance ☐ Hobby ☐ Research
☐ Teaching ☐ Other_____

Student Access
☐ Yes ☐ No
☐ Undergraduate Students ☐ Graduate Students
☐ Interns (Seasonal/Term) ☐ Post-Doctoral/Fellows

Access Controls
☐ Yes ☐ No
☐ Card Key Access ☐ Energy Isolating
☐ Other

Keys Maintained By: _____

3.0 SHOP POLICIES AND PROCEDURES

HOURS OF OPERATION:

Day	Hours
Sunday	_____
Monday	_____
Tuesday	_____
Wednesday	_____
Thursday	_____
Friday	_____
Saturday	_____

General Policies and Procedures

- Tools and machines may only be used by Authorized Users.
- Only work with tools and machines that you have been authorized to use.
- Do not operate tools and machines when you are fatigued.
- Do not use equipment if you are using any medications with a warning to avoid driving or using equipment, unless a release is provided by a licensed physician.
- Do not use equipment if you are under the influence of alcohol or illicit substances.
- Do not use phones, headphones, ear-buds, or other electronic devices while operating machinery or tools.
- Safety glasses must be worn at all times while in a restricted area.
- Wear other PPE as required for each specific piece of equipment.
- Do not work alone in a shop unless you have written authorization by the Shop Manager.
- Open-toed footwear is not permitted in the shop.
- Wear non-slippery, thick, leather work shoes, preferably rubber-soled.
- Long pants (or equivalent) must be worn. (A shop apron cannot be worn in lieu of long pants.)
- Neck ties, necklaces, bracelets, jewelry, watches, long sleeves, etc. must be removed or rolled up before operating machinery.
- Long hair must be tied back to avoid entanglement in machinery.
- Safety guards must be in place at all times, ensure guides and fences are tight.
- Report damaged safety guards, machines and tools to the Shop Manager.
- Report unsafe issues to the Shop Manager.
- Keep your work area clean, do not place tools and materials on the machine table.
- Put tools away when you are done using them.
- Never leave tools unattended.
- Only one person may work on a machine at a time.
- Keep blades covered as much as possible.

- Never make heavy cuts with planers, jointers and routers.
- Plywood and particleboard must **NOT** be worked with the jointer or planer.
- Do not work small pieces with power machinery. Instead, use hand tools.
- Always secure the work piece with clamps or a vise.
- Never remove metal chips, turnings or shavings with your hands.
- Never use compressed air to clean clothing.
- Compressed air used for cleaning equipment must be regulated to 30psig and be equipped with a safety nozzle.
- No running or horseplay.
- No eating in the shop area.
- Always follow the Shop Manager's directions.
- Report all injuries (even small ones) to the Shop Manager.
- The First Aid Kit is located_____
- The Eyewash Station/Flush is located_____

Additional Policies and Procedures

- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____

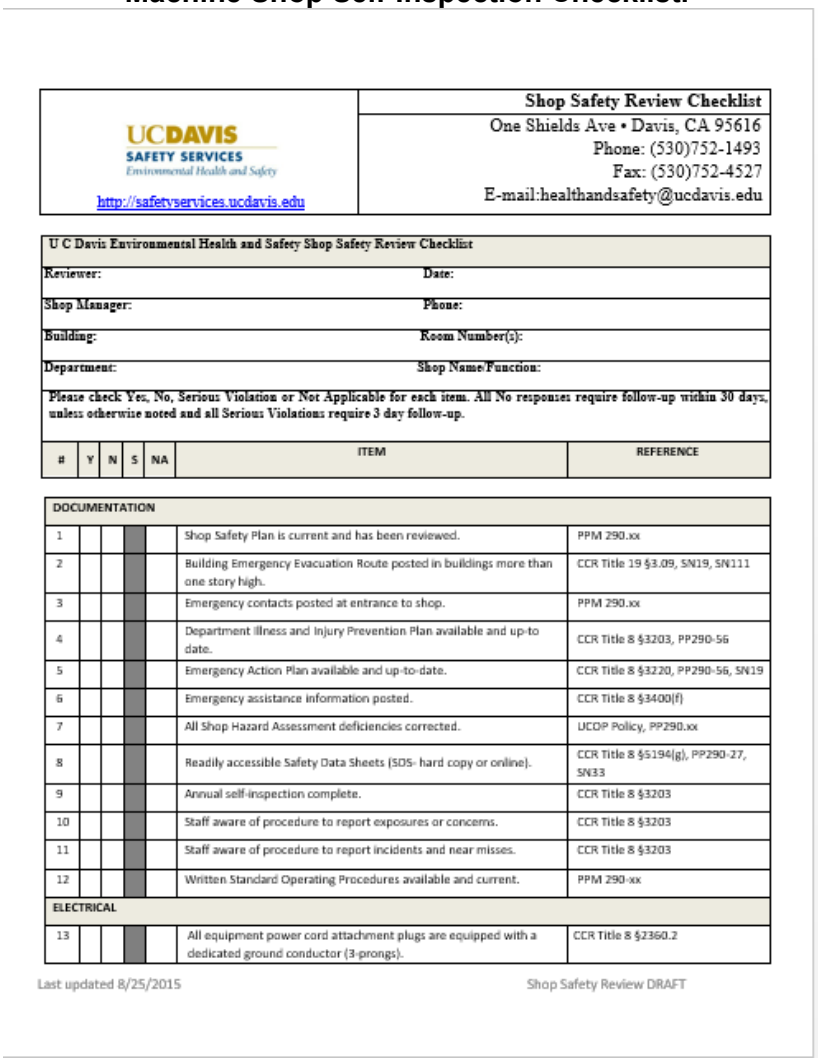
4.0 INVENTORY OF SHOP EQUIPMENT

Machine	Manufacturer	Model Number	UCD ASSET #
Arc Welder			
Abrasive Cut Off Saw			
Band Saw			
Belt Sander			
Belt Disc			
Bench Grinder			
Chop Saw			
CNC Machine			
Drill Press			
Horizontal Mill			
Jointer			
Metal Lathe			
Mig Welder			
Miter Saw			
Oxy-Acetylene Torch			
Planer			
Radial Arm			
Robotic Liquid Dispenser			
Router			
Shear			
Table Saw			
Vertical Mill			
Wood Lathe			
Other:			
Other:			

5.0 SHOP INSPECTION FORM

- Documented self-inspections of machine shops must be conducted on a periodic basis.
- Machine shops should be well organized and housekeeping closely monitored.
- Equipment should be periodically inspected to ensure safe operations and proper guarding.
- Unsafe equipment should be removed or locked out / tagged out until repaired.
- Never use damaged equipment or equipment that is missing its machine guard(s).

Machine Shop Self-Inspection Checklist.



UCDAVIS SAFETY SERVICES
Environmental Health and Safety
http://safetyservices.ucdavis.edu

Shop Safety Review Checklist
One Shields Ave • Davis, CA 95616
Phone: (530)752-1493
Fax: (530)752-4527
E-mail:healthandsafety@ucdavis.edu

U C Davis Environmental Health and Safety Shop Safety Review Checklist

Reviewer:	**Date:**
Shop Manager:	**Phone:**
Building:	**Room Number(s):**
Department:	**Shop Name/Function:**

Please check Yes, No, Serious Violation or Not Applicable for each item. All No responses require follow-up within 30 days, unless otherwise noted and all Serious Violations require 3 day follow-up.

#	Y	N	S	NA	ITEM	REFERENCE
DOCUMENTATION						
1					Shop Safety Plan is current and has been reviewed.	PPM 290.xx
2					Building Emergency Evacuation Route posted in buildings more than one story high.	CCR Title 19 §3.09, SN19, SN111
3					Emergency contacts posted at entrance to shop.	PPM 290.xx
4					Department Illness and Injury Prevention Plan available and up-to date.	CCR Title 8 §3203, PP290-56
5					Emergency Action Plan available and up-to-date.	CCR Title 8 §3220, PP290-56, SN19
6					Emergency assistance information posted.	CCR Title 8 §3400(f)
7					All Shop Hazard Assessment deficiencies corrected.	UCOP Policy, PP290.xx
8					Readily accessible Safety Data Sheets (SDS- hard copy or online).	CCR Title 8 §5194(g), PP290-27, SN33
9					Annual self-inspection complete.	CCR Title 8 §3203
10					Staff aware of procedure to report exposures or concerns.	CCR Title 8 §3203
11					Staff aware of procedure to report incidents and near misses.	CCR Title 8 §3203
12					Written Standard Operating Procedures available and current.	PPM 290-xx
ELECTRICAL						
13					All equipment power cord attachment plugs are equipped with a dedicated ground conductor (3-prongs).	CCR Title 8 §2360.2

Last updated 8/25/2015 Shop Safety Review DRAFT

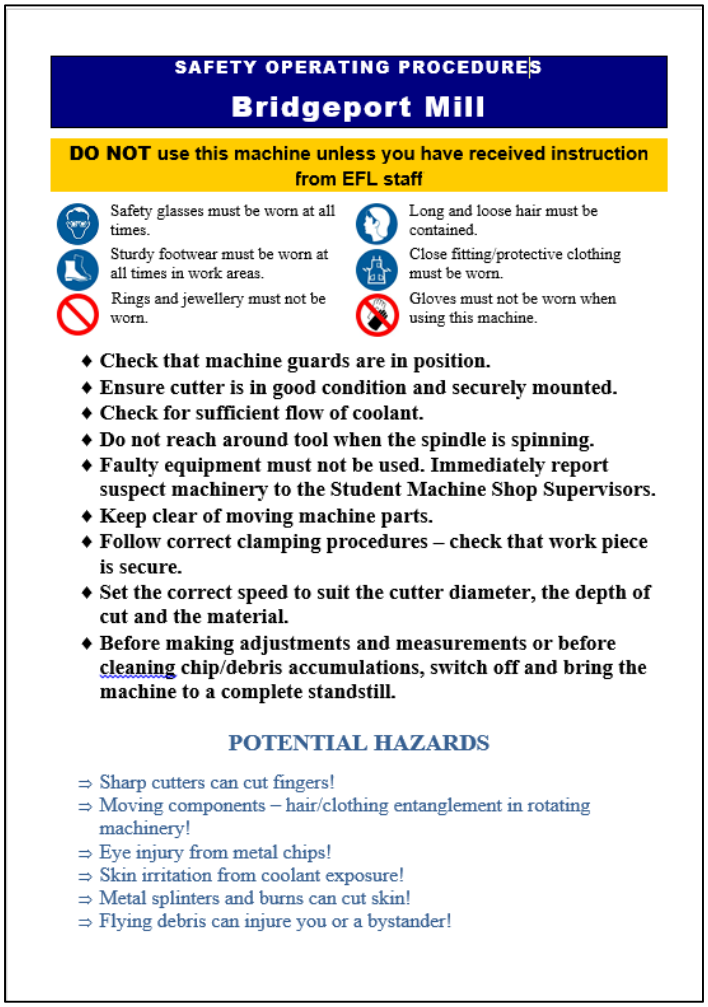
NOTE: The form is located on EH&S website. If you currently use your own inspection form, please insert it here.

6.0 STANDARD OPERATING PROCEDURES

Standard Operating Procedures (SOPs) for machine shop equipment is located on the EH&S website: *http://www.XXXX*

Generic Standard Operating Procedures for various shop equipment are located on the External Reference section of the website. Information is provided by Lovegreen Safety. *http://www.lovegreen.com/risk/placard.html*

- EH&S recommends that SOPs be posted at the machine if possible or readily available in the machine shop area.
- The SOPs provide quick safety references/tips on safe equipment use. This information is not a substitute for manufacturer, OSHA or other equipment training materials.



SAFETY OPERATING PROCEDURES

Bridgeport Mill

DO NOT use this machine unless you have received instruction from EFL staff

Safety glasses must be worn at all times.

Long and loose hair must be contained.

Sturdy footwear must be worn at all times in work areas.

Close fitting/protective clothing must be worn.

Rings and jewellery must not be worn.

Gloves must not be worn when using this machine.

- **Check that machine guards are in position.**
- **Ensure cutter is in good condition and securely mounted.**
- **Check for sufficient flow of coolant.**
- **Do not reach around tool when the spindle is spinning.**
- **Faulty equipment must not be used. Immediately report suspect machinery to the Student Machine Shop Supervisors.**
- **Keep clear of moving machine parts.**
- **Follow correct clamping procedures – check that work piece is secure.**
- **Set the correct speed to suit the cutter diameter, the depth of cut and the material.**
- **Before making adjustments and measurements or before cleaning chip/debris accumulations, switch off and bring the machine to a complete standstill.**

POTENTIAL HAZARDS

⇒ Sharp cutters can cut fingers!
⇒ Moving components – hair/clothing entanglement in rotating machinery!
⇒ Eye injury from metal chips!
⇒ Skin irritation from coolant exposure!
⇒ Metal splinters and burns can cut skin!
⇒ Flying debris can injure you or a bystander!

7.0 TRAINING & RECORDKEEPING

7.1 Training Content

Each shop is responsible for training its users. Training content should include two components; 1. **"Classroom Training"** to discuss shop rules, policies and safety procedures; and 2. **"Practical Hands-On Training"** for each piece of equipment the user will have access to.

Please list in detail the subjects you will train each student on. **NOTE**: If you already have forms, factsheets or other documents used for training, simply insert the most updated version here. These forms must include (but not limited to):

- Employees' names (or other identifier)
- Training dates
- Subject matter covered
- Training providers

Bench Grinder (example)
Classroom Training Outline:

- Grinder operation- turning on/off, adjusting work rest and tongue guards.
- Nomenclature- parts of the grinder.
- Approved work materials – i.e. no Aluminum.
- Abrasive wheel types and their limitations.
- Proper PPE.
- Hands-on.

Practical (Hands On) Training Outline:

- Perform proper lock out before changing wheel.
- Remove and replace wheel- use of blotters, proper flanges, torque mounting nut.
- Perform ring test of wheel.
- Verify rpm rating of wheel is greater than motor rpm.
- Adjust work rest and tongue guard to proper clearances.
- Demonstrate proper dressing of wheel.
- Demonstrate proper grinding techniques.

7.2 Record Keeping

A. Record Keeping

The following documents must be maintained by the Shop Manager:

a. A completed User Authorization Form *(Attachment 2 example.)* for each Authorized User. This document must be kept for the duration of employment, tenure or work-study term plus 3 years.
b. All training rosters *(Attachment 3 example)* and training content must be kept for 3 years.
c. All procedures or protocols developed for shop safety must be kept for as long as they are current.
d. All shop Hazard Assessments must be kept on file. *(Attachment 4 example).*
e. Annual Shop Safety inspection checklists must be kept on file. *(Attachment 5 example).*
f. Crane and hoist inspection reports and proof load tests, if applicable.

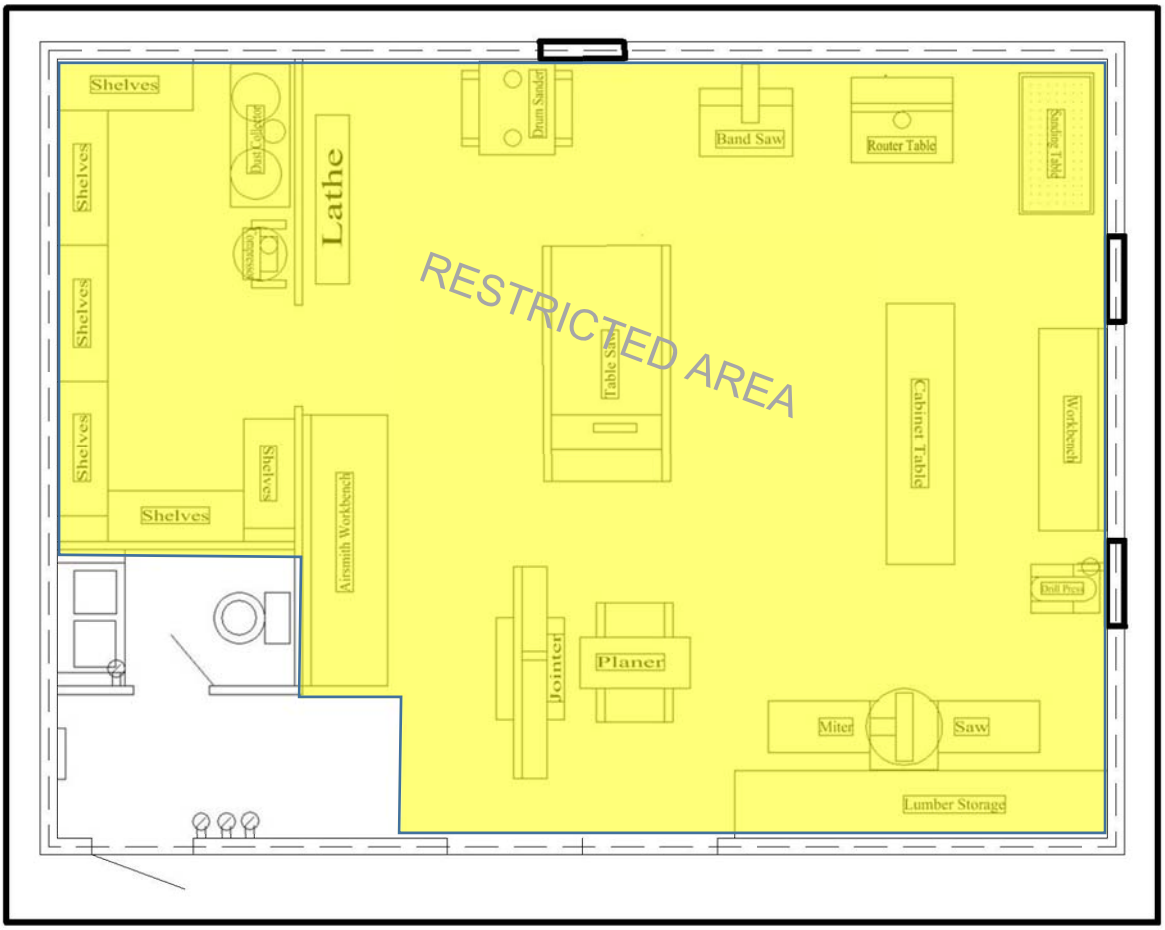
Please list any shop specific requirements for authorized users.

8.0 LIST OF AUTHORIZED USERS

Name	UC Davis Student ID	Phone	Training Completed	Date Authorization Given	Shop Manager's Initials
			Yes / No		
			Yes / No		
			Yes / No		
			Yes / No		
			Yes / No		
			Yes / No		
			Yes / No		
			Yes / No		
			Yes / No		
			Yes / No		
			Yes / No		
			Yes / No		
			Yes / No		
			Yes / No		
			Yes / No		
			Yes / No		
			Yes / No		
			Yes / No		

9.0 RESTRICTED AREAS

Please insert a floorplan drawing below showing the restricted areas of the shop. A restricted area may be the entire shop or a portion thereof. If a restricted area is only the area surrounding a machine or process, the floor around that tool or process should be marked with a high visibility paint (or equivalent).



9.1 SIGNAGE

Entrances to all restricted shop areas must be posted with notices stating that entry is only allowed by Authorized Users. Visitors should be directed to the Shop Manager and telephone contact information should be provided.

U.S Heath Works locations

BAKERSFIELD
1800 WestWind Dr
Suite 301
Bakersfield, CA 93301
Ph: (661) 327-9617
Fx: (661) 327-5701

CAMARILLO
4934 Verdugo Way
Camarillo, CA 93012
Ph: (805) 484-0095
Fx: (805) 388-2174

GILROY
190 Leavesley Rd
Suite 102
Gilroy, CA 95020
Ph: (408) 848-0444
Fx: (408) 848-0443

MODESTO
1524 McHenry Avenue
Suite 135
Modesto, CA 95350
Ph: (209) 575-5801
Fx: (209) 575-0115

MODESTO (CERES)
1340 Mitchell Road
Modesto, CA 95351
Ph: (209) 581-9711
Fx: (209) 581-9703

MORENO VALLEY
16420 Perris Blvd
Suite Q
Moreno Valley, CA 92551
Ph: (951) 571-2450
Fx: (951) 571-2455

MURRIETA
25115 Madison Ave.
Murrieta, CA 92562
Ph: (951) 600-9070
Fx: (951) 600-9177

OXNARD
1851 North Lombard
Suite 100
Oxnard, CA 93030
Ph: (805) 983-2234
Fx: (805) 988-1941

RIVERSIDE (CHICAGO AVE)
1760 Chicago Avenue
Suite J3
Riverside, CA 92507
Ph: (951) 781-2200
Fx: (951) 781-2220

RIVERSIDE (DAY ST)
6485 Day Street
Suite 302
Riverside, CA 92507
Ph: (951) 653-5291
Fx: (951) 653-2440

SAN BERNARDINO
599 Inland Center Drive
Suite 105
San Bernardino, CA 92408
Ph: (909) 889-2665
Fx: (909) 884-4114

STOCKTON (EAST)
3663 E. Arch Road
Suite 400
Stockton, CA 95215
Ph: (209) 943-2202
Fx: (209) 943-2209

STOCKTON (WEST)
1429 West Fremont Street
Stockton, CA 95203
Ph: (209) 546-7767
Fx: (209) 546-7785

Valley Industrial Medical Group - Visalia
225 South Chinowth, Visalia, CA 93291
Phone: 559-627-3222

Valley Industrial Medical Group - Tulare
755 E. Terrace Ave Tulare, CA 93274
Phone: 559-685-8800

Imperial Valley Occupational Medicine
1850 W. Main Street, Suite E
El Centro, CA 92243
Phone: (760) 370-0020
Fax: (760) 370-0220
Email: pwisdom@ivoccupational.com

Sky Lakes Medical Center
2865 Daggett Ave.
Klamath Falls, OR 97601
541.882.6311

Pacific Redwood Medical Group
242-B Hospital Drive
Ukiah CA 95482
Phone: (707) 462-7900
Fax: (707) 462-7947

UC Davis Occupational Health Clinic
Cowell Hall (located on UCD campus - California Ave, across from Russell Field)
1 Shields Ave. Davis, CA 95616
occupationalhealth@ucdavis.edu
Phone: 530-752-6051
Fax: (530) 752-5277

UC San Diego EH&S Occupational Health Nurse
Fax: (858) 534-7561
ehsih@ucsd.edu