## Introduction

**LAB SAFETY INSTRUCTIONS**

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Safety is an important issue that needs to be placed at the highest priority when conducting experiments or working in laboratories. Please take time to read and understand this Safety Document. If you have any questions, comments, or suggestions, please email them to me or stop by my office.

## Emergencies

* *Fires*

Never enter a room that is smoke filled.

Never enter a room containing a fire without a backup person.

Report any problems with fire alarms, fire extinguishers, or other fire protection devices to the Laboratory Personnel.

* *Small Fires*

Small fires are defined as those fires confined to a specific, small area or piece of equipment where flames cannot easily reach other combustibles. These types of fires can be extinguished without evacuation. However, an immediate readiness to evacuate is essential in the event the fire cannot be controlled. See below for proper use of fire extinguishers.

What you should do:

* + Alert people in laboratory and, if there is any chance you may not be able to put out the fire, activate alarm or call 911 and report fire.
	+ Smother the fire or use the correct fire extinguisher. If an electrical fire, first turn the power off at the circuits' electrical panel.
	+ Always maintain an accessible exit.
	+ Avoid smoke and fumes.
	+ Report the fire to the Laboratory Personnel.
* *Major Fire or Explosion*

What you should do:

* + Alert people in the area to evacuate.
	+ Activate nearest fire alarm. Call 911 and report the fire. Give exact location and extent of fire and any special circumstances that could be hazardous, such as chemicals or faulty equipment. If unsafe to call from the lab, go elsewhere to call.
	+ If it can be done safely, shut off any electrical equipment that may be involved.
	+ Assist any who needs help to evacuate, if it can be done safely. If someone's clothing is on fire, roll the person around on the floor.
	+ Close doors to confine the fire.
	+ Evacuate to a safe area or exit the building through a stairwell.
	+ Have a person knowledgeable of the incident.
	+ Account for each person in your work area.
	+ Do not reenter the building (even if the fire alarm bells/horns stop) until you are advised to do so by Safety Personnel.

Fire Extinguishers and Proper Usage

There are 2 types of fire extinguishers:

* + - Carbon Dioxide (CO2): Flammable Liquids or Electrical Fires
		- Dry Powder (ABC): Ordinary Combustibles, Flammable Liquids or Electrical Fires

Remember **PASS** when using a fire extinguisher:

**P**: Pull the pin.

**A**: Aim the extinguisher at the base of the fire.

**S**: Squeeze the trigger. Keep the extinguisher upright.

**S**: Sweep the nozzle from side to side.

## Personal Injury/Medical

If an injury is life threatening, you should call 911 for immediate medical response.

*Clothing on Fire*

* Roll the person around on the floor to smother the flames. If water is immediately available, drench the person with water.
* Obtain immediate medical attention and report the incident to the Laboratory Personnel.

*Thermal Burns*

* Any burn covering an area larger than the palm of a hand or any burn on the face or head should be treated as a major injury.
* For burns with no open blisters, flush with lots of cool running water. Apply moist, sterile dressings and bandage loosely.
* For burns with open blisters, apply dry, sterile dressings and bandage loosely. Do not use water as it increases the risk of shock.
* Obtain immediate medical attention.
* Report the incident to the Laboratory Safety Personnel.

*Major Injury* from Explosion, Fall, etc. (including minor injuries that cause shock or unconsciousness)

* Remain calm. This is critical in assisting the injured person.
* Initiate lifesaving measures if required. For severe bleeding, apply direct pressure.
* Call 911 and give the name of the injured (if known), exact location, and description of the problem.
* Do not move the injured person unless there is danger of further harm.
* Maintain the injured person's body temperature, adding cover(s) if needed.
* If the injured stops breathing, immediately obtain the assistance of someone who knows CPR.
* Remain with the injured person until medical help arrives. When medical help arrives, inform them of the circumstances (if known).
* Report the incident to the Laboratory Personnel and your supervisor.

## Operating Equipment:

*Soldering Irons*

Users should follow these guidelines when operating any soldering irons in the lab.

* Always wear safety glasses when soldering.
* Turn off power to the circuit being soldered and unplug the power cord from the wall.
* Keep long hair tucked away.
* Never leave an unattended powered soldering iron.
* Always place the soldering iron in its holder. Never place the soldering iron on anything else.

## Electrical and Electronic Safety

Please follow these general guidelines pertaining to electrical safety.

* Turn off power and unplug from the wall before working on electric or electronic circuits, except when absolutely necessary.
* Do not use extension cords as a permanent power source. It is against the fire code and will result in fines if these are found by an inspector.
* Do not work on electrical equipment in a wet area or when touching an object that may provide a hazardous earth ground path.
* Turn off power and unplug equipment before checking or replacing fuses. Locate and correct the cause of a blown fuse or tripped circuit breaker before replacing the fuse or resetting the circuit breaker.
* Replace defective cords and plugs. Inspect cabling for defects such as frayed wiring, loose connections, or cracked insulation.
* Remove metal jewelry, watches, rings, etc., before working on electrical circuits.
* Always check the electrical ratings of equipment you use and be sure you use that equipment within its ratings.
* Never overload circuits.
* Never leave unprotected systems unattended.
* Never place containers of liquid on electrical systems.
* Never defeat the purpose of a fuse or circuit breaker. Never install a fuse of higher amperage rating than that specifically listed for your circuit.
* Make sure equipment chassis or cabinets are grounded. Never cut off or defeat the ground connection on a plug.
* Safely discharge capacitors in equipment before working on the circuits.

Questions regarding operation, maintenance, or safety of electrical or electronic equipment should be directed to your lab supervisor or an appropriate electronics expert.

**Student Shop Safety Rules**

# Safety glasses with side shields or goggles are to be worn at all times while in the shop.

* + No loose fitting clothing allowed when working.
	+ No open toe shoes or sandals allowed.
	+ All users must sign in before using shop.
	+ Students must have prints or drawings of parts with dimensions, hole locations, thread sizes, and other machining information prior to machining.
	+ Users must clean up area used every time work is finished. If you have not completed your project and must leave the shop you must clean area prior to leaving. Others may need to use the area in your absence.
	+ Students must clean and return all tools to proper location when finished.
	+ No tools are to be removed from shop without authorization.
	+ No horseplay allowed in shop. Do not distract anyone using equipment.
	+ Report all injuries immediately.
	+ Floor area, where work was done, must be swept after every use.
	+ You must be authorized to use the shop.
	+ Always shut door when you leave if no one else is in the shop.
	+ Safety is your top priority. If you are not sure what you are doing, “ASK”.
	+ Never attempt to use equipment you have not received training on.
	+ Report any broken tools or machines immediately to supervisor.