

Working Safely in the Department of Physics and Astronomy

General Considerations

P&A Safety Training, Nov. 7, 2023
charles.jui@utah.edu

- Please sign for those parts of the training that you have received to day and give the signed form to you supervisor/PI
- PI and Supervisor: It is your responsibility to make sure that each person whose form you accept has actually received the training
- **The PI/Supervisor must personally supervise the video training for anyone not attending the in-person session. By accepting the form, YOU are accepting the responsibility for the safety of that person under your supervision**

Department of Physics and Astronomy, University of Utah
 General Safety and Chemical Hygiene Plan Completion **Form**

I, _____ + _____
 (print full first and last name)

have read, and/or attended the safety training sessions and agree to follow all of the safety rules described in the Department General Safety and Chemical Hygiene Plan and in the Safety Presentations. I realize that I must obey these rules to insure my own safety, and the safety of those around me.

I realize that I must also complete the lab specific training outlined by my supervisor before beginning work in my laboratory.

I am aware that any violation of this contract that results in unsafe conduct in the laboratory or irresponsible behavior on my part, may result in dismissal from the laboratory and more serious consequences may result.

My supervisor/professor/PI is _____

General safety
 Signature: _____ Date: 11/07/2023

PI/ safety committee rep Signature: Chamberlain Date: 11/07/2023

Chemical safety:
 Signature: _____ Date: 11/07/2023

PI/ safety committee rep Signature: Chamberlain Date: 11/07/2023

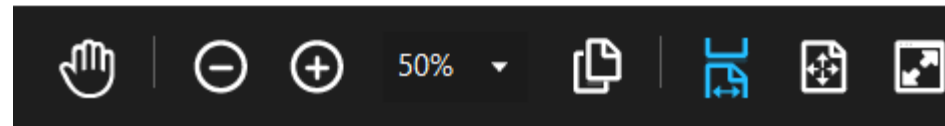
Laser safety:
 Signature: _____ Date: 11/07/2023

PI/ safety committee rep Signature: Chamberlain Date: 11/07/2023

Cryogenic safety:
 Signature: _____ Date: 11/07/2023

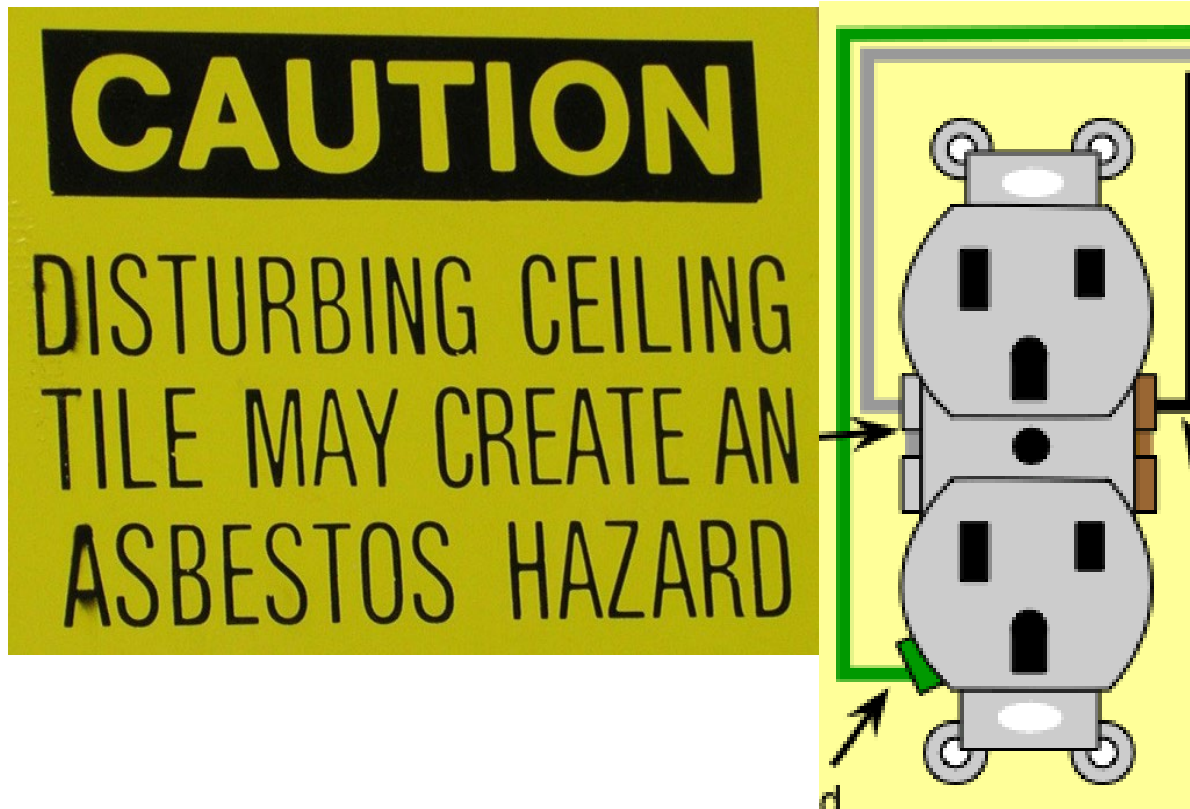
PI/ safety committee rep Signature: Chamberlain Date: 11/07/2023

Lab specific training: (By PI _____)



be collected and kept by a supervisor or by the safety committee. In the later case the scanned copy of the form will be sent to the supervisor)

- Do NOT modify existing building infrastructure in any way. Contact Facility Manager **Harold Simpson**
 - **801-581-3839**, u0614919@utah.edu
- Many rooms still have ceiling tiles with asbestos – DO NOT touch!!!



Emergency Response Guide –
should be in every lab

Our staff Safety Coordinator is
Senior Optical Engineer

Dr. Zhiheng Liu

801-581-7001

zhiheng.liu@utah.edu

U HEADS UP! **EMERGENCY RESPONSE GUIDE**

SAVE A LIFE • STOP A CRIME
REPORT A FIRE • CALL 911
REMAIN CALM

Scan QR code to download U Heads Up! app

YOU ARE IN ROOM # _____ IN BLDG # _____ AT PHONE # _____

IF THIS HAPPENS:	TAKE THIS ACTION: <i>(For additional info, lift flap)</i>
ORGANIZING FOR EMERGENCIES	Emergency Response Team (ERT)
EARTHQUAKE	Drop! Cover! Hold On! Tune to KUER FM 90.1
UTILITY FAILURE	Call Facility Operations ☎ 801-581-7221
FIRE	Activate Alarm & Proceed to Assembly Point
MEDICAL ASSIST: INJURY / ILLNESS	Seek Medical Attention ☎ Call University Police 911
INDOOR ENVIRONMENTAL QUALITY CONCERN	oehs.utah.edu/ieq
ACTIVE SHOOTER/ ACTS OF VIOLENCE	☎ Emergency: Call 911 ☎ Report: 801-585-2677 (5-COPS)
BOMB THREAT/ SUSPICIOUS PACKAGE	Use checklist and report to police: ☎ 801-585-2677 (COPS)
SEVERE WEATHER	Seek Appropriate Shelter Tune to KUER FM 90.1
BIO/CHEM/RAD SPILLS	Call Rad Health 801-581-6141 - OEHS 801-581-6590 Spill Kit Location: _____
SECURE IN PLACE / SHELTER IN PLACE	Follow directions provided
EVACUATION	Activate Alarm, Proceed to Assembly Point Assembly Point Location: _____

EAP
EMERGENCY ASSISTANCE PROGRAM

In case of Accidents or Injuries

- Emergency Response
 - <https://alert.utah.edu/emergency-response-guide/>
- Illness, Injuries, fire, ...etc. accident: 911 (9-911 campus phone):
 - <https://oehs.utah.edu/topics/injuries-or-illnesses>
- Auto accident form (via CIS login)
 - <https://oehs.utah.edu/resource-center/forms/e-1-hr-workers-compensation-first-report-of-injury-form-122>
- Auto accident form (via CIS login)
 - <https://riskmanagement.utah.edu/intranet/vehicles/vehicle-accident.php>

After an accident/Near Miss

- Render Aid if possible and safe to injured personnel and call 911 (start from desk phone), or on cell phone and put on speaker mode (frees up hands)
- If safe, turn off gas or water supplies.
- If safe, put out small (is it smaller than a breadbox?) fires with fire extinguisher – do not use water – the fire may involve electrical faults or oils.
- If there is a fire, pull fire alarm if not triggered automatically
- Evacuate and lock lab, and put a label on the door
- Contact EHS at **801-581-6590** or call University Police at **801-585-2677** after 5:00pm.
- Contact your PI or safety administrator/coordinator.

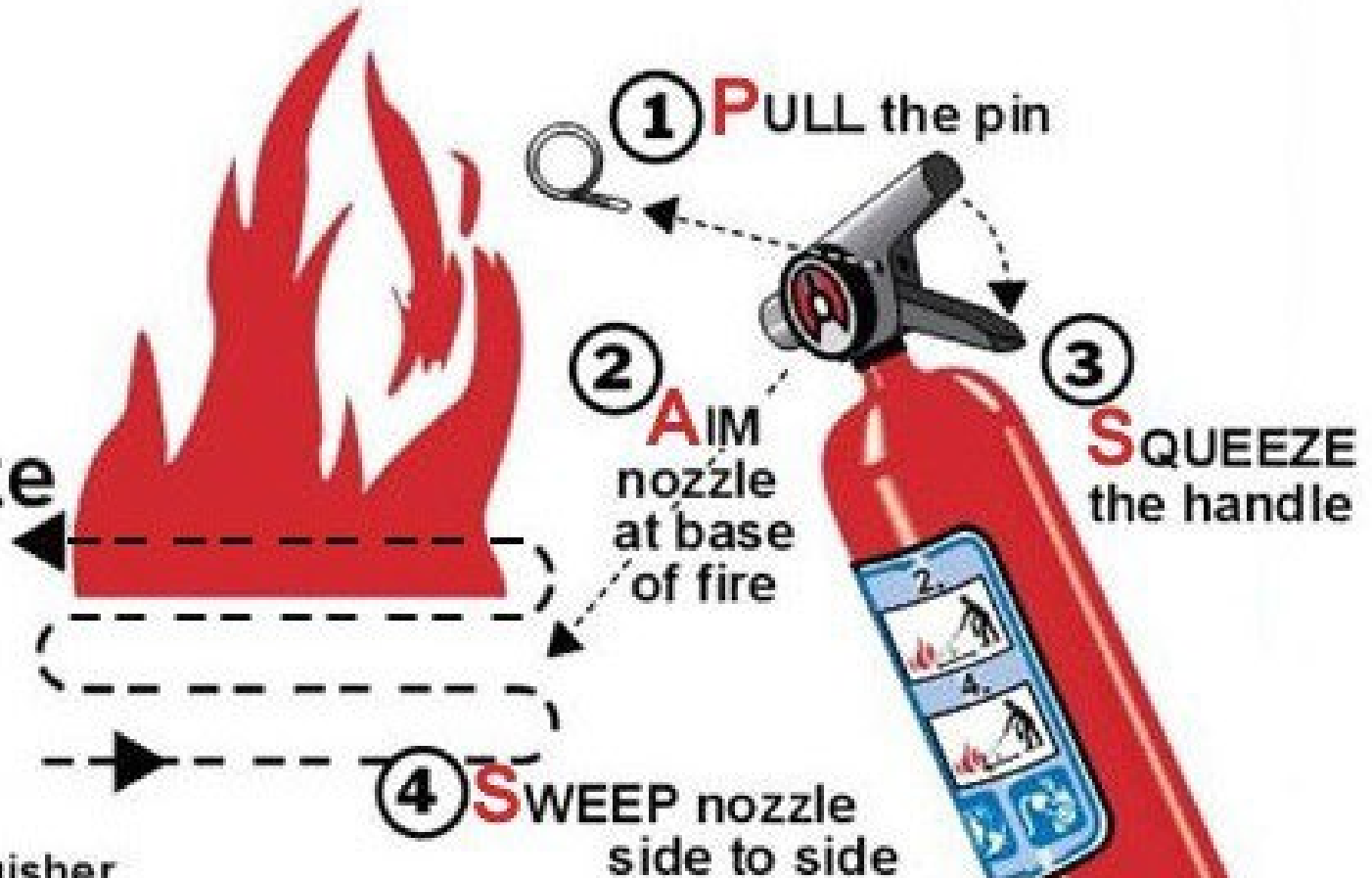
Fire Extinguisher Operation

Pull

Aim

Squeeze

Sweep



Know your extinguisher

Use the correct extinguisher

(Check your own extinguisher's label for detailed instructions.)

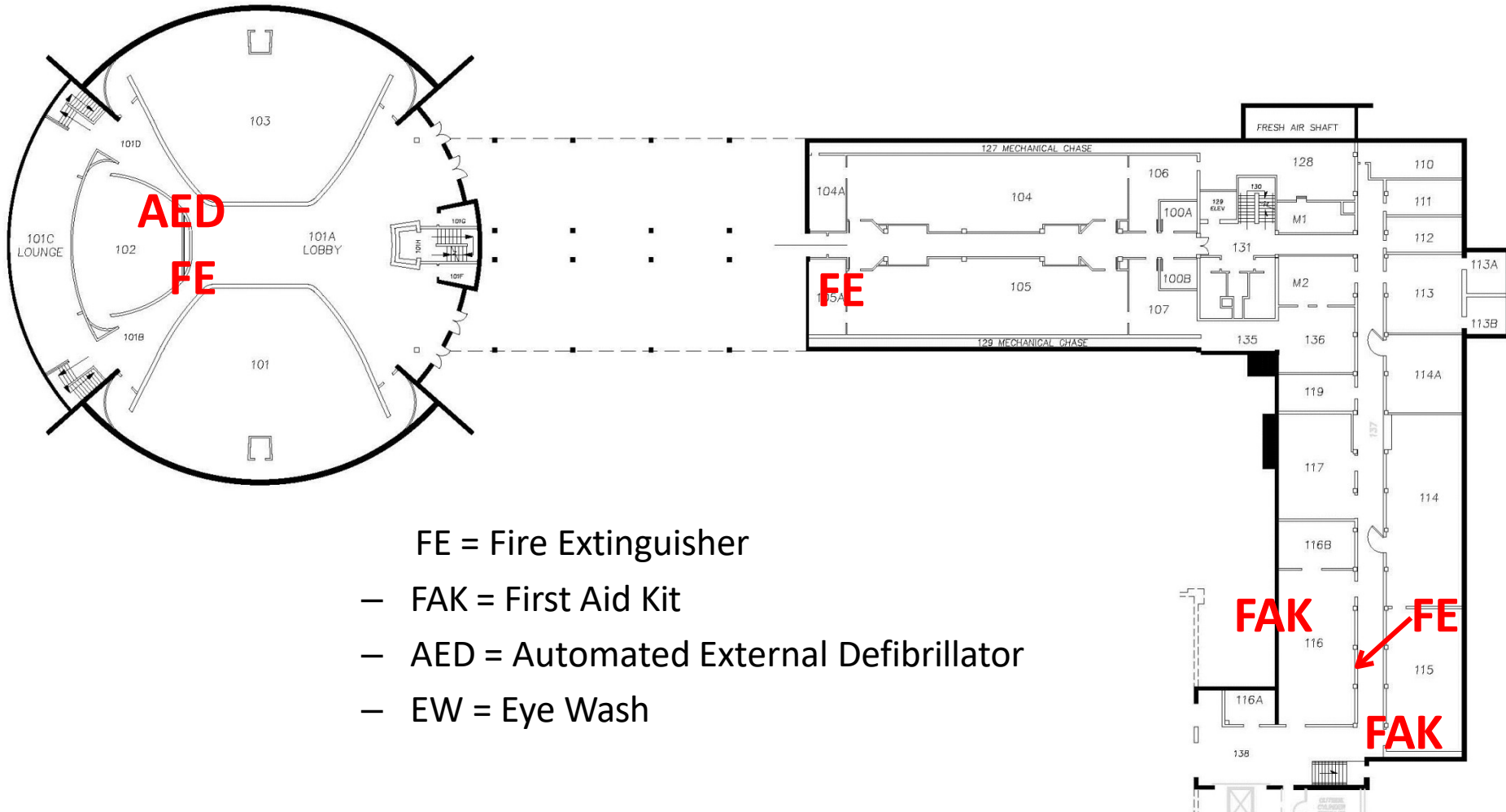
- First aid supplies are available in shops, main office and some labs
 - Must be “self administered”
 - You can’t legally put a Band aid on someone else unless you have taken the “Blood borne pathogen training”
- Know the locations of fire extinguishers, eye-washes and emergency showers
- You may only use a respirator if you have taken the training

AED: Automated External Defibrillator

- Instructions commence on your opening of the device.
- Many explanations available on YouTube
 - <https://www.youtube.com/watch?v=IL3EmNRjlvE>
 - Above video includes check for consciousness and CPR

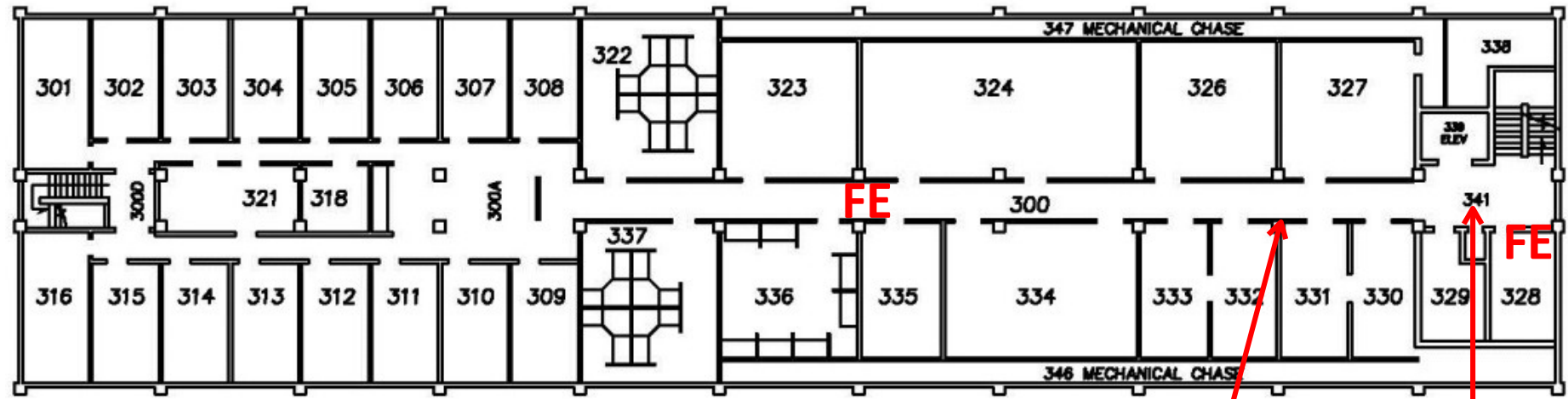
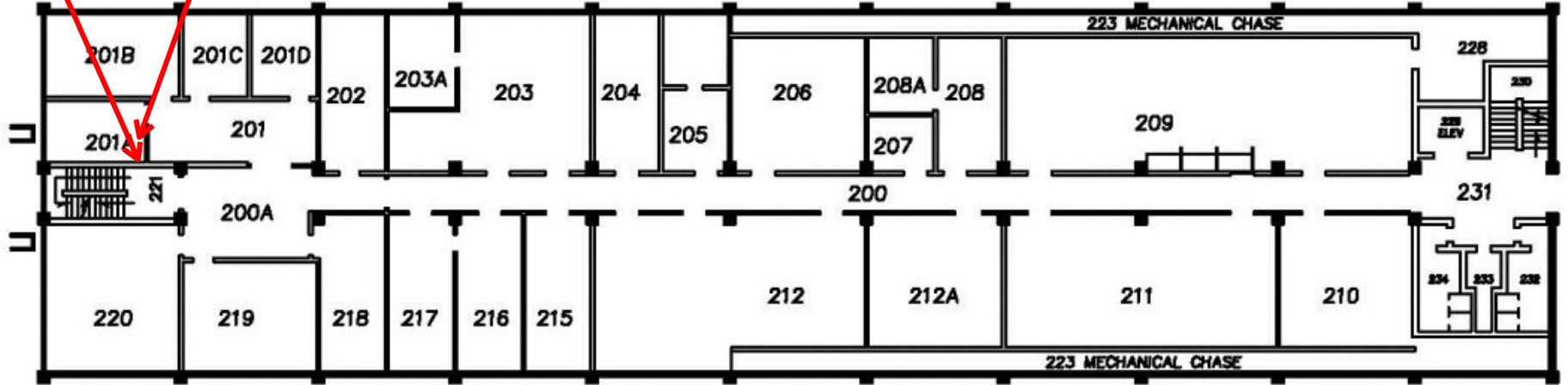


JFB First Floor



JFB 2nd & 3rd Floors

FE **FAK**



FE = Fire Extinguisher

FAK = First Aid Kit

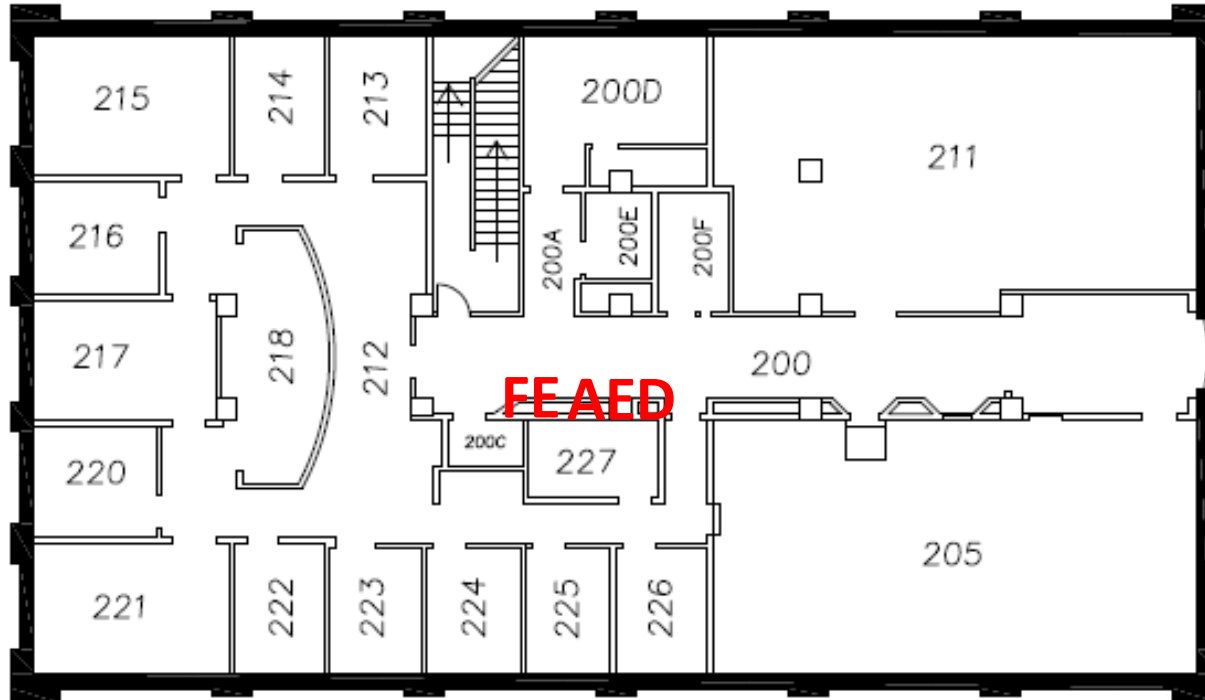
SS = Safety Shower

EW = Eye Wash

EW

SS

South Physics (SP) 2nd Floor

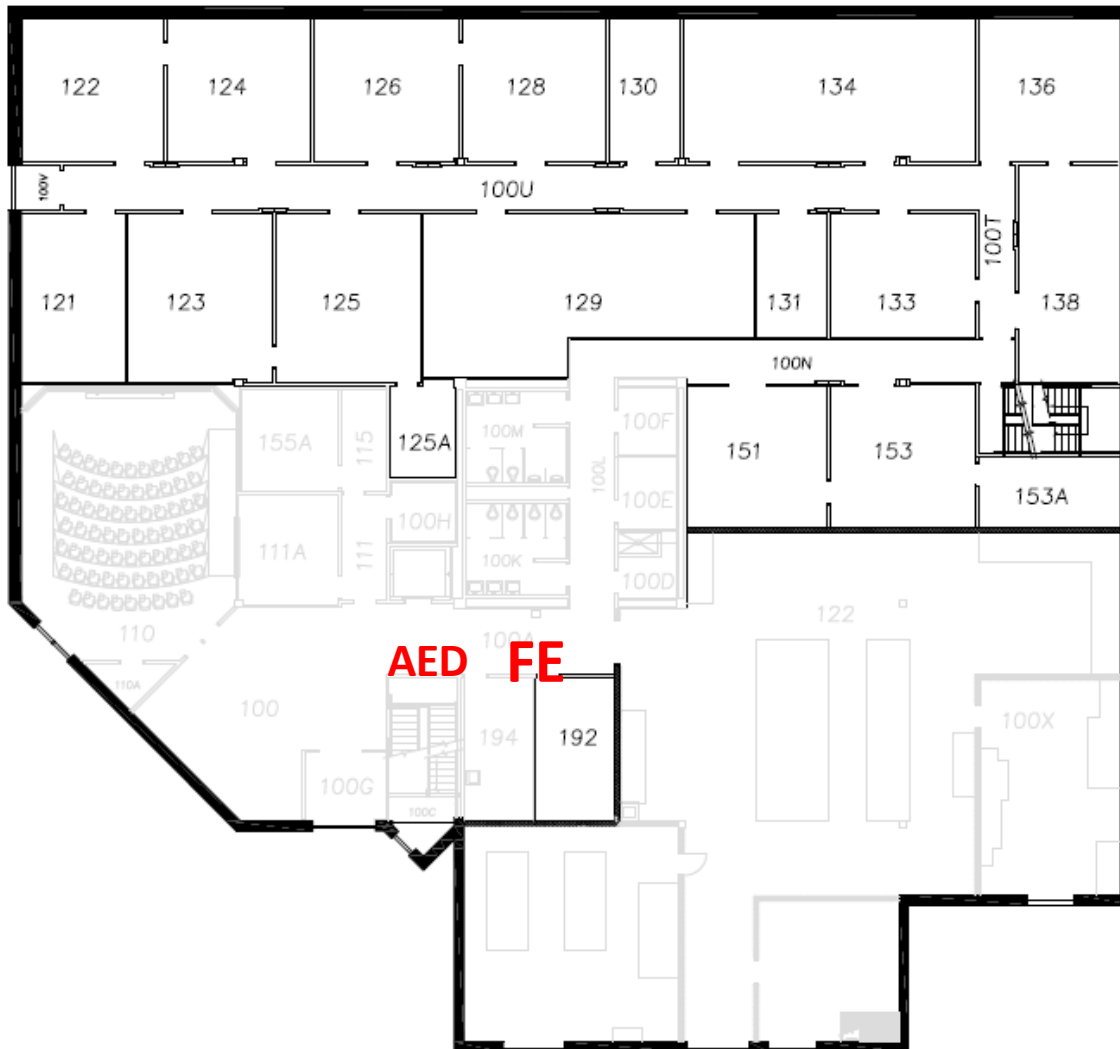


FE = Fire Extinguisher

FE also found outside of SP 402

- AED = Automated External Defibrillator

INSCC First Floor



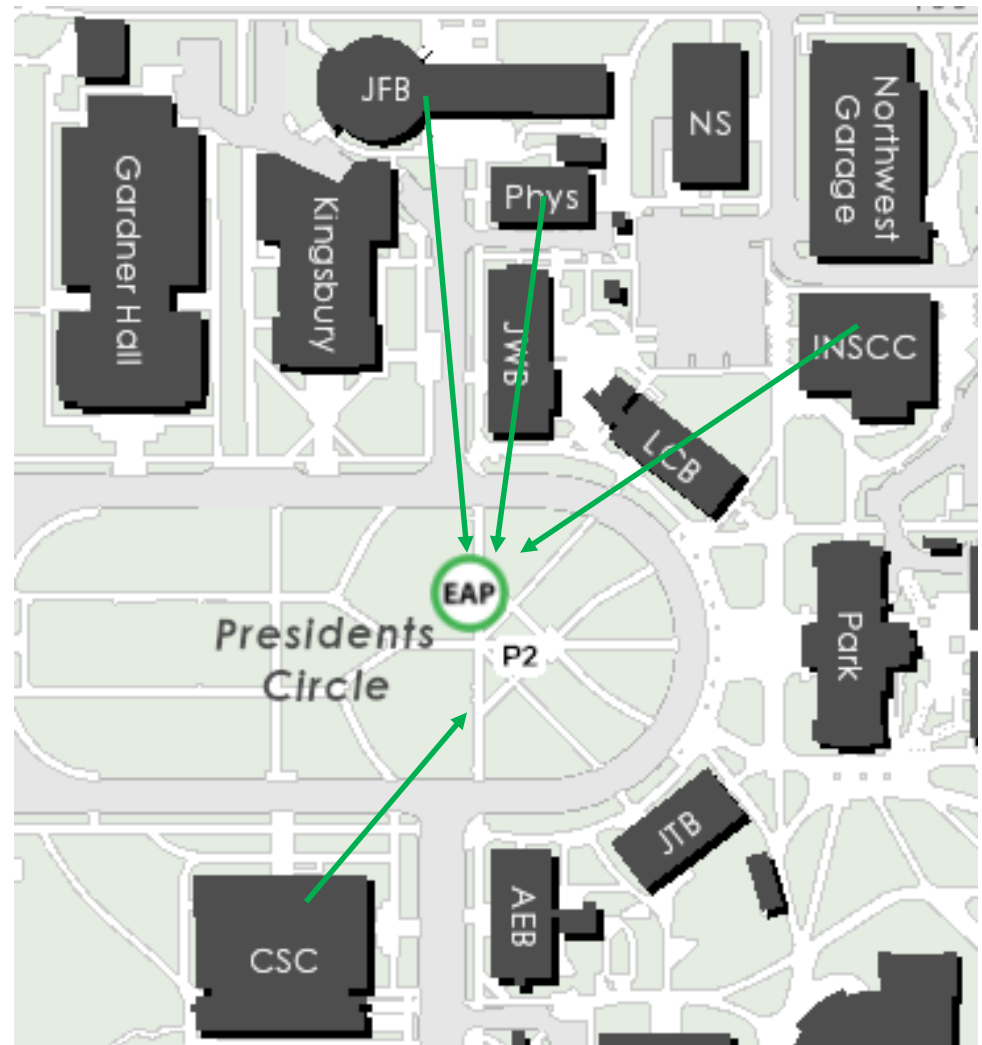
AED = Automated External
Defibrillator

FE = Fire Extinguisher

FE also found
outside of INSCC 227
(cosmic ray group)
AND in INSCC 480
(Astronomy group)

Emergency Assembly Point

- When you hear an alarm sound, or receive an emergency alert
 - E.g. fire, chemical spill, earthquake ...etc
- Leave and assemble at the designate EAP and await further instructions there.
- Emergency Alert: Sign up via link in <https://alert.utah.edu/>



To stop the spread of hazards, for example fire

- Keep hall doors closed in case of fire or spill
 - Realistically, kick out blocks during evacuation



Electrical and RF Safety

- Electrocutation
 - The most dangerous voltage source is the 110 Vac that powers the labs, shops and offices. Not only is it sufficient in many cases to pass the deadly 100 mA of current, but there are so many opportunities to come in contact with it.
- Damage Due to Reflex Action
 - Currents over 10 mA can cause violent involuntary muscle contraction. Such contractions can result in bodily damage and/or equipment damage.
- Burns
 - Currents over about 2 A will result in burns at the point of contact. This is a major factor only for those working with extremely high (many kV) sources.

- Electrical equipment requiring a ground must be grounded



The purpose of a ground wire is to give excess electrical charges a safe place to go. A ground wire helps those excess (short circuit, overload, malfunctions) charges get to the ground in a safe, direct and controlled way, where they can be discharged without the risk of electrical shock or fire.

- In a lab: only use approved power strips



UL US
LISTED
E491513

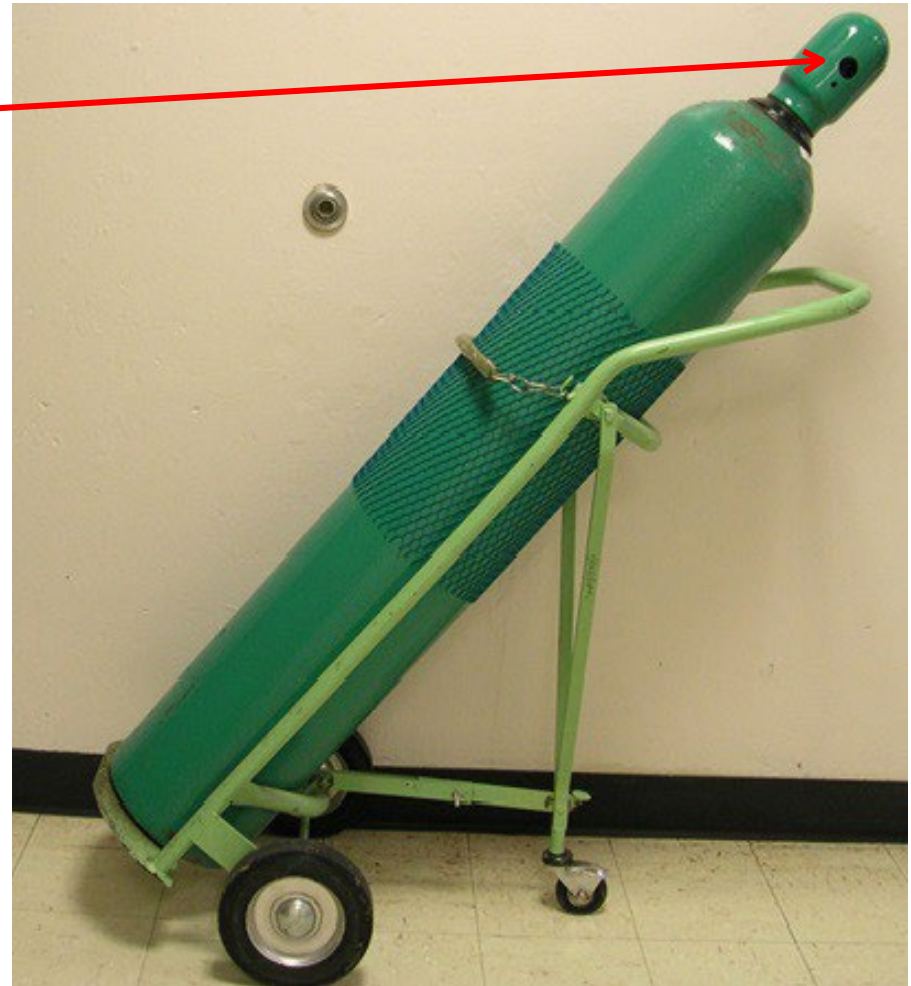
Radio Frequency (RF) Field Injury

- Microwave fields are efficiently absorbed by water-containing materials, such as the human body. This fact is put to use in microwave ovens.
- The threshold is only about one milliwatt/cm² for damage to the eyes.
- This damage is not associated with pain, so one must take care not to work with microwaves that are not enclosed in waveguides if the power densities can exceed this level.

- High pressure gas cylinders
 - Always use a regulator
 - Always chain up
- Next slide is a scene from Mythbusters showing the effects of breaking off the valve on a high pressure gas cylinder



- Gas cylinders, continued
 - Remove regulator and install bonnet (which you would call a “cap”) before moving
 - Always move on a cart



- Remove any grease before installing regulator
 - Grease and oxygen form an explosive mixture

In Summation

- Always be cognizant of what you need to do to always work safely.
 - Safe work practices
 - Safe equipment
 - Safe workplaces
- If anything can go wrong, it will. So have a plan for dealing with the situation when things go wrong. Plan ahead!

- Keep halls free of clutter
 - Ladders, tables, packing boxes, LHe dewars, etc.



- Wear eye protection when handling chemicals, glassware, cryogenics or in the machine shops.



- Use ladders only under conditions for which they were designed.



Not a permitted use of a ladder!

- Think ergonomics: Lift with your legs, not your back

Summary of the safety policy

- 1) Safety training needs to be provided once a year. In general, this is supervisor responsibility. Supervisor determines content and keeps the records.
 - a) Option A: Safety day plus a safety review specific to each lab.
 - b) Option B: Supervisor can provide independent training. Videos plus other info will be available on the dep. website.
 - c) Guest, visitors, undergraduate students must complete the training before working in a lab.
- 2) SOP: Special operational procedures need to be developed and documented if needed.
- 3) All chemicals need to be labeled and inventoried . For each chemical, a group need to have MSDS (material safety data sheet). Chemicals and chemical wastes need to be properly stored.
- 4) If required, the potentially “dangerous” equipment (fume hoods, hoists, lasers ..) need to be certified.

PI, supervisors, personnel must follow safety practice.

To a participant: You do not have to sign the form if you think that you are not properly trained! Look up material available at the EHS website.

It is not possible for us to oversee and cover every potentially dangerous situation.