

## **ECE DEPARTMENT**

### **GENERAL LABORATORY SAFETY POLICY**

The Electrical & Computer Engineering (ECE) department is committed to providing a safe and healthy working environment for its students, staff, and faculty. The ECE department requires its students, staff, and faculty to adhere to basic laboratory safety rules in the ECE laboratories.

All laboratory operations contain some elements of danger. Safe working habits are essential in experimental work. Good housekeeping, using the right tools for the right jobs, avoiding hazards, keeping the lab area clean - all contribute to safe operation. Accidents should be reported as soon as possible to a faculty member.

#### **General Laboratory Safety Rules**

- Learn and know what to do in an emergency.
- Occupants shall be familiar with the locations and operation of safety and emergency equipment such as fire extinguishers, first aid kits, emergency eye wash stations, emergency showers, emergency power off, emergency telephones, and emergency exits.
- In case of emergency, call Campus Security **x6100** (394-6100) or dial **9-911**.
- Unauthorized person(s) shall not be allowed in a laboratory. 'Authorized' means having business (i.e., a class, project, ...) in the laboratory with the permission of the ECE department. Anyone under the age of eighteen has to be under immediate and direct supervision of a qualified/authorized person at all times.
- Laboratories shall remain locked other than office hours or open lab hours.
- Never open (i.e., remove cover) any equipment in the laboratories.
- Report all problems to lab instructor, TA, or EE Shop, 394-2456
- Food, drink and related utensils shall not be brought into, stored in or consumed in general laboratories (e.g., EP 336 & EP 342). In dual use rooms (e.g., EP 338 and EP 341), which are used for study halls and laboratories, keep food, drink, & related utensils off of lab benches (i.e., on center 'study' tables) and away from equipment.
- Smoking is prohibited in ECE laboratories as well as in all campus buildings.
- Shoes shall be worn that provide full coverage of the feet, and appropriate personal clothing shall be worn in laboratories.
- Appropriate eye protection shall be worn, when using toxic chemicals or operating mechanical equipment.

#### **Electrical Safety Guidelines**

- Know what you must do in an emergency.
- Voltages above 50 V<sub>rms</sub> ac and 50 V dc are always dangerous. Extra precautions should be considered as voltage levels are increased.
- Before equipment is made live for high voltage circuits (see above), (1) circuit connections and layout should be checked by a TA, unless specifically advised otherwise, and (2) all colleagues in your group should give their assent.

- Never make any changes to circuits or mechanical layout without first isolating the circuit by switching off and/or removing connections to supplies.
- Experiments left unattended should be isolated from the supplies. If for a special reason, it must be left on, a barrier and a warning notice should be placed.
- Be familiar with the electrical hazards associated with your workplace.
- You may only enter the laboratory when authorized to do so and at authorized times.
- Be careful for the safety of others as well as for yourself. Think before you act. Be tidy and systematic.
- Avoid bulky, loose or trailing clothes. Avoid long loose hair. Remove metal bracelets, jewelry, and/or watchstraps. Avoid wet hands and clothing.
- Use extension cords only when necessary and only on a temporary basis.
- Discard or have repaired damaged cords and cords that become hot, or cords with exposed wiring.
- Know the correct handling procedures for batteries, cells, capacitors, inductors and other high energy-storage devices.
- Equipment found to be faulty should be reported immediately to instructor, TA, or EE Shop (394-2456) and not used until it is inspected and declared safe.
- No power laboratory should be performed without a Teaching Assistant (TA) or faculty member present.

## Electrical Emergency Response

The following instructions provide guidelines for handling two types of electrical emergencies:

### 1. Electric Shock:

When someone suffers serious electrical shock, he or she may be knocked unconscious or be unable to move. If the victim is still in contact with the electrical source, immediately turn off the power source, i.e., unplug power cord, throw breaker(s), or push the Emergency Power Off button (if available).

#### **IMPORTANT:**

Do not touch a victim still in contact with a power source; you could electrocute yourself.  
Have someone call for emergency medical assistance immediately (SDSMT emergency number x6100 or 9-911). Administer first-aid, as appropriate.

### 2. Electrical Fire:

If an electrical fire occurs, if possible turn off the electrical power source, i.e., unplug power cord, throw breaker(s), or push the Emergency Power Off button (if available). If the fire is small, you are not in immediate danger, and you have been trained in fighting fires, use any type of fire extinguisher except water to extinguish the fire.

**IMPORTANT:** Do not use water on an electrical fire.

## **Fire Hazards & Procedures**

### **Fire Alarms**

The EEP building is fitted with a fire detection system. The system is a series of smoke detectors, which are situated in the corridors. A few selected laboratories are also connected centrally and will automatically call the Fire Department in the event of a fire.

However, in the event of a significant fire, raise an alarm independent of the fire detection system. This can be done by dialing the SDSMT emergency number **x6100** and notifying security. Mention room location, floor number and building (**EEP**). They will set off the fire alarm bell and call the Fire Department. **DO NOT ASSUME THE FIRE DETECTION HAS DETECTED THE FIRE UNLESS YOU HEAR THE ALARMS.**

### **Fire Safety**

If you discover a significant fire, immediately make people in the vicinity aware of the danger, and leave the area if in danger. Wait at a safe distance and be available to assist the fire services.

Never place yourself in danger by attempting to fight a significant fire alone. Do not attempt to tackle a large fire.

Only return with others to the area of the fire if it is small enough to tackle. If possible, switch off electricity and gas supplies in/to the area. Remove any inflammable materials. Use a suitable fire extinguisher to contain or reduce the blaze.

### **Soldering**

Soldering electrical components can be a common activity for a computer, electrical, or electronics engineer, but it is not without its risks. The most obvious one is that of a burn from the hot iron or solder. There is also the risk of electric shock if the soldering equipment has a damaged or defective wiring. Always check the main wires and plug for damage before starting work. Also, take care not to rest the iron against or on the wires.

A less obvious risk is from the flux fumes. These can contain formaldehyde and other toxic chemicals, which can cause health risks (e.g., an asthma attack). While the risk is small, soldering should, as far as possible, be done in a well ventilated area with care taken to minimize the inhalation of the fumes. If you feel unwell, stop work immediately and get some fresh air.

Remember too that many solders contain flux and/or lead. Therefore, avoid contact between your hands and your eyes or mouth. Wash your hands thoroughly when done.

### **Projects**

**DO NOT** work on a power project in an unsupervised laboratory.

**DO NOT** work with unprotected live mains. All electronic equipment should be fused with the correct rating of fuse. Projects on motors, transformers, etc using mains **MUST** be conducted on

a bench which has mains protection. All project benches have this. MAINS PROTECTION SYSTEMS ARE NOT FOOL PROOF. Ensure you know which fault(s) are not covered.

**DO NOT** use PCB room or the workshop without prior training. Ask the faculty to arrange this.

**DO** ensure you know any additional rules that apply if you are working in a research laboratory. It is your responsibility to ask your supervisor about this, and his or hers to train you.

## **Security**

We request your cooperation in maintaining a climate of concern for proper use and care of the equipment, materials and supplies in the labs.

It is requested that laboratories and work areas be kept locked when they are not in use. If you are the last person leaving the lab, be sure to close and lock all windows and doors. If you were issued keys, they are for your own personal use and should be kept under your control.

In the past, there have been problems with unauthorized access given to students and others to labs. It is very important that you restrict access to authorized persons.

Unauthorized individuals and random curiosity seekers should be challenged and asked to obtain visiting permission from faculty or staff members.

Please notify the ECE Department Office or Security Officers immediately if any evidence of theft or unlawful entry is found. Security can be contacted 24 hours a day at (Ext. 6100).