



**MUGLA SITKI KOÇMAN UNIVERSITY**  
**FACULTY OF ENGINEERING**  
**METALLURGICAL AND MATERIALS ENGINEERING DEPARTMENT**

**LABORATORY SAFETY MANUAL FOR UNDERGRADUATES**

## **GENERAL RULES OF LABORATORY**

Basic safety rules which must be followed for health and safety of the people working in the lab are listed below. It has great importance to indicate these rules and lab supervisor's warnings.

- 1.** SAFETY FIRST - USE COMMON SENSE to avoid accidents.
- 2.** No student is allowed to work in a laboratory unless Lab Supervisory Personnel (Assistant) are present. DO NOT ENTER LABORATORY unless your assistant is present in the lab.
- 3.** Any student who endangers others' safety, or his or her own, will be dismissed from the laboratory.
- 4.** Wear lab coats (knee length) and safety glasses in laboratories employing chemicals, biohazards or radioisotopes. Open shoes, such as sandals, should never be worn in the lab.
- 5.** Eating and drinking are not permitted in laboratories.
- 6.** Tie back or otherwise restrain long hair when working with chemicals, biohazards, radioisotopes, or moving machinery.
- 7.** Laboratory doors are kept closed at all times.
- 8.** Laboratory studies should be performed during working hours. For the work to be done except of working hours should be allowed by lab supervisor.
- 9.** If you are or a student near you injured or if any type of accident or fire occurs, IMMEDIATELY call your assistant for assistance.
- 10.** Any student who has, or who develops a medical condition (epilepsy, asthma, allergies, diabetes, etc.) should immediately notify the lab instructor.
- 11.** When a fire alarm should occur, place the chemical and equipment safely to the nearest possible table/bench, exit the building calmly and go to the designated area outside. The instructor/technician should be the last one to leave the room, and should close and lock the door. Remain together as a class. The instructor will check to be certain that all students have exited the building. Do not wonder away and stay together. When the "all clear" signal is received, return to the classroom.
- 12.** Cigarette and other tobacco products are not permitted in laboratories.
- 13.** Restrict laboratory access to authorized persons only.

## WORKING AND SAFETY RULES OF LABORATORY

1. The working space should be as uncluttered as possible to allow work space and avoid accidents. Also, keep the aisles clear to prevent tripping over your gear. Place jackets, coats, book bags, pocketbooks, etc. at/on the designated area. Ask your assistant for help if needed.
2. Keep your work space clean and tidy. The working space, desk drawers, cabinets, instruments must be kept neat and clean at all times.
3. After the lab work; return unused materials, equipment and apparatus to their proper storage locations.
4. Never pipette by mouth; use mechanical transfer devices.
5. Decontaminate any equipment or work areas that may have been in contact with hazardous materials.
6. Only authorized experiments may be performed. Equipment should be performed only for its intended purpose.
7. Wear appropriate clothing (e.g. shirts, shoes) and personal protective equipment (e.g. safety glasses, lab coats, gloves) while cleaning of the laboratory.
8. Label all waste materials completely and legibly in accordance with rules established by the laboratory management.
9. Corrosive substances in steel cabinets, chemicals should be stored at appropriate temperature conditions. Equipment, hand tools, measuring instruments and chemicals should be stored in shelves or cabinets and put in place after use.
10. If an acid is to be diluted, pour acid slowly into the water with constant stirring. Never add water to acid.
11. Take the exact amount of reagent indicated. Larger amounts will not be more effective and may lead to uncontrollable reactions.
12. Never use one pipette for different chemicals. Do not insert your pipette or dropper into the reagent bottles. Use the one that is designated (labeled) for that reagent.
13. Never pick up hot objects with your hands. After heating glassware or crucibles place the item on a wire gauze to cool.
14. Never taste any laboratory chemicals.

15. Any chemical spilled on your eye should be washed off with plenty of water for at least 15 minutes at the eye wash. Notify an instructor immediately.
16. Any chemicals spilled on the skin should be washed off immediately and the skin should be flooded with water for several minutes. Notify an instructor immediately.
17. Familiarize yourself with the location and operation of safety and emergency equipment such as fire extinguishers, eye wash and shower, first aid and spill response kits, fire alarm pull stations, telephone and emergency exits.
18. If clothing catches fire, use a fire blanket or safety shower. If no blanket or safety shower is available, roll the person over the floor while covering with other coats. NEVER spray a fire extinguisher directly on a person.
19. In case of a skin burn, notify the instructor. Minor skin burns should immediately be placed under cold running tap water for 5-10 minutes.

## **WASTE**

1. ONLY PURE WATER CAN GO DOWN THE SINK.
2. Follow the instruction of waste disposals. Never discard chemicals through the sink or to a regular trash.
3. Only discard the proper waste that is identified by the label on the waste container/collector.
4. Never mix the waste. Mixing may result in explosions and serious injuries.
5. Never overfill a waste container. If it is full, request a new one from your lab instructor.
6. Laboratory specific wastes:

Solid waste must be discarded to solid waste container.

Silica waste must be dried in the student hood before poured into silica waste container in the hood.

Broken glass should be placed into the broken glass collector. Never discard broken glass to regular trash.

7. Never place regular trash into the waste containers. Normal trash can be thrown into trash bins or to bins labeled as trash.

8. Rinse all disposable or broken glassware with water before discarding it in the broken glass waste container. Rinse all regular glassware thoroughly with water before returning.
9. *If you are unsure on how to dispose of something, ask an assistant!*

## SAFETY SYMBOLS



**E: EXPLOSIVE** Again, fairly self-explanatory, though fairly seldom seen in the average lab. Bear in mind that noise and movement can also trigger explosion (not just sparks/flames!).



**F: FLAMMABLE** and Extremely Flammable Chemicals to be stored in flame-resistant cupboards. Volatile solvents can be a particular problem as they are prone to spread around from unsealed containers. This also covers pyrophoric materials (that catch fire spontaneously on exposure to air).



**T: POISONOUS** The poison symbol is self-explanatory. Whereas most chemicals are fairly dangerous if ingested or inhaled, many of these are dangerous even on contact.



**X: IRRITANT** or **HARMFUL** This symbol covers a wide range of (sometimes relatively minor) hazards - with precautions such as avoid contact with the skin, do not breathe, etc.



**N: ENVIRONMENTAL HAZARD**



**C: CORROSIVE**



**O: OXIDISING CHEMICAL** Oxidising chemicals are materials that spontaneously evolve oxygen at room temperature or with slight heating, or that promote combustion.



#### **IN THE CASE OF EMERGENCY**

- Report the location of the emergency; give your name, telephone number, and building and floor number. Meet the ambulance or fire crew at the place you indicated or send someone else if you cannot go.
- Report the nature of the emergency, whether an explosion has occurred and whether there has been a chemical or electrical fire.
- If individuals are involved, report how many and whether they are unconscious or trapped.

## **IN THE EMERGENCY CASE**

**CALL 112**

**IN MUGLA**



*Prepared By, Specialist Uğur Can ÖZÖĞÜT*