



Civil Engineering Department  
College of Engineering



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*Vision:* Local and international leadership in civil engineering education, innovative research, and knowledge dissemination.

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# Laboratory Safety Manual Guide

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## Civil Engineering Department

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*Mission:* Providing outstanding education and scientific research in line with advances in the field of civil engineering in order to prepare competitive engineering graduates capable of solving industry and community problems.

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## 1. Introduction and Overview

The department of Civil Engineering at Shaqra University strives to provide a safe working and learning environment for all stakeholders. It includes safety activities that involve potential exposure to hazardous safety and health conditions as well as environmental hazards.

This safety manual describes policies and procedures that are required for providing safety information to members for the safe conduct of experiment and research at the department. This manual is intended to promote and keep laboratories clean, safe places and compatible with relevant safety, health and environment regulations. This manual is applicable to students, laboratory faculty, visitors, and any individual entering the laboratory premises.

Each laboratory must have this manual readily available to all in the laboratory, and all members must be familiar with the contents related to laboratory and the procedures for obtaining additional safety information needed to perform safe duties

It is mandatory that all individuals who perform work in laboratory are familiar with and understand this manual as well as other training requirements set by the Civil Department, and their lab instructors. Fulfilling these requirements is a shared responsibility of the instructors, teaching assistants, students and researchers, according to the specific work in the lab. When unsure about a laboratory activity or situation, students are required to seek guidance from the instructor, teaching assistant or laboratory supervisor.

### 1.1 Purpose

The purpose of the Safety Manual is to provide students, employees and visitors with general safety guidelines. The manual provides information to assist lab instructors and students carry out their responsibility in ensuring a safe environment at various lab facilities. All personnel should read this manual and conduct their work accordingly.

## 1.2 Scope

This document provides a general overview of the activities and safe work practices for use of the material testing, structural engineering, hydraulics/fluid mechanics, highway engineering, environmental and geo-technical laboratories for both teaching and research applications.

It includes policies, procedures, equipment, personal protective equipment, and work practices that are capable of protecting students and all users (including visitors) of laboratories. This manual covers field work / in-room experiment, handling testing equipment/tools, taking readings during/after lab session, storing materials, tools and equipment and performing basic maintenance tasks.

## 2. Laboratory Safety Program

It describes the general safety guidelines and other information useful in preventing laboratory incidents and to appropriately respond to any incidents that may occur.

### 2.1 General Safety Guidelines

General safety rules apply to all lab and related equipment. Each individual who enters the laboratory is responsible for understanding the safety and health hazards related to corresponding equipment. It is also the individual's obligation to observe the general safety requirements applicable to all laboratory as listed below:

- Never operate any equipment alone in a laboratory.
- Unauthorized experiments are not allowed.
- No student is allowed to work in any laboratory without the presence and permission of the instructor.

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- Never touch any of the equipment or chemicals, unless you are directed to do so.
- Perform only those experiments as explained by your instructor.
- Carefully follow all written and oral instructions.
- Inappropriate and unprofessional behavior is not permitted in the laboratory.
- Avoid distracting or surprising other students.
- No food or beverages should be brought and consumed in a laboratory.
- Take responsibility for your own safety and that of others in the lab.
- Don't do anything that you feel is unsafe or are unsure about.
- Always be prepared physically and mentally while working on any heavy equipment.
- Smoking is strictly prohibited in and around lab premises.
- Always wear full sleeves clothes.
- Wear safety glasses and gloves when recommended.
- Leave bags and coats in designated areas.
- Bring only the essentials to the lab bench
- Never use broken or chipped glassware.
- Place broken glassware in specially marked containers.
- Maintain dry conditions on the equipment and avoid spillage of water
- Do not use wet hand while using electrical items like switches or plugs.
- Do not physically contact any rotating component of the equipment.
- Mouth pipetting is forbidden.
- Hands should be washed after contact with hazardous materials and before leaving the lab.
- Lab users should know the locations and operation of safety and emergency equipment such as fire extinguishers, first aid kits, emergency power off, emergency telephones, and emergency exits.

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## 2.2 General Lab Etiquette

Students are expected to follow the 'SAFELAB' protocol.

- **Supervision:** Never work in the laboratory without the supervision of a faculty
- **Attention:** Always pay attention to the work
- **Instructions** - Always perform experiments as per instructed by the faculty.
- **Labeling:** Always check labels to verify substances before using them.
- **Completion:** Switch off the equipment and return all materials and supplies to its proper location after use.
- **Cleanliness:** Always Keep your work area clean. No experiment is complete until the laboratory is cleaned. At the conclusion of each experiment, all used materials must be cleaned and set to drain.
- **Clothing:** Always wear appropriate protective equipment and clothing.
- **Emergency preparedness:** know what to do in case of an emergency situation

## 2.3 General Laboratory Responsibility

It is the duty of lab instructor to guarantee that the procedures outlined in this document are followed. Students must be encouraged to always follow safety protocols.

### 2.3.1 Lab Instructor Responsibility

- **Instruction:** This role involves delivering proper written and oral instructions before the start of any laboratory in an accurate and appropriate manner.
- **Supervision:** This involves suitable supervision as specified by professional and regulatory norms to ensure students act appropriately in the face of any potential

safety hazards. Students should not be left unsupervised unless there is an emergency situation.

- **Maintenance:** This involves ensuring a safe environment for students and teaching staff. He should ensure documented reports for maintenance/correction of hazardous conditions or defective equipment are properly submitted with competent authorities.

### 2.3.2 Student Responsibility

- Read and understand the experiments before conducting them.
- Always follow the user manuals while using equipment
- Follow the instructor advice
- Report any safety concern to the instructor
- Always ensure yours and colleagues safety
- Never introduce any dangerous object/substance in the lab
- Don't consume food and drinks in the lab
- Keep bags and other material at safe place to avoid dangers or difficulties during or after the Lab time
- Follow the safety procedures, manuals, related to the experiment
- Show safe behavior (e.g. sitting only on chairs, maintain discipline and order etc.)



### 3. Safety Rules

Safety rules provide a description of various safety guidelines to be followed while working in the laboratory. They are designed to give instructions for the safe handling of equipments.

#### 3.1 Work Area Safety

Your work area should be well lit and kept clean throughout the work period and before leaving the lab for the day. Before commencement of any experiment, always review all posted safety signs and instructions upon entering the lab space. Also, check emergency and exit routes before the beginning of each lab session. Other guidelines for maintaining a safe work area are as follows:

- Know the use and location of the nearest first aid kit and eyewash station in case of any emergency.
- Keep personal belongings away from work spaces.
- Clean up all lab spaces after completing experiments and dispose of all used materials properly.
- Do not dispose of cementitious materials by washing down the drain.
- Place excess and scrap materials (e.g. aggregate, lumber) in appropriate containers.
- Keep distractions to a minimum while working in the lab.
- Report all accidents, injuries, fires, spills, and close calls to the lab instructor.

### 3.2 Field Safety

Field safety is important in any laboratory, or co-curricular activity that involves outside work, whether at or away from the College of Engineering campus. Consider the following general guidelines as you plan for safe activities in the field:

- Assess the weather before scheduling field work.
- Wear proper PPE for the field conditions and weather, including long pants, closed toes shoes and safety vest.
- Wear sunscreen and consider bringing a hat with, sunglasses, rain gear as appropriate.
- Be aware of surroundings at all times.
- When working on roadsides, team members should maintain a safe distance from roadways
- Never travel to a site alone; and keep have emergency contact info.
- If you are traveling to a remote area, bring a first aid kit with you.

### 3.3 Clothing

Clothing and personal protective equipment (PPE) protects laboratory users from exposure to dust, chemicals, equipment, and other hazards in the laboratory. The following general clothing guidelines apply to laboratory use:

- Consult your instructor regarding appropriate clothing for individual lab sessions and experiments.
- Depending on lab activities, appropriate attire is a lab coat or apron. Always wear a full-length, long-sleeved laboratory coat or apron.
- Closed-toes shoes must always be worn in the Machine Shop and teaching laboratories.

### 3.4 Personal Protective Equipment (PPE)

Protective Equipment (PPE) includes safety glasses, goggles, face shields, gloves, lab coats, aprons, ear plugs, and respirators. Other PPE required in labs includes safety glasses, gloves, hard hats, hearing protection, respiratory protection, special protective clothing, and welding masks. The following general PPE guidelines apply to laboratory use:

- Always discuss proper safety equipment with your instructor
- Use personal protective equipment as necessary.
- Always wear appropriate eye protection (i.e., chemical splash goggles) in environmental laboratory.
- Wear disposable gloves, as provided in the laboratory, when handling hazardous materials. Remove the gloves before exiting the laboratory.
- Dust is produced while working with soils, aggregates, and cement. To address these potential hazards, discuss the appropriate controls and respiratory protection with your instructor.

### 3.5 Material Handling and Chemical Safety

Chemical consumables of hazardous nature are usually found in Environmental Engineering Lab. Chemical safety depends on control and knowledge of hazardous materials and basic chemical properties. These chemicals are shipped, stored, handled, used and disposed by trained personnel. Consult your instructor if you have any questions about a chemical or hazardous material, and follow below guidelines.

- All chemical containers must be labeled clearly and completely

- Store flammable and corrosive materials in approved safety cabinets or in a dedicated area.
- Do not keep chemicals longer than the indicated shelf life. Dispose of peroxide forming chemicals before the expiration date on the container.
- Do not store chemicals in the fume hoods.
- Keep all containers securely closed. Inspect containers regularly for leaks or cracks.
- Do not put your hands in your eyes or mouth, and never pipette by mouth. Make sure your hands are washed before leaving the laboratory area

### 3.6 Fire Safety

Labs typically have a high potential for fires, due to various electrical, chemical, and other factors. When working in any lab, consider the following factors regarding fire safety:

- Oily rags, dust, and paper are fire hazards. Before working with tools that can produce sparks, make sure that the surrounding area is free from ignitable materials.
- In environmental lab, solvents in any quantity are highly inflammable in nature and high toxicity of products of combustion. Make sure absence of open flames.
- Know the locations of fire alarms and extinguishers.
- In case of a lab fire, ensure your safety first and call emergency responders immediately for help.
- Don't use elevators. Use stairs and locate the nearest exit.

### 3.7 Electrical Safety

- Switch off all electrical equipment when not in use.
- Do not attempt to do any electrical repairs or investigations. Always refer your problem to the concerned staff.

- Don't leave any working equipment unattended.
- All equipment should undergo regular electrical testing.
- Practice good office safety by not overloading outlets or power strips

### 3.8 Water Safety

- Keep your area dry.
- Keep water away from electrical outlets, since water serves as an excellent electric conductor between the ground, you, and your equipment.
- Wet floors and work surfaces can cause slips.

### 3.9 Tool Safety

Tools differ in their function, power source, and size. General safety rules apply to the use of all tools. Below are following guidelines on tool safety:

- Always use the right tool for the job.
- Never use tools that you are unfamiliar with. Get proper training from your lab instructor.
- Read the tool manual for proper use procedures and safety precautions.
- Always inspect your tools before using them.
- Do not use defective and improper tools, and report faulty equipment to instructor

#### 4. Safety and Emergency Contacts

Safety questions should be referred to the lab instructor. If they are unavailable or in an emergency situation, contact the department head. Contact information is as follows:

**Table 1: EMERGENCY CONTACT DETAILS**

<b>LIST</b>	<b>PHONE NUMBER</b>
Head of Civil Engineering Department	8151
Fire Emergency	998
Police	999/ 911
Ambulance	997
Dawadmi General Hospital	011 642 1175