



THE UNIVERSITY OF  
**JORDAN**



School of Engineering  
Mechanical Engineering Department  
University of Jordan

# **Safety Manual for the Mechanical Engineering Department**

## **University of Jordan**

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## **1. Introduction**

The Mechanical Engineering Department at the University of Jordan is committed to maintaining a safe and healthy environment for all students, faculty, and staff. This Safety Manual details the policies, procedures, and preventive measures in alignment with international safety standards, such as OSHA and ISO, to ensure the safe operation of all departmental laboratories and workshops. Strict adherence to these guidelines is mandatory to minimize risks and prevent accidents.

## **2. Applicability**

This manual applies to all individuals, including faculty, staff, students, and visitors, who work in or access the Mechanical Engineering Department's laboratories and workshops. It encompasses general safety practices and specific precautions for activities unique to the department.

## **3. Responsibility**

### **3.1 Departmental Responsibilities**

- **Department Chairperson:** Responsible for ensuring department-wide compliance with safety regulations and providing resources for safety improvements.
- **Safety Officer:** Conducts regular safety inspections, addresses safety issues, and ensures the proper maintenance of safety equipment.

### **3.2 Laboratory Supervisor**

- Displays warnings for unusual or significant hazards.
- Enforces the use of proper personal protective equipment (PPE).
- Coordinates emergency plans and safety drills.
- Conducts daily inspections of laboratory facilities, ensuring proper equipment maintenance and adherence to safety protocols.
- Immediately addresses violations of safety rules.

### 3.3 Students and Laboratory Users

- Follow all safety procedures and standard operating procedures (SOPs).
- Always wear appropriate PPE, such as lab coats, gloves, and safety goggles.
- Report hazards and unsafe conditions to the laboratory supervisor immediately.
- Maintain clean work areas and handle equipment responsibly.

### 4. Laboratory Design and Equipment

Laboratory design must prioritize safety, meeting international standards such as ISO 14001 (Environmental Management) and ISO 45001 (Occupational Health and Safety). Design considerations include:

- Adequate ventilation, especially in areas with chemical use.
- Fire alarms, extinguishers, and emergency exits must be installed and clearly marked.
- Ergonomic workstations to reduce physical strain and enhance safety.
- Clearly labeled and grounded electrical systems with proper circuit protection.

### 5. Laboratory Hazards

Mechanical engineering laboratories present several potential hazards, including:

- **Physical Hazards:** Moving machinery parts, hot surfaces, high-pressure systems, and heavy equipment.
- **Chemical Hazards:** Handling of lubricants, solvents, and other chemical agents.
- **Electrical Hazards:** Exposure to high voltages and risk of short circuits.
- **Noise Hazards:** Prolonged exposure to loud machinery, which may lead to hearing damage.

## **6. Standard Operating Procedures (SOPs)**

Each laboratory must have clearly documented SOPs, which should include:

- Detailed operational steps for equipment and processes.
- Necessary PPE for each task.
- Emergency shutdown protocols.
- Guidelines for routine maintenance and equipment inspection.

## **7. General Shop/Work Area Safety**

- Keep work areas clean to prevent tripping and slipping hazards.
- Use all tools and machinery correctly, ensuring that safety guards are in place.
- Operate machinery only after receiving proper training.
- Always wear PPE, such as goggles, gloves, and ear protection.

## **8. Laboratory Safety Equipment**

All laboratories must be equipped with safety devices that conform to international standards, including:

- **Fire Extinguishers:** Inspected regularly and readily accessible.
- **Eye Wash Stations:** Installed near chemical handling areas.
- **First Aid Kits:** Stocked, visible, and regularly checked.
- **Fume Hoods:** Available where hazardous chemicals are used.
- **Spill Kits:** Accessible for chemical spill containment and cleanup.

## **9. General Rules of Safety**

- No eating, drinking, or smoking in laboratory areas.
- Report all accidents and hazards immediately.
- Keep emergency exits clear at all times.
- Complete mandatory safety training before using any equipment.
- Dispose of hazardous waste in accordance with safety regulations.

## **10. Responding to a Fire and Evacuation Emergency**

### **10.1 Evacuation Procedures**

- Trigger the fire alarm.
- Call emergency services, providing necessary details.
- Assist injured personnel, or notify emergency responders.
- Use the nearest emergency exit (avoid elevators) and evacuate calmly.
- Assemble at the designated safe area and remain until authorized to re-enter.

### **10.2 Small Fires**

If manageable, extinguish a fire using the PASS method:

- **P**ull the pin.
- **A**im at the base of the fire.
- **S**queeze the handle.
- **S**weep from side to side.

### **10.3 Large Fires**

If the fire is uncontrollable, evacuate immediately and follow the standard evacuation procedures.



## **11. Basic Emergency or First Aid**

- For minor cuts, wash the wound and apply a sterile bandage.
- For severe cuts, apply pressure to the wound and seek medical assistance.
- For burns, cool the affected area under running water and avoid using creams.
- For electrical shock, disconnect the power source and seek immediate medical attention.

## **12. Laboratory Safety Symbols and Rules**

Laboratories must prominently display safety symbols, including:

- **Flammable:** Denotes areas with flammable materials.
- **Toxic:** Indicates hazardous or poisonous substances.
- **Laser Hazard:** Marks areas with high-powered laser equipment.
- **Radiation:** Indicates the presence of radioactive materials.

## **13. Specific Precautions in Mechanical Engineering Laboratories**

### **Fluid Mechanics Laboratory**

- Clean up water spills immediately to prevent slip hazards.

### **Thermodynamics Laboratory**

- Handle high-pressure equipment carefully.
- Ensure water spills from experiments are promptly cleaned up.

### **Mechanics of Materials Laboratory**

- Handle broken samples with caution to avoid injury.
- Take extra care when performing bending beam experiments, as strain gauges are delicate.

- During impact testing, secure the pendulum and avoid standing in front of the machine.

### **Control Laboratory**

- Inspect electrical cords and wiring for damage before use.
- Disconnect all equipment from power sources when not in use.

### **Dynamics and Vibration Laboratory**

- Exercise caution around rotating devices and moving belts.

### **Heat Transfer Laboratory**

- Disconnect all equipment from electricity after use to prevent electrical hazards.