



**INTERNATIONAL
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**SAFETY RULES AND REGULATIONS
ON
RESEARCH AND DEVELOPMENT CENTER**

This document establishes the framework for safe laboratory practices, protection of human health, and environmental stewardship within the Research and Development Center (RDC) at the International University of Sarajevo. It applies to all university laboratories and research facilities, with particular emphasis on Genetics and Bioengineering, Mechanical Engineering and Electrical and Electronics Engineering laboratories.

The following regulations supplement the general IUS rules on protection at work document and address hazards and procedures unique to laboratory environments.

The regulations are binding for all users, including students, academic staff, laboratory technicians, assistants, and technical personnel. All users are responsible for understanding and following these rules, contributing to a safe and responsible research environment.

Program-Specific Laboratory Safety Regulations

I. Genetics and Bioengineering Laboratories (GBE)

The following regulations apply specifically to laboratories associated with the Genetics and Bioengineering program including Microscopy and Microbiology laboratory, PCR and Cell Culture laboratory, Molecular Biology laboratory, and Preparation and Storage laboratory. In addition to this document, program should define their own specific safety guidelines and procedures within the courses/laboratories (Appendix A).

Safety Awareness

All 1st and 2nd year courses that include practical or laboratory work must provide basic biosafety training before students start working in the laboratory. This training should include topics such as chemical safety, proper use of personal protective equipment (PPE), location and use of first aid kits, incident reporting procedures, risk awareness, and general laboratory safety protocols.

No student is allowed to participate in laboratory work without prior safety instruction.

General Safety in Laboratories

The use of personal protective equipment is mandatory at all times in the laboratory. This includes laboratory coats, protective gloves, and safety goggles where required. Eating, drinking, and inappropriate behavior are strictly prohibited in the laboratory. The responsible person (laboratory technician/assistant or supervisor) is in charge of enforcing safety rules. They are required to remind users to follow safety procedures and have the authority to exclude individuals who do not comply with the rules.

Equipment and Maintenance

All laboratory equipment must be maintained in proper working condition. Regular inspection, cleaning, and calibration must be performed where applicable. Records of maintenance and calibration must be documented and available to ensure traceability.



INTERNATIONAL
UNIVERSITY OF SARAJEVO

Waste Management

All laboratory waste must be properly classified and disposed of in designated, clearly labelled containers.

Hazardous waste must not be disposed of in regular waste streams or sinks unless explicitly permitted.

The laboratory technician/assistant is responsible for proper waste handling, including decontamination procedures such as autoclaving of biological waste where applicable, as well as ensuring safe storage and disposal in accordance with regulations.

Risk Assessment

Before performing any experiment, potential risks must be assessed and appropriate safety measures applied. Whenever possible, safer alternatives and procedures with lower risk should be considered.

Emergency Preparedness

All laboratory users must be familiar with emergency procedures. In case of fire, users must alert others, use fire extinguishers only if trained, and evacuate if necessary.

In case of chemical spills, the incident must be reported immediately and handled using appropriate spill kits.

In case of biological exposure, the affected area must be washed immediately and the incident reported to responsible personnel.

Emergency equipment such as fire extinguishers and first aid kits must be accessible at all times.

Incident Reporting

All accidents, injuries, and near-miss events must be reported immediately to the responsible laboratory personnel.

Proper documentation of incidents is required in order to improve safety and prevent future occurrences.

Responsibilities

All laboratory users are responsible for following safety rules, using protective equipment properly, and reporting unsafe conditions. Laboratory technicians/assistants are responsible for supervision, enforcement of safety rules, equipment oversight, and proper waste management.

Academic staff are responsible for ensuring that students receive appropriate safety training before participating in laboratory work.

Laboratories should operate in accordance with relevant institutional policies and recognized safety standards where applicable.

Failure to comply with these rules may result in removal from laboratory work and further disciplinary measures.

II. Electrical and Electronics Engineering Laboratories (EEE)

The following regulations apply specifically to laboratories associated with the Electrical and Electronics Engineering program including Electronics laboratory, Embedded systems laboratory and Control laboratory. In addition to this document, program should define their own specific safety guidelines and procedures within the courses/laboratories.

Safety Awareness

All 1st and 2nd year courses that include practical or laboratory work must provide basic introductory laboratory session, to inform the students about the safety guidelines relevant to the laboratory and the experiments to be performed.

Students should be aware of electrical safety, proper use of personal protective equipment where required, safe handling of instruments and energized circuits, location of first aid kits and fire extinguishers, risk awareness, and general laboratory safety rules.

For laboratory work involving higher-risk systems, such as high-voltage equipment, power system protection devices, transformer-based setups, DFIG stations, etc, students must be additionally informed by the responsible laboratory technician/assistant before the work begins.

No student should participate in laboratory work without being introduced to the applicable safety guidelines.

General Safety in Laboratories

Students must behave responsibly and follow all instructions given by laboratory technician/assistant.

Unauthorized experiments, careless handling of equipment, and inappropriate behavior are strictly prohibited.

Personal protective equipment shall be used whenever required by the nature of the experiment. Protective eyewear, anti-static precautions, or other protective measures shall be applied where electrical, mechanical, or thermal hazards are present.

Loose clothing, jewelry, and long hair must be secured where they may create danger through contact with energized circuits, rotating parts, or moving equipment.

Eating, drinking, and inappropriate use of personal devices are prohibited in the laboratories. Workspaces must be kept clean and always organized to prevent short circuits, accidental damage, and unsafe working conditions.

The laboratory technician/assistant, is in charge of enforcing safety rules. They are required to remind students to follow safety procedures and have the authority to stop an experiment or exclude individuals who do not comply with the rules.

Electrical Equipment Safety

Electrical safety is mandatory in all EEE laboratories and applies to all experimental setups, instruments, and systems.

Students must never touch exposed conductors, terminals, probes, or circuit elements while equipment is energized. Before assembling, modifying, or disassembling any circuit or setup, the power supply must be switched off and verified as de-energized.

All circuits and configurations must be checked by laboratory assistant prior to energization. Particular attention must be given to avoiding short circuits, incorrect polarity, improper grounding, and overloading of components.

Only approved and properly rated equipment, cables, probes, connectors, and components may be used. Equipment must be used strictly within its specified voltage, current, insulation, and power limits.

Damaged wires, loose connections, faulty instruments, or unsafe equipment must not be used. Students must visually inspect equipment before use and immediately report any irregularities.

Special care is required when working with:

- Power supplies, oscilloscopes, multimeters, and function generators
- Semiconductor devices and sensitive electronic components
- Microcontrollers, embedded systems, and communication interfaces (including protection against electrostatic discharge, reverse polarity, and overvoltage)
- Transformer-based setups, motor drives, and power-electronic systems
- Protection systems such as SIPROTEC devices and DFIG stations

Such systems may only be configured, connected, or energized under the supervision of authorized laboratory personnel. Protection settings, wiring configurations, and operating parameters must not be modified without approval.

When working with control systems and electromechanical setups, including DC motors, Mechatro Lab systems, dSPACE units, sensors, and actuators, additional precautions must be observed.

Rotating components and moving mechanical elements present physical hazards and must not be touched during operation. Experimental setups must be properly secured to prevent unintended motion or instability.

Control parameters, reference inputs, and software configurations must be verified before operation to avoid unstable system behavior, oscillations, or equipment damage.

Any abnormal behavior, including noise, vibration, overheating, or unstable response, must result in immediate shutdown of the system and notification of laboratory personnel.

Equipment and Maintenance

All laboratory equipment must be maintained in proper working conditions.

The laboratory technician/assistant should check all equipment and consumables before each laboratory session and inform RDC management of any malfunction, damage, shortage, or failure.

Inspection, cleaning, testing, calibration, and servicing shall be performed where applicable. Calibration and service schedules shall be followed by the laboratory technician/assistant in coordination with the RDC manager.

Maintenance and calibration records should be documented and kept available where necessary for traceability and safe operation.

Students must visually inspect equipment before use and inform the laboratory technician/assistant if there are signs of damage, malfunction, loose connections, missing protective covers, or unusual behavior.

Faulty or unsafe equipment must not be used.

Risk Assessment

Before performing any experiment, potential risks must be considered and appropriate safety measures applied.



INTERNATIONAL
UNIVERSITY OF SARAJEVO

Possible hazards may include electric shock, burns, overheating, high voltage, rotating machinery, moving mechanical elements, incorrect wiring, unstable control response, and damage to sensitive electronic equipment.

Whenever possible, safer alternatives and lower-risk procedures should be considered.

Emergency Preparedness

All students must be familiar with the basic emergency measures applicable to laboratory work.

In case of fire, students must alert others, use fire extinguishers only if appropriate, and leave the laboratory if necessary. In case of electric shock, burn, overheating, smoke, equipment malfunction, or mechanical injury, the laboratory technician/assistant must be informed immediately.

Emergency equipment such as fire extinguishers and first aid kits must be accessible at all times.

Responsibilities

All students, laboratory assistants, technicians, and professors, are responsible for following safety rules, using equipment properly, observing the given safety guidelines, and informing responsible personnel of unsafe conditions.

Laboratory technicians/assistants are responsible for supervision of laboratory activities, enforcement of safety rules, safety checks, equipment oversight, and maintaining laboratory inventory and materials records.

Laboratories should operate in accordance with relevant institutional policies and recognized safety standards where applicable.

Failure to comply with these rules may result in removal from laboratory work and further disciplinary measures.

III. Mechanical Engineering Laboratories (ME)

These guidelines apply to all Mechanical Engineering (ME) laboratories, including machining and material testing laboratory (G-code Lab) and 3D printing laboratory (CEZERI Lab). All users are expected to act responsibly, follow authorized instructions, and protect themselves, others, equipment, and the laboratory environment at all times.

Safety Awareness

Laboratory work must begin only after users have understood the task, the equipment involved, and the associated hazards.

No experiment or machine operation may start without proper authorization and, where required, direct supervision by responsible staff.

Users must remain attentive during all procedures and avoid distractions, unsafe shortcuts, or unauthorized modifications.

Any condition that appears unsafe must be reported immediately and work must stop until the issue is addressed.



INTERNATIONAL
UNIVERSITY OF SARAJEVO

General Safety in Laboratories

Entry to the laboratories is allowed only to authorized users and only for approved activities. Appropriate personal protective equipment (PPE) must be worn at all times, including safety glasses, closed-toe footwear, and a lab coat or other task-specific protection when required. Loose clothing, dangling jewelry, and unsecured long hair are not permitted near moving equipment.

Food, drinks, and unrelated personal items are not allowed in laboratory work areas. Users must keep workstations clean, dry, and organized, and must never block aisles, exits, or emergency equipment.

Equipment and Maintenance

Equipment may only be used by trained or authorized users and must be operated according to the manufacturer's instructions and laboratory procedures.

Before use, users must inspect tools, cables, guards, fixtures, sensors, and safety devices for visible damage or abnormal behavior.

No guard, interlock, safety switch, or emergency stop may be bypassed or disabled.

Any malfunction, abnormal noise, overheating, vibration, leak, or damage must be reported immediately and the equipment must be taken out of service if necessary.

Routine maintenance, calibration, and inspection must be performed only by authorized personnel.

Waste Management

All waste must be separated and disposed of in the designated containers provided in the laboratories.

Sharp objects, broken specimens, metal chips, contaminated wipes, spent materials, and chemical residues must be treated as appropriate waste and handled according to laboratory instructions.

Waste must never be left on benches, floors, or inside equipment areas.

Users must follow the specific disposal rules for each laboratory, especially when handling lubricants, solvents, resins, cutting fluids, or other process-related materials.

Risk Assessment

A basic risk assessment must be completed before experiments, machining, testing, heating, lifting, or any work involving moving parts, high temperature, pressure, electricity, or hazardous materials.

The assessment should identify the main hazards, the people at risk, the required controls, and the emergency actions.

Users must not proceed if the risk is unclear, uncontrolled, or beyond the approved scope of the activity.

Additional precautions must be taken when working with rotating machinery, sharp tools, hot surfaces, pressurized systems, or fragile test specimens.



INTERNATIONAL
UNIVERSITY OF SARAJEVO

Incident Reporting

All accidents, near-misses, injuries, spills, equipment failures, and unsafe conditions must be reported immediately to the responsible staff member or laboratory management.

In the event of injury or an emergency, users must stop work, secure the area if safe to do so, and seek assistance without delay.

Reports should include a clear description of what happened, when it occurred, which equipment was involved, and what immediate action was taken.

No damaged equipment may be reused until it has been inspected and formally cleared.

Responsibilities

Users are responsible for following all safety instructions, protecting shared equipment, and maintaining a professional laboratory culture.

Laboratory supervisors and technical staff are responsible for providing guidance, ensuring safe access, and enforcing the rules when necessary.

Each user is responsible for the safe handling of the tools, specimens, and materials assigned to them.

Any damage caused by negligence, misuse, or violation of the rules may result in restricted access and further administrative action.

By entering and using the Mechanical Engineering laboratories, all users confirm that they have read, understood, and will comply with these safety guidelines.

RDC Manager

Šejla Džakmić

APPENDIX A

GBE LABORATORY RULES

- Wear lab coat and gloves
- No food, drinks, or personal items
- Clean and disinfect surfaces before and after work
- Treat all samples as potentially hazardous
- Dispose waste in designated containers
- Use equipment only if authorized
- In case of incident, report immediately to supervisor
- Remove gloves and wash hands before leaving
- Remove lab coat before exit

GUIDELINES

for the safe handling of acids and alkalis

I. Safety precautions when working with acids

1. Concentrated acids must be handled in a fume hood. All work with them must also be conducted in a fume hood, whilst using personal protective equipment (e.g. gloves, goggles).
2. When using bottles containing acids, ensure that each bottle is clearly labelled with the name of the acid. When you are pouring the acid, make sure that the label is facing upwards.
3. During the classes, experiments involving concentrated acids must be demonstrated by the professor or laboratory assistant whilst wearing protective clothing and goggles.
4. When diluting acid solutions, pour the acid of higher concentration into the vessel containing the acid of lower concentration; when preparing a mixture of acids, pour the liquid of higher density into the liquid of lower density.
5. Pour the acid down a glass rod. After pouring a specific portion of acid, stir the contents of the vessel in which the solution is being prepared. The first portions are usually small. During dissolution, monitor the temperature of the liquid and prevent overheating.
6. In the event of an acid spill, it must be cleaned up: cover the spill with quartz sand, then scoop it up with a dustpan and dispose of it or bury it in the ground. After removing the sand, treat the spill site with a 10–15% sodium bicarbonate solution, followed by water.
7. Do not hold a bottle containing acid against your chest, as this may cause spillage and burns. Acid must be poured into containers with a capacity of no more than 1 L.
8. Students are not permitted to prepare acid solutions for experiments. Samples for experiments must be provided by the professor or laboratory assistant in ready-to-use form.
9. Used acids must be collected in special bottles and discharged into the drains only after they have been neutralized with a 10–15% sodium bicarbonate solution (up to pH around 7 according to universal indicator paper).

II. Safety precautions when working with alkalis

1. Solid alkalis should be stored in polyethylene containers or thick-walled, wide-mouthed glass jars, sealed tightly with paraffin-coated corks.
2. Concentrated ammonia solutions must only be stored and used in a fume hood. It is forbidden to store it together with acids.
3. When preparing alkali solutions, solids must only be removed from their containers using a special spoon and must never be sprinkled, as dust may get into the eyes or onto the skin. The spoon must be washed thoroughly after use. Work with alkalis must be conducted in a fume hood, whilst using personal protective equipment (e.g. gloves, goggles).
4. Thin-walled porcelain cups must be used when weighing out samples of solid alkalis.
5. Solutions must be prepared in thick-walled porcelain vessels in two stages. First, a concentrated solution is made, cooled to room temperature, and then diluted to the required concentration.
6. Students are not permitted to prepare alkali solutions for experiments. Samples for experiments must be provided by the professor or laboratory assistant in ready-to-use form.
7. Concentrated ammonia solution is not given to students.
8. In the event of an alkali spill, it must be cleaned up: cover the spill with quartz sand, then scoop it up with a dustpan and dispose of it or bury it in the ground. After removing the sand, treat the spill site with a 10% acetic acid solution, followed by water.
9. Used alkalis must be collected in special containers and discharged into the drains only after they have been neutralized with a 10% acetic acid solution (up to pH around 7 according to universal indicator paper).

AUTOCLAVING OF BIOLOGICAL WASTE

Collection:

- Dispose of waste in autoclave bags.
- Do not fill bags more than 2/3 full.

Preparation:

- Apply autoclave indicator tape.
- Do not overload the autoclave.

Cycle (Waste):

- 121°C
- 20 min (standard)

After the cycle:

- Check the indicator.
- Allow to cool before handling.

Disposal:

- Label: "AUTOCLAVED".
- Do not reopen bags.