

AA 13.LABS POLICIES AND PROCEDURES

1. RATIONALE

Hands-on ability contributes to the “Practical ingenuity” of an engineer, considered by the National Academy of Engineering (NAE) as a necessary attribute of the 2020 engineer. Hands on skills to an engineer liken sculptor’s ability to use the chisel to carve an abstract idea into form. RHU students must attain the practical hands-on experience on relevant technologies to better prepare them to engage the technology-pervasive practical world. Hands-on skills are therefore important and necessary component in engineering education. A necessary condition to providing students effective hands-on experience is the existence of labs that integrate into the curriculum. Access to appropriate and adequate lab facilities is a fundamental student right at RHU.

2. POLICY STATEMENT

The policy of the Rafik Hariri University (RHU) is to provide a safe and fruitful learning and working environment. This document has been developed to streamline the workflow and conditions of Laboratories at RHU according to institution-wide policies and procedures for the effective and safe use of lab equipment, hazardous chemicals, and other materials at the University. By adhering to the following policies and procedures, student learning outcomes shall be maximized and the risk of exposures to physical hazards shall be minimized:

- a. Each department shall develop a 3 to 5 year technology strategic plan that seeks to integrate emerging technologies into courses as curricula, technology, and market demands change.
- b. Lab users are responsible to obey existing lab rules and regulations otherwise risk the potential of disciplinary actions.
- c. Lab instructors must have the skills to support students’ learning requirements, and must supervise students during lab hours.
- d. Safety measures must be employed to ensure the safety of lab users.
- e. Safety rules and lab use procedures must be posted in each lab and followed at all times.
- f. Lab experiments must concur with the course outlines and course learning outcomes.
- g. Lab facilities shall be assessed periodically for usability, safety, and relevancy.
- h. Lab inquiries, requests, and concerns shall be addressed to the Labs Director through the Department Chairperson for resolution.

3. ASSIGNMENT OF RESPONSIBILITY

The primary responsibility for insuring safe conduct and conditions in the laboratories resides with the Director of Laboratories. The Director should be familiar with the contents of this document, make sure all of his workers are familiar with it, and ensure all work in the laboratories is conducted in compliance with the policies and procedures outlined herein.

Individual laboratory workers are responsible for their own safety and the safety of their co-workers and visitors to their laboratories. All staff, faculty, and students must demonstrate this responsibility in their actions and attitudes. It will be each laboratory worker’s responsibility to wear Personal Protective Equipment (PPE) assigned to them, abide by the stated safety rules and regulations, and know and follow all emergency procedures. Lab staff must pre-plan their work and be aware of the associated hazards to ensure their safety and the safety of those individuals who work around them. The Director of laboratories has the responsibility for controlling hazards in all laboratories. This shall include:

1. Preparing a hazard assessment for all lab procedures
2. Instructing laboratory personnel on potential hazards

3. Monitoring and correcting errors and dangerous conditions
4. Highlighting the importance of laboratory safety measures
5. Selecting the proper Personal Protective Equipment (PPE) and ensuring it is being used
6. Maintaining all relevant records and documentation
7. Investigating the circumstances surrounding a laboratory accident and taking effective steps to prevent its recurrence

It is the responsibility of the Labs Director and lab staff to strive for a safe working environment in laboratory. Observed hazards or potential hazards must be identified and corrected immediately.

The Labs Director and staff shall provide assistance for the compliance efforts of all University staff, faculty, and students while they work in the labs. Furthermore, they shall foster an attitude that ***Safety Is Always a Top Priority.***

4. OPERATIONAL AND SAFETY GUIDELINES

Each laboratory at the university is unique, depending on the experiments being conducted, the equipment in use, and the physical layout of the lab or space utilization. Regardless of the characteristics, laboratories at the RHU must adhere to the operational and safety guidelines outlined herein.

4.1. Safety Rules and Regulations

All laboratory experiments have been designed with students' safety as top priority. Unforeseen events may occur and lead to circumstances that are potentially dangerous. In such cases, using common sense and prompt and correct response reduces potentially serious injuries. To avoid potentially dangerous accidents, students shall:

- ◆ Never be left in the labs alone
- ◆ Use lab equipment carefully and appropriately
- ◆ Inquire before taking any step they are not sure about
- ◆ Behave responsibly and move around lab equipment with caution
- ◆ Use common sense
- ◆ Pay attention to all instructions
- ◆ Be aware of their surroundings
- ◆ Familiarize themselves with the location of First Aid kits and fire extinguishers.

4.2. Use Common Sense

Most often, safety in the laboratory can be insured if simple common sense is applied. Irresponsible or reckless behavior in the laboratory can be dangerous, and thus will not be tolerated. Students must never leave their experiments unattended. They must not tamper with any equipment; they must be familiar with their experiments, their work area, and always exercise caution and good judgment.

- a. Great care must be exercised when dealing with power.
 - i. Power cords should not be overly bent or kinked, as this can crack the insulation exposing students to the danger of electrical shock or burn.
 - ii. Liquids should never be close to power sources as spillage can have dire consequences.
- b. Great care must also be used when dealing with chemicals.
 - iii. Glassware may break or spill, utmost caution is advised.
 - iv. Thermometers contain mercury, a poisonous material that must be handled with extreme care.
- c. In general, heating or soldering elements may potentially cause serious injury and burn, it is important that they never come in contact with fingers, clothing, power cords, or any chemicals.

4.3. Hazard Identification

Notice Boards

A notice board posted at all of the entrances to the lab will identify the categories of potentially hazardous materials that may be found in the lab at any given time and contact persons in case of emergency.

Hazard warning stickers identify the potential chemical, biological or physical hazards that may be in the laboratory. These stickers can be added or removed as needed for the changes in the laboratory inventory.

Labeling

The manufacturer's label will provide the initial information on the handling of any substance. Directions found on the label must be followed. All bottles and chemical containers must be labeled, including flasks, beakers, etc.

4.4. Health and Hygiene

Clothing and Footwear

- Full coverage shoes constructed of sturdy material shall be worn at all times.
- Shorts and t-shirts are allowed as long as lab coats are worn when using chemical, biological or radioactive material.
- Overly loose clothing, long necklaces, ties, or scarves can get caught in equipment or knock over work materials.
- Rings must be removed if working on equipment with moving parts or emersion of gloved hands in concentrated solutions.

Food and Drink

- Food and drink should not be stored or consumed in areas where chemical, biological or radioactive substances are being used or stored.
- Food and drink may only be consumed in prescribed and clearly designated areas, away from lab equipment and potentially contaminated airflow.
- Transport of samples and chemicals are not permitted through the Food and drink designated area.
- Equipment (e.g. microwaves), glassware or utensils that have been used for laboratory operations should never be utilized to prepare or consume food.
- Laboratory refrigerators and cold rooms may not be used for the storage of foods. Separate, clearly labeled appliances must be used. Sinks and drain boards used for washing food utensils should not be used for research purposes.

Smoking

Smoking is not allowed in any of the Laboratory premises.

Cross Contamination Prevention

Personal protective items (gloves, lab coats, etc.) are not permitted in public areas of the building such as restrooms, offices, and cafeterias. In an effort to eliminate possible exposure or contamination of building fixtures and equipment, gloves shall be removed when leaving the lab. To transfer specimens or chemicals from one lab to another use one gloved hand to handle the cart or container. The ungloved hand can be used to open doors, push elevator buttons, etc.

4.5. Physical Hazards and Housekeeping

- Physical hazards and poor housekeeping practices may put staff and visitors at risk of injury.

- Lab staff must correct or report any hazards found in the lab.
- Physical hazards or housekeeping issues observed outside of the lab should be reported to the appropriate maintenance division.
- Labs should be properly ventilated
- Emergency EXIT sign (battery powered) should be placed on top each exit door

Trip hazards and Spills

- Trip hazards such as electrical or computer cords across floors
- Excess storage in walkways, etc. must be minimized.
- Irregular, bumpy or loose flooring should be reported to the maintenance department.
- Aisles, hallways and stairways must not be used for storage areas.
- Avoid excessive overhead storage.
- Shelves must be of sturdy construction, leveled, and if possible, attached to walls or cabinets so they do not tip.
- Do not overload shelves.

Lab Equipment

- Refrigerators and freezers must be level to prevent samples and solutions from spilling when their doors are opened.
- Sharp edges or corners on equipment should be protected or equipment relocated to minimize injury.
- Sharp objects must be removed from equipment or covered with a protective guard when not in use.
- Belt and pulley systems, such as on vacuum pumps, or any other pinch points must be covered by a protective guarding.

4.6. Fire Safety

As accidents may happen, ignorance is our worst enemy. Students must be well informed to avoid serious injury in case of fire. One of the main causes of injury in fires is having blocked passage ways. Never leave the entrance/exit of a laboratory blocked with any object. Access to the outside must remain unblocked and uncluttered at all times. The second most common cause of injury is pushing and shoving during a stampede.

In case of fire, follow these simple rules to ensure your safety as well as the safety of others:

1. Exit the lab room quickly but calmly without pushing and shoving people out of your way to get to the door.
2. Do not open any windows; this will give the fire much needed oxygen to burn stronger and hotter.
3. Keep the lab door closed; you don't want to fan the fire.
4. Call out for help.
5. In case you want to use the fire extinguisher, follow the instructions written on the device, and direct the extinguisher stream to the base of the flames which will deprive the fire from its source of oxygen and smother the flames.

4.7. Electrical Safety

The electrical demand in laboratories has grown tremendously since most buildings and labs were designed. It is imperative that the electrical systems in these buildings are not abused or overloaded. Great care must be exercised when dealing with power.

- Liquids should never be close to power sources as spillage can have dire consequences.
- Lab staff cannot modify, install or remove electrical systems.
- Contact the Maintenance Department to assess or modify the lab's electrical requirements.

Electric Shocks

In case of electrical shock, the real measure of shock intensity lies in the amount of current forced through the body, and not the voltage. While currents of as little as 0.075 Amperes can cause breathing to stop completely, currents between 0.1 mA and 0.2 A are lethal. Any electrical device using a house wiring circuit can under certain conditions transmit a fatal current. Here are some general guidelines to dealing with electricity:

- a. Do not touch electrical equipment while barefoot, or standing on metal floors, damp concrete, or other well-grounded surfaces.
- b. Do not handle electrical equipment while wearing damp clothing (particularly wet shoes) or while skin surfaces are damp.
- c. If you observe an individual being electrically shocked:
 - i. Cut the voltage and/or remove the victim from contact as quickly as possible, but without touching him with your bare hands and endangering your own safety.
 - ii. Do not waste valuable time looking for the power switch. Use a length of dry wood, rope, blanket, etc., to pry or pull the victim loose. The resistance of victim decreases with time, and fatal 100 to 200 mA level may be reached if action is delayed.
 - iii. If the victim is unconscious and has stopped breathing, start artificial respiration immediately after freeing him/her. Do not stop resuscitation until medical help arrives.

Electric Cords

- Power cords should not be overly bent or kinked, as this can crack the insulation exposing students to the danger of electrical shock or burn.
- Electrical cords and plugs must be inspected routinely to identify cracked insulation or broken plugs.
- Any equipment found with damaged cords or plugs must be removed from service until it is repaired.
- Wrapping broken insulation with electrical tape is not an acceptable repair method.
- Electrical cords cannot be run across floors, under rugs, through walls, doors, windows, over ceiling tile or around sharp edges or corners where they can be damaged or cannot be inspected for damage.

Surge Protection

The use of surge protection is recommended for all electrical equipment in all labs. These should have internal fuses and cannot be plugged into one another in series.

Ground Fault Circuit Interrupters (GFCI)

GFCIs should be installed on outlets located near wet areas such sinks, showers, wash down areas, etc. A GFCI is a fast acting device that interrupts current to protect against shocks and accidental electrocution. Freezers, refrigerators, and other important lab equipment that require continuous power should not be plugged into GFCI outlets. GFCIs sense very small current leakages to ground and will shut off the electricity to that outlet.

4.8. Important Numbers

In the event of a major emergency it is important to alert the proper authorities immediately. In order to contact off-campus emergency personnel, use any of the telephones located in all faculty and staff offices. The emergency numbers are: 112 (Police), 175 or 125 (Fire), & 140 or 125 (Emergency Medical Service), 2424 or Ext 490 (Campus Safety and Security).

5. SAFETY RULES AND REGULATIONS

All laboratory experiments have been designed with students' safety as top priority. Unforeseen

events may occur and lead to circumstances that are potentially dangerous. In such cases, using common sense and prompt and correct response reduces potentially serious injuries. To avoid potentially dangerous accidents, students shall:

- ◆ Never be left in the labs alone
- ◆ Use lab equipment carefully and appropriately
- ◆ Not tamper with any equipment
- ◆ Be familiar with their experiments, their work area
- ◆ Never leave their experiments unattended
- ◆ Inquire before taking any step they are not sure about
- ◆ Behave responsibly and move around lab equipment with caution
- ◆ Always exercise caution and good judgment
- ◆ Use common sense
- ◆ Pay attention to all instructions
- ◆ Be aware of their surroundings
- ◆ Be aware that heating or soldering elements may potentially cause serious injury and burn
- ◆ Never bring heating or soldering elements in contact with fingers, clothing, power cords, or any chemicals
- ◆ Never use matches or lighters in Labs without prior authorization
- ◆ Familiarize themselves with the location of First Aid kits and fire extinguishers

Irresponsible or reckless behavior in the laboratory can be dangerous, and thus will not be tolerated.

Buddy System

For safety reasons, no lab member is allowed to work alone in the lab at any time. There may be occasions (such as night, over a weekend) when there are no other people working in the lab. If you plan to work during a time when the lab might be expected to be closed or empty, please plan ahead and coordinate your work schedule with another lab member. This way, you can be sure to have a buddy and can work safely.

6. LABS USAGE RULES

The Lab is a space for inquiry and learning. Users of lab resources and facilities must follow the following guidelines and rules.

1. Know and obey published safety rules and regulations; rules ensure integrity of the process.
2. Do not smoke, eat, or drink; these activities are not compatible with a lab environment and are safety hazard.
3. Set your cell phone to the silent mode; it disturbs the concentration of others.
4. Take the high moral grounds; disruptive behavior puts people and property at risk, contradicts with intellectual expression, and leads to nowhere.
5. Use Lab resources responsibly and for the purposes set by the Instructor; unauthorized use may damage the equipment and cause harm.
6. Do your job and help other do theirs; do not install/uninstall software, change the settings or configurations, or move any lab equipment around.
7. Do not download, develop, or distribute malicious software and obscene material; such materials diminish the human spirit and are morally repulsive.
8. Restore workbench and its equipment to its original condition when the work is completed; clean up the workbench, remove personal belongings, and turn power off and restore all pieces of equipment to their original state and location.
9. Do not remove lab equipment, tools, computers, and furniture from the lab without prior approval from the labs supervisor; lab equipment is not yours they belong to all.
10. Submit all inquiries, requests, and concerns related to lab conditions and equipment and report to the labs director; your input helps improve lab conditions.
11. Report any missing/malfunctioning/damaged equipment, furniture, and/or computers to the labs supervisor.

Appropriate disciplinary actions shall be levied against those who fail to obey rules and follow guidelines.

7. GENERAL LAB PROCEDURES

Labs are an integral part of the teaching/learning process. To guarantee labs continuity and readiness, it is of utmost importance that the following lab procedures are strictly adhered to:

1. A Lab use schedule is prepared by the Labs supervisor and approved by the concerned faculty members prior to the beginning of every semester based on the published course timetable and other pre-scheduled events.
2. Lab instructors must report about problems with lab equipment and/or computers in writing immediately as they are identified. Report forms are included herewith.
3. Lab instructors shall coordinate with the Labs supervisor and faculty advisor concerning any special needs 24 hours ahead of their scheduled session.
4. At the very 1st lab session, instructors should: distribute copies of the “Laboratory Policies & Procedures”, explain them to the students and enforce them thereafter. Each student must sign the **Laboratory Safety Agreement** form and pass the **Safety Competency Test** before he/she is allowed the privilege of using the lab.
5. Students may be allowed to use the labs after-hours under supervision and only after approval of instructor’s formal request. Students using the Labs after-hours must fill the After-Hours Student Sign-In Sheet.
6. Inappropriate usage and misconduct shall be reported using the appropriate forms. Such behavior may prevent students from future lab use as well as subject them to disciplinary actions in accordance to university rules and regulations.

Please refer to attached appendices for a detailed list of Lab use rules and lab forms.

8. DAY-TO-DAY LAB USE PROCEDURES

Lab Instructors shall:

- ◆ Maintain and ensure the wellbeing of the labs they use.
- ◆ Ensure that students obey the Lab use rules and safety procedures.
- ◆ Closely coordinate with the lab supervisor on all operational matters.
- ◆ Report any problems with equipment or safety concerns for remedial action.

1. During a lab session

Smoking, eating and drinking are strictly prohibited since they violate fundamental safety guidelines. Offenders exposing themselves, their colleagues, and the equipment to serious risk, and hence:

- a. Will be expelled from the lab premises immediately
- b. Will be reported to the Faculty Disciplinary Committee for action.

2. After a lab session: The lab instructor is expected to:

- a. Make sure the lab is left in a clean and tidy manner by asking every student to:
 - i. Properly shut down his computer and turn off his screen
 - ii. Turn off his equipment
 - iii. Clear all his personal belongings from his workbench and leave his work area in a clean and tidy state.
 - iv. Return all used equipment and tools to their original locations.
 - v. Return his chair to where it belongs.
 - vi. Remove any litter from desk or floor.
- b. Inspect the student’s desk and work area before allowing him to leave the lab

- c. Promptly report any damage or misuse.
 - i. A Report form (present in the lab) must be filled and returned to the Labs Supervisor immediately.
 - ii. Intentional offenders will be subjected to immediate action in accordance with the university rules on student misconduct.
 - d. Turn off the LCD projector (where available)
 - e. Turn off the lights and air-conditioning units.
 - f. Wait till assistant locks the lab door. An unlocked lab should never be left unattended.
3. **Before Leaving the lab.** Before locking the lab door, the Lab instructor is expected to:
- a. Return all equipment to their storage.
 - b. Turn all computers off and restore equipment to its normal configurations.
 - c. Require users to remove any litter or personal effects.
 - d. Turn off lights, projectors, and AC units.
4. **Additional notes**
- a. Students are welcome to use the Labs outside class hours provided that the approvals of the Lab Instructor and of the Labs supervisor are obtained through the instructor. After-hours users of the Labs will be supervised by Lab Assistants and are required to sign-in and sign-out.
 - b. No equipment or lab tool may be removed from any Lab without the written approval of the Labs Supervisor.

9. INTERNET & NETWORK ACCESS RULES AND USAGE POLICY

RHU allocates network access and resources to its faculty, staff, and students. Use of the network must be conducted in compliance with the applicable rules set forth in this policy. Computer and internet access privileges are granted as long as the Access Rules and Usage Policy are respected and RHU's vested interests are not compromised.

Access Rules and Policies

- I. All lab computers, network equipment, and/or available software, are the sole property of RHU. Users are given access to the network to carry out their work within the confines of the Rules and Usage Policy listed below. Users are not to attempt access to systems and/or applications which may jeopardize the entire network, or any of its servers in any way. All users are prohibited from carrying out any of the following activities for any reason whatsoever.
 - 1. Disconnecting, removing, and relocating any PCs and/or network equipment from any laboratory.
 - 2. Installing/uninstalling software and/or equipment (such as printers, scanners, etc.) in/from any laboratory computers.
 - 3. The use of any equipment requiring special software installation.
 - 4. The playing of audio or video files without the use of headphones.
 - 5. The download, creation, and/or distribution of viruses, worms, spyware, or any kind of malicious software, which is considered an act of vandalism. Such unacceptable misconduct will result in suspension of access privileges. Repeat offenders may face further disciplinary actions.
 - 6. The download and distribution of racially offensive or pornographic material. Offenders will be subjected to immediate disciplinary actions.
 - 7. Network configuration.
- II. Violators of the Network Access Rules and User Policy may be subject to disciplinary actions which, depending on the severity of the violation, may range from a verbal/written warning,

removal of system access for a specific period of time, termination of access privileges, to heavier disciplinary actions such as suspension and fines.

10. PROCUREMENT OF LAB HARDWARE AND SOFTWARE

- i. Software and hardware purchasing needs must have been anticipated and budget appropriations have been made in advance.
- ii. Requests to purchase budgeted lab software or hardware should be made by submitting the software (or hardware) request form.
- iii. The labs director makes his/her comments and submits all requests to the Department Labs Committee for consideration.
- iv. The recommendations of the Labs Committee are forwarded to the Dean through the Departmental Chairperson for final approval.

11. RELATED FORMS

Cooperation between Lab instructors and the Labs department is essential to keep the labs running as smoothly and efficiently as possible. Close supervision and diligence are essential to prevent abuse of the equipment and of the labs. A few simple forms have been designed to keep the process of managing lab requests simple and easy to follow:

1. The ***Equipment Condition Report Form*** is to be used to report missing, malfunctioning, or damaged equipment, furniture, and/or computers.
2. The ***Service Request Form*** is to be used to request maintenance or repair services on malfunctioned lab equipment.
3. Special lab requests and concerns should be made by submitting the ***Lab Resources Request Form*** and promptly forwarded to the Labs Director.
4. The Lab usage ***Misconduct Report Form*** is submitted to the Department Chairperson for appropriate action.
5. Students wishing to use the labs after-hours should ask their instructor to fill the ***After-Hours Lab Usage Request Form*** and forwards it to the Labs supervisor at least 24 hours prior to the intended time slot in question. All students using the Labs after-hours must fill the ***After-Hours Student Sign-In Sheet***.

EQUIPMENT CONDITION REPORT FORM

This form must be filled by the lab instructor/supervisor to report change in lab conditions that needs attention. Please return the form to the Labs director for further action.

Report category	Equipment affected	Room #
<input type="checkbox"/> Missing items		
<input type="checkbox"/> Damaged items		
<input type="checkbox"/> Malfunctioned items		
<input type="checkbox"/> Maintenance needed		
Reported by		Date

If wrong doing is the reason for the report please give the names of individuals who allegedly committed the infraction that caused the problem reported.

Please specify the nature of misuse that caused the problem (if applicable)	
Name of offending party (if applicable)	Student Number
1.	
2.	
3.	
Signature	Date

Action taken by the Lab Director
Signature:
Date:

SERVICE REQUEST FORM

This form must be filled by the lab instructor/supervisor to request services needed in a lab.
Please submit the form to the Labs Director for further action.

Service needed	Equipment affected		Room #
<input type="checkbox"/> Maintenance			
<input type="checkbox"/> Repair			
<input type="checkbox"/> Installation	<input type="checkbox"/> Hardware ()	<input type="checkbox"/> Software ()	
<input type="checkbox"/> Maintenance needed	<input type="checkbox"/> Hardware ()	<input type="checkbox"/> Software ()	
Priority Level			
<input type="checkbox"/> Normal		<input type="checkbox"/> Urgent	
Please describe the nature of the service requested			
Requested by			Date

LAB RESOURCES REQUEST FORM

This form is to be filled by the faculty member requesting new lab resources.

The form is submitted to the Department Chairperson for further action.

The Lab for which the resources are requested						
Room #						
Item #	Type of Resource⁽¹⁾	Supplier	Cost/unit	Qty	Total cost	Purpose⁽²⁾
Justification: 						
Priority Level			<input type="checkbox"/> Normal		<input type="checkbox"/> Urgent	
Requested by					Date	
Lab Supervisor comments 						
Approval of the Chairperson Signature: Date:						

⁽¹⁾ PC, sensor, data acquisition, trainer, software, etc.

⁽²⁾ Teaching, research, or FYP

MISCONDUCT REPORT FORM

This form is to be completed by the labs instructor/engineer to report violations of lab rules by users. The form is to be submitted to the Labs Director for further action.

The Lab in which the violation occurred			
Room #			
Date of occurrence			
Involved individuals			
Name	ID		
Reported by		Date	
Description of the violation:			
Comments			
Labs Director			
Comments:			
Recommended Action:			
Signature:		Date:	

AFTER HOURS LAB USAGE REQUEST FORM

This form is to be filled out by students who wishes to use a lab after normal operating hours. The Labs Director makes appropriate decision in conformity with safety rules.

The Lab to be used			
Room #			
Date			
After Hours Work			
Name of students			
Name	ID	Mobile #	
Reasons to work after hours:			
Labs Director comments and decision:			
Signature:			
Date:			

AFTER HOURS SIGN UP SHEET

This form is to be filled out by students who wishes to use a lab after normal operating hours. The Labs Director makes appropriate decision in conformity with safety rules.

Lab in use after hours		
Room #		
Date		
After Hours Work		
Name of students		
Name	Time in	Time Out
Report of accidents/equipment malfunction/etc.		
Labs Director comments:		
Signature:		
Date:		