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I. General regulations

1. Purpose and scope

1.1. Purpose

- Provide a comprehensive framework for safe practices in all university laboratories. It defines protocols for lab access, hazardous material handling, maintenance, and emergency response.
- Promote a safe working environment by defining responsibilities, outlines safety regulations, and providing common accident response guidelines, while also supports the fair and efficient use of institutional resources, including facilities, equipment, and supports staff for scheduled activities.

1.2. Scope

- Apply to all faculty, staff, researchers and students of VinUniversity engaged in activities within laboratory and research facilities.
- Compliance is mandatory to ensure a safe and legally compliant environment.

2. Responsibilities Hierarchy

2.1. Dean/Vice Dean of College

- Ensure compliance with university safety policies in all laboratories.
- Provide resources and support for laboratory safety initiatives.
- Appoint qualified personnel for lab director/manager position.
- Address any risk or incident that exceeds the Lab Director's authority.

2.2. Laboratory Director

- Be responsible for all matters related to the laboratories and report directly to the Dean/Vice Dean. Escalate any risk or incident that exceeds the Lab Director's authority.
- Oversee the overall safety, compliance, and operational strategy of the labs.
- Coordinate with other units on lab-related resource planning and safety improvements.

2.3. Laboratory Manager

- Implement and enforce safety procedures in all laboratories under Lab Manager's supervision.
- Ensure compliance with the Laboratory Safety Manual.
- Train and supervise students, staff, and researchers on safety practices.
- Maintain Emergency Action Plans and first aid supplies.
- Conduct regular safety inspections and maintain training records.
- Review and update the Laboratory Safety Manual.
- Report safety issues and recommend improvements.

2.4. Laboratory Technician/Coordinator

- Assist faculty in laboratory lesson setup.
- Responsible for maintaining all teaching laboratory operations.
- Ensures availability and safety of chemicals/reagents and supplies (laboratory use).
- Take part in procurement for all teaching labs.
- Responsible for maintaining lab equipment and calling appropriate companies for equipment repair.
- Ensure general upkeep of the laboratories. Conduct routine safety checks and report issues.
- Support students and faculty with safe equipment use.

2.5. Faculty/Supervisor

- Ensure students follow safety protocols during experiments.
- Provide clear instructions on safe procedures.
- Supervise student activities to ensure adherence to safety procedures.
- Ensure safety signage and equipment are appropriately used during instruction
- Report safety concerns to the Laboratory Manager.

2.6. Students/Post-doctoral Fellows/Staff/Research Faculty

- Follow all laboratory safety rules and instructions.
- Use personal protective equipment (PPE) as required.
- Report any accidents, spills, or unsafe conditions.
- Successfully complete all required safety training prior to engaging in lab activities.

- Immediately inform supervisor of any injuries or hazards

3. General Safety Regulations in Laboratories

3.1. General safety rules

Section	Safety Practices
Personal Protection and Dress Code	<ol style="list-style-type: none"> 1. Always wear appropriate PPE (laboratory coats, safety goggles, gloves, and closed-toe shoes, ...) as required for the task. 2. Use additional PPE (face shields, respirators, aprons, ...) as necessary depending on the experiment. 3. Regularly inspect PPE for damage and replace defective items. Report any damaged PPE to the laboratory manager. 4. Secure long hair, avoid loose clothing, and store personal items outside the work area.
General Hygiene and Cleanliness	<ol style="list-style-type: none"> 1. Maintain proper hand hygiene: wash hands before and after laboratory work and each time gloves are removed. Ensure PPE and gloves are removed before exiting the laboratory. 2. Store personal belongings (bags, books, mobile phones) in designated areas. 3. Keep work areas clean, promptly clean spills, and ensure clear pathways. 4. Dispose of waste properly (chemical, biological, or sharps) in designated containers. 5. Prohibited Actions: no eating, drinking, smoking, horseplay, or unauthorized experiments. 6. Maintain clean and clutter-free workspaces. Clean tools and equipment after use. 7. Store glassware, chemicals, and equipment in designated locations. 8. Ensure all lights, gas, and electrical devices are turned off before leaving.
Behavior and Conduct	<p>All laboratory users must comply with <u>Staff Code of Conduct - VinUni Policy</u> and specific regulations below:</p> <ol style="list-style-type: none"> 1. Only trained individuals may operate laboratory equipment. Complete safety training before use. 2. Regularly inspect equipment before use and report any malfunction. 3. Maintain a usage log for shared or high-risk equipment. 4. Return equipment to designated storage areas after use.
Chemical and Material Handling	<ol style="list-style-type: none"> 1. Label all chemicals with names, concentrations, and hazard symbols, preparation and expiry dates (if any). 2. Store chemicals according to hazard class (flammable, corrosive, toxic) in designated cabinets. 3. Use fume hoods for volatile substances. Minimize direct contact with chemicals. 4. Always wear appropriate PPE and immediately change gloves after handling hazardous materials. 5. Dispose of chemical waste is detailed in section 3.3.
Training, Compliance, and Reporting	<ol style="list-style-type: none"> 1. Complete the Laboratory Safety Induction and sign the Safety Induction Form before use, if applicable. 2. Adhere to all safety regulations and instructions from the laboratory manager. 3. Report any unsafe behavior or conditions immediately.

3.2. Chemical storage

3.2.1. Evaluate chemical hazards for storage

Hazards due to the reactions between incompatible chemicals may include:

- Generation of heat
- Fire
- Explosion
- Toxic gas or vapor production
- Flammable gas or vapor production
- Formation of a substance with greater toxicity than the reactants
- Formation of shock- or friction-sensitive compounds
- Pressurization of closed vessels
- Solubilization of toxic substances
- Dispersal of toxic dusts and mists
- Violent polymerization

The general approach is to separate all chemicals into compatible groups. The specific Safety Data Sheet

(SDS) should always be consulted when evaluating chemical properties and hazards of the materials for storage. Most chemicals have multiple hazards; decisions should be prioritized as follows:

No.	Hazards	Instructions																																
1	Flammability	<p>The most important consideration for storage is the flammability characteristic of the material. If the chemical is flammable, it should be stored in a flammable cabinet. If the total for flammables exceeds quantity limits as table below, they must be stored in a flammables cabinet.</p> <p><i>Flammability Limits of Certain Chemicals</i></p> <table> <tr> <th rowspan="2">Chemical</th><th colspan="2">Flammability Limits (% volume in air)</th></tr> <tr> <th>Lower (LFL)</th><th>Upper (UFL)</th></tr> <tr> <td>Acetone</td><td>4</td><td>60</td></tr> <tr> <td>Benzene</td><td>1.3</td><td>7.1</td></tr> <tr> <td>Carbon disulfide</td><td>1.3</td><td>50</td></tr> <tr> <td>Diethyl ether</td><td>1.9</td><td>36</td></tr> <tr> <td>Ethanol</td><td>3.3</td><td>19</td></tr> <tr> <td>Methanol</td><td>6.7</td><td>36</td></tr> <tr> <td>Methyl ethyl ketone</td><td>1.8</td><td>10</td></tr> <tr> <td>Pentane</td><td>1.5</td><td>7.8</td></tr> <tr> <td>Toluene</td><td>1.2</td><td>7.1</td></tr> </table>	Chemical	Flammability Limits (% volume in air)		Lower (LFL)	Upper (UFL)	Acetone	4	60	Benzene	1.3	7.1	Carbon disulfide	1.3	50	Diethyl ether	1.9	36	Ethanol	3.3	19	Methanol	6.7	36	Methyl ethyl ketone	1.8	10	Pentane	1.5	7.8	Toluene	1.2	7.1
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2	Reactivity	If the material will contribute significantly to a fire (e.g., oxidizers), it should be isolated from flammables. If the material will contribute significantly to a fire when water is applied (e.g., water reactive chemicals), it should be stored to ensure it is protected from any contact with water, including water that would be applied while extinguishing a fire in the lab. Isolate materials that can react with themselves (e.g., polymerization).																																
3	Corrosives	Corrosive substances are chemicals that cause a reaction that lead to the damage of a solid structure. A material is considered corrosive if a liquid or solid causes irreversible destruction of human skin at the site of contact within a specified period. Review the corrosivity of the material and store accordingly.																																
4	Toxicity	The toxicity of the material, with particular attention paid to regulated materials, means that certain chemicals will be isolated within a storage area. For example, an extreme poison that is also flammable should be locked inside the flammable storage cabinet.																																

3.2.2. Chemical storage practices

Establish and follow safe chemical storage and segregation procedures for your laboratory:

- Provide an appropriate storage place for each chemical and return the chemical to that location after use.
- Store in compatible containers.
- Incompatibles must not be stored together.
- Avoid storing chemicals on bench tops.
- Avoid storing chemicals in laboratory fume hoods.
- Store volatile toxics and odoriferous chemicals in a ventilated cabinet.
- Do not expose stored chemicals to heat or direct sunlight.
- Storage shelves should be level, stable, and secured to the wall or stable surface.
- Containers should not protrude over shelf edges.

- Store heavy bottles on lower shelves; store corrosives below eye level; ideally, cabinets and shelves should be sturdy and low to the floor and constructed of material that is impervious (i.e. non-reactive) with the corrosive; they should also be ventilated or located near the ventilation system.
- Containers of chemicals must be capped when not in use; make sure that caps on containers are secure; replace damaged caps.
- If a chemical does not require a ventilation cabinet, store inside a closable cabinet or on a shelf that is anchored and that has a lip to prevent containers from sliding off.
- Chemicals should not be stored under, near, or in the sink to minimize the chance of accidents and improper discharges to the sanitary sewer. Any vapors of corrosive materials and bases will cause corrosion of the plumbing fixtures under the sink. Some chemicals, including many corrosives, are water reactive and in the event of a water leak, there can be unanticipated and unfortunate consequences.
- Do not store chemicals in hallways, corridors or exit ways.
- If chemicals must be stored adjacent to each other on a benchtop, use secondary containment to prevent incompatible chemicals from mixing and reacting with each other.
- Use secondary containment or spill control, such as placing the container on an absorbent pad (generally required for containers on the floor).
- Particularly hazardous substances (highly dangerous or toxic chemicals, select carcinogens, mutagens, and teratogens) should be stored together if compatible.
- Signs should be posted indicating toxic chemical location and unique hazards.
- Maintain the lowest possible quantities of highly toxics.
- Chemicals with a high degree of toxicity (e.g., venoms, mycotoxins, and select agents), should be doubly contained and stored in a locked area accessible only by authorized personnel.
- Use containers that are chemically resistant and non-breakable.
- Store chemical wastes
 - ✓ Waste containers (if necessary) must be labeled. If reusing a container that previously held another compatible chemical, the original manufacturer's label must be defaced. For more information about chemical waste (See section **3.3 Chemical Waste Disposal**) of this regulation.
 - ✓ Use properly designed refrigerators or freezers for storing volatile flammables (certified by the manufacturer for flammable materials storage) which require refrigeration. Explosion-proof appliances are usually not required for the typical laboratory setting

Chemical Storage Recommendations:

Flammables	Store in approved safety cans or cabinets. Do not store incompatible materials in the same cabinet. Keep away from any source of ignition: heat, sparks, or open flames. Flammable solids must be segregated from flammable liquids.
Acids	Do not store with flammable solvents or combustibles. Ideally, store in a cabinet designed for acids; do not store acids on metal shelving. Segregate inorganic from organic acids. Isolate nitric acid and perchloric acid from everything; including other perchlorics.
Bases	Store in corrosives cabinet or on protected shelving away from acids. Segregate inorganic from organic bases.
Light Sensitive Chemicals	Store in amber bottles in a cool, dry, dark place
Nitrated Compounds	Nitrated compounds can be considered explosive; special care and handling may be required
Oxidizers	Store in a cool, dry place away from flammables and reducing agents. Oxidizers must not be stored on wooden shelves or in cardboard boxes.
Peroxidizable Chemicals	Store in airtight containers in a dark, cool place. Most peroxidizable compounds are flammable and should be stored in a flammable liquid storage cabinet. Label containers with receiving and opening dates. Test for the presence of peroxides at least every six months. Discard before exceeding expiration date. Inspect peroxide forming chemicals often for evidence of contamination, degradation, or any change from normal physical or chemical characteristics.
Pyrophoric Substances	Store in a cool, dry place, making provisions for an airtight seal. Materials will react with the air to ignite when exposed
Toxic Chemicals	Store according to the nature of the chemical, using appropriate security where necessary. Generally, store in a ventilated, dry, cool area in a chemically resistant secondary container

Water-Reactive Chemicals	Store in a cool, dry location away from any water source, including sprinkler systems. Have a Class D fire extinguisher available in case of fire.
General Chemicals	Store on laboratory benches or shelves.

3.2.3. Chemical labeling for storage

No.	Targets	Instructions
1	Original container	The label on an original chemical container must be legible. It must include the chemical/product name as shown on the SDS and the manufacturer's name and address. Do not accept materials if the label is illegible or missing required information. Labels on chemicals/products shipped from the manufacturer must be consistent with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as required 6 elements: <ul style="list-style-type: none"> ○ Product name ○ Manufacturer's name and contact information. ○ Signal word (e.g., "danger", "warning" or no signal word) ○ Hazard statement(s) (e.g., toxic if inhaled, combustible liquid) ○ Pictogram(s) ○ Precautionary Statements (e.g., keep container tightly closed) Avoid damaging the original container's label, if possible. If a container label becomes illegible, replace the label.
2	Stock/working solutions	Containers of preparations, sample aliquots and other working solutions are not required to be labeled if the container will be emptied before the end of practical lessons. If a preparation or working solution is used by others, or kept longer than the day of use the container must be labeled with the following information: <ul style="list-style-type: none"> ✓ Identity of the contents (spell out chemical names) ✓ Signal word, if known or suspected (e.g., "danger", "warning") ✓ Hazards, if known or suspected (e.g., "flammable", "corrosive", "irritant"). It is best practice to label the working solution with the initials of the person preparing the solution and the date of preparation.
3	Waste containers	Waste containers must be labeled following the guidelines in this regulation, for hazardous chemical waste. If re-using a container to hold waste, the container must be compatible and appropriate for the waste. Completely deface all old labels on containers used for wastes. Affix a new label.

3.3. Chemical waste disposal

If laboratory personnel generate chemical waste, they must be able to instruct or determine whether their chemical wastes are hazardous by using the guidelines in this chapter. For hazardous waste, they must identify the hazards of the waste and follow accumulation rules, which include labeling, storage and handling requirements. They must know how to request collection of hazardous waste, as well as the rules for disposal of chemicals and contaminated items to trash and sanitary sewers. They must prevent the accumulation of legacy chemicals and inherently waste-like chemicals (defined in section 3.3.2) by cleaning out their chemical inventory on a regular basis.

In order to determine whether or not your chemical is hazardous, use your knowledge, the chemical's original label and/or the chemical's Safety Data Sheet (SDS) to determine if the waste is corrosive, flammable, toxic, reactive, persistent in the environment and/or mutagenic or carcinogenic.

3.3.1. Hazardous waste accumulation rules

Follow the below rules for hazardous chemical waste accumulation:

No.	Targets	Instructions
1	Appropriate container	Accumulate waste in an appropriate container compatible with the waste. You may reuse containers, even containers that were used for other chemicals, if they have been rinsed and the original labels have been defaced (note that the rinsate may be hazardous waste) Containers designed for solid chemicals should not be used for liquids. Use only containers that show no sign of damage or deterioration. You must use containers with screw top closures. Waste containers must remain closed, except when you are adding waste. Use spring-loaded funnels for adding waste frequently to waste containers. Syringes, vials, or small items containing chemicals should be placed in secondary containment for collection. Finally, do not fill the containers completely. Each container should not be more than

		$\frac{3}{4}$ full to allow for pressure changes due to changes in temperature. Request collection of your waste ahead of time to avoid overfilling your containers.
2	Hazardous waste label	<p>Label the container using the Hazardous Waste Label. If you do not know the hazards of your chemical, use the Material Safety Data Sheets of the chemical to determine what they are. Do not date the container or label. Deface or remove any original labels remaining on the container to avoid confusion about the identity of the waste. Waste must be under the control of the individual(s) generating the waste. The waste should be in a physically safe area (e.g., not on a windowsill.) Waste chemicals may be stored with unused chemicals as long as the containers are properly labeled, and your laboratory personnel know the storage location.</p> <ul style="list-style-type: none"> ○ Do not accumulate large amounts of waste in the fume hood. Use flammable liquid storage cabinets for flammable waste over ten gallons in volume. ○ Store waste away from emergency equipment, such as safety showers and emergency access panels; do not block exits. ○ Do not store the waste near or in sinks. If the waste is stored in an area that drains to a floor drain, the waste must be in secondary containment.
3	Segregation	Segregate regulated chemical waste by chemical compatibility. Refer to the segregation guidelines in Section 3.2.2 of this regulation. Use secondary containment (tubs, basins or buckets) for segregation of incompatible wastes accumulated in the same area.
4	Accumulation volume limits	<p>Accumulate no more than 200 liters (55 gallons) of chemical waste per waste stream or one liter (one quart) of extremely hazardous waste per waste stream. Chemical waste must not be stored for more than one year. Leave some head space (at least one inch) in each container to allow for pressure changes due to changes in temperature. Extremely hazardous waste is waste that is highly toxic, and the one-liter limit is designed to limit risk, especially in the event of a spill.</p>

3.3.2. Inherently waste-like chemicals

Inherently waste-like chemicals include expired chemicals, chemicals in deteriorating containers and chemicals that appear to be, or are, unusable. Do not keep chemicals past their expiration date and conduct cleanouts when doing your annual chemical inventory update.

3.3.3. Hazardous waste collection requests

In case of necessity, VinUniversity will collect hazardous chemical waste from the laboratories and a certificated company will be in charge of waste collection and treatment. To avoid problems, plan ahead and request collection before the containers are full.

3.3.4. Trash disposal

Non-hazardous solid chemicals can go in the trash. Irritants, sensitizers and known, probable, or suspected carcinogens cannot go in the trash. Deface labels, bag, and label non-toxic chemicals as “non-hazardous.” Liquids and pressurized containers, like non-empty aerosol cans, can never go in the trash. Uncontaminated and slightly contaminated items such as gloves, paper towels and empty containers can go in the trash. It recommends double bagging and labeling these items as nonhazardous if there is evidence of contamination. Manage very contaminated items, such as spill cleanup materials, as hazardous waste. In addition, empty containers for extremely toxic chemicals are hazardous waste unless you triple rinse them and dispose of the rinsate as hazardous waste.

No.	Targets	Instructions
1	Chemical wastes	<p>The following are prohibited in the trash because of their chemical or physical hazards:</p> <ul style="list-style-type: none"> ○ Hazardous chemical waste as defined earlier in this section. ○ Known, probable or suspected carcinogens, irritants and sensitizers (see SDS to determine if chemical is any of these) ○ Free liquids of any type ○ Pressurized vessels (including non-empty aerosol cans) ○ Laboratory glass and sharps ○ Radioactive waste ○ Batteries ○ Mercury (including thermometers) ○ Biohazardous waste <p>To throw away chemicals that are not prohibited in the trash, deface any labels, securely double bag it, and label it “non-hazardous” so that custodial staff know it is safe for them to handle the trash.</p>

2	Empty chemical containers	<p>Empty chemical containers may still contain enough chemicals in them to present a hazard to custodial staff. On the other hand, it can be difficult to completely empty a container. The legal interpretation of the word "empty" acknowledges this difficulty. A container is legally empty when both of the following are true:</p> <ul style="list-style-type: none"> ○ Contents have been removed by normal, such as inverting and draining, shaking, scraping, or scooping. ○ No more than three percent of the contents remain. If the chemical is extremely hazardous waste or a pesticide marked with danger or warning labels, then the container must be triple rinsed before it is legally empty. The rinse from this process is also considered hazardous waste by law. If your chemical is a known or suspected carcinogen, we strongly recommend that you triple rinse the container. <p>It is not allowed to dispose of hazardous waste by leaving non-empty containers of chemicals in the fume hood, or elsewhere, to evaporate the chemical. If you choose to dispose of the empty container, do the following:</p> <ul style="list-style-type: none"> ○ Dry the empty container, preferably in a fume hood. Ensure that there are no sources of heat or open flame in the fume hood when drying containers that contained flammable chemicals. ○ With a pen or marker, cross out the labels on the container: Leave the container uncapped; throw the cap away separately. ○ If the container fits in the trash can, place it there; if it does not fit in the trash can place it next to the trash. ○ Do not leave empty containers in public areas, such as hallways or loading docks, unless you have made an agreement with a waste treatment company for pickup services. Consider reusing the empty container for accumulation of waste for that same chemical or other compatible chemicals. If you reuse a container, deface or remove the label on the container and then fill out and affix a hazardous waste label to the container.
3	Contaminated items	<p>Used gloves and other commonly used items (besides empty containers) can be placed in the trash if they are not grossly contaminated with hazardous chemicals. If you have an item that is grossly contaminated dispose of it as hazardous chemical waste. Examples of grossly contaminated items include used spill clean-up materials, items such as gloves and equipment contaminated from a spill, and used equipment that contains hazardous chemical residue. We encourage you to collect items that look like they might be contaminated by chemicals, such as weighing papers and gloves, in bags and then label the bags "non-hazardous waste" before you place them in the trash. Custodial staff members are sometimes understandably nervous when handling laboratory trash; a white residue or a few drops of water in the trash could be a dangerous chemical. Taking an extra step to bag these items can be a nice gesture.</p>

3.4. Fire and explosion safety regulations

Please refer to **Regulations on handling fire incidents**.

3.5. Laboratory Risks, Hazards and Safety Measures

Hazard Type	Key Risks	Safety Measures
Chemical Hygiene	<ul style="list-style-type: none"> • Exposure to toxic chemicals (acids, bases, organic solvents), chemical spills • Explosions due to chemical reactions, • Inhalation of toxic vapors. 	<ol style="list-style-type: none"> 1. Use a laboratory with a good ventilation system (fume hood). 2. Wear PPE (nitrile gloves, safety goggles, lab coat). 3. Store chemicals in designated cabinets, categorized by type (acids separate from bases). Avoid storage under sinks or in fume hoods. Use flammable cabinets for volatile substances. Secure shelves and keep heavier items low. 4. Regularly inspect fire extinguishers, emergency shower, and emergency eye wash stations (once per month).

		5. Use designated waste pickup services. Never dispose of hazardous materials via sink or trash.
Biosafety	Exposure to biological agents such as bacteria, viruses, and other infectious materials.	<ol style="list-style-type: none"> 1. Prohibited Actions: mouth pipetting, eating, drinking, or cosmetic application in biohazard areas. 2. PPE Usage: Gloves and certified safety eyewear are mandatory when handling blood, bodily fluids, or contaminated surfaces. Choose PPE based on anticipated exposure. Regular eyeglasses are not acceptable eye protection. 3. Biohazardous Waste Management <ul style="list-style-type: none"> • Sharps: Use puncture-proof, yellow labeled sharps containers. Seal and dispose once per month or when $\frac{3}{4}$ full. • Liquid Waste: Pre-treat with disinfectant or autoclave before sink disposal. Use non-breakable containers. • Solid Waste: Use biohazard bags in leak-proof containers. Autoclave or incinerate via vendor. Clearly label all materials to avoid custodial exposure. 4. Working with GMOs <ul style="list-style-type: none"> • Before conducting any research involving GMOs, it is necessary to assess the potential risks to human health and the environment. • Based on the level of danger of GMOs, appropriate control measures should be taken. • Waste from GMO labs must be treated according to special procedures to ensure that it does not pollute the environment or infect humans.
Fire/ Explosion	Fire is a major lab hazard. While training reduces risks, personnel must be prepared. Small bench-top fires are common; large fires are rare but dangerous due to flammable materials and toxic fumes. Labs using solvents risk flash fires, explosions, and rapid fire spread.	<p>Laboratory personnel should be trained at hire to do the following to prevent fires:</p> <ol style="list-style-type: none"> 1. Have a written emergency plan for your space and/or operation. 2. Minimize material quantities. Only essential personnel should be in the immediate work area. Use only the minimum quantities necessary for work in progress. Not only does this minimize fire risk, but it also reduces costs and waste. 3. Observe proper housekeeping. Keep work areas uncluttered, and clean frequently. Put unneeded materials back in storage promptly. Always keep aisles, doors, and access to emergency equipment unobstructed. 4. Observe restrictions on equipment. 5. Wear proper clothing and personal protective equipment. 6. Avoid working alone. 7. Store solvents properly in approved flammable liquid storage cabinets. 8. Shut the door behind you when evacuating. <p>Limit open flame used to under fume hoods and only when constantly attended. Keep combustibles away from open flames. Remember the “RACE” rule in case of a fire: R= Rescue/remove all occupants A= Activate the alarm system C= Confine the fire by closing doors</p>

		<p>E= Evacuate/Extinguish.</p> <p>9. Annual retraining in fire prevention and fighting practices for laboratory staff.</p>
Electrical	<ul style="list-style-type: none"> • Electric shock occurs when the body becomes part of an electrical circuit. This can happen by: <ul style="list-style-type: none"> • Touching both conductors in a circuit. • Providing a path between an ungrounded conductor and the ground. • Touching grounded material that contacts an ungrounded conductor. • Wet conditions greatly reduce the body's resistance and increase shock risk. 	<ul style="list-style-type: none"> • Strictly follow the safety guidance by each laboratory. • When electric shock happens, please do the following sequences: <ul style="list-style-type: none"> • Don't touch the person if they are still in contact with the electrical source. • Switch off the main power supply if it is safe and accessible. • Call for emergency help. • Check for breathing and pulse; begin CPR if trained and necessary until medical personnel arrive • Do not move the victim unless necessary • Document and report the incident. • If smoke is detected, immediately turn off power and find the issue before restoring it. Before powering a circuit, check for wiring/design errors and ensure all components can handle the intended current.
Slips/ Falls	<p>Wet floors, spills, and clutter in labs can cause slips, trips, and injuries. To stay safe, keep floors clean and dry—wet surfaces also encourage mold, fungi, and bacteria that may cause infections.</p>	<ol style="list-style-type: none"> 1. Use warning signs for wet floors. 2. Use drainage, mats, platforms, or waterproof footwear in wet areas. 3. Keep workspaces clean, orderly, and sanitary. 4. Keep aisles clear and in good condition; avoid cords across walkways. 5. Ensure exits are always unobstructed. 6. Report and clean up spills immediately. 7. Remove clutter and obstructions in work areas. 8. Follow good housekeeping: use caution signs, clean one side of walkways at a time, and ensure good lighting. 9. Use handrails on stairs, avoid rushing, and keep stairways visible—ask for help with large loads. 10. Fix uneven floors. 11. Encourage safe practices even in tight spaces. 12. Avoid awkward lifting—use proper tools and posture.
Cybersecurity and Digital Safety	<p>Computer infected with malware; data leak.</p>	<p>Do not install unauthorized software or connect unapproved devices to lab computers or servers. Always log out or lock your computer before leaving the workstation.</p> <p>Report any suspicious activity or cybersecurity issues to the IT department immediately.</p>
Other physical hazards	<p><i>Pinch-Point hazards:</i> arise when using power or hand tools in the construction of student projects</p>	<p>Lab equipment must be used with all safety features intact. Operate saws, drills, and other tools away from water and electrical sources to avoid hazards.</p>
	<p><i>Airborne Particulates hazards</i> Cutting and drilling, especially when working with wood, are the main sources of airborne dust particles, which can pose health risks if inhaled.</p>	<p>Eye protection should be used, and windows should be opened.</p>
	<p><i>Noise hazards</i> Mechanical labs utilize mechanical machines which during operation might produce noise.</p>	<p>Under normal operation, no hearing protector is required as the noise produced is below the threshold limits.</p>

	<i>High Temperature Hazards</i> Heat can be the result of using some equipment such as a power tool, 3D printing machine, or laser cutter	Direct physical contact with heat-generating parts should be avoided while it is operating.
	<i>Chemical spills</i>	<ul style="list-style-type: none"> • For small chemical spills (less than 2.5 L of liquid), clean up using the provided chemisorb granules (CAS #: 61790-53-2) or similar chemical absorbents. • For larger chemical spills, use the chemical spill kits according to the scale of the spills. Please refer to <u>Measures to prevent and response to chemical incident</u> for more details.

3.6. Contact Points

For any safety or environmental concerns requiring guidance, please find contacts below:

- Campus operation hotline: +84 2471089779/ext.: 9903
- Campus security hotline: +84 2471089779/ext.: 9901
- VinUni Medical Service Hotline: (+84) 866 200 019
- Lab Contact Points (*Please refer to the detailed contact list available at each laboratory*)

II. Specific regulations

1. Operation guidelines

1.1 CHS Teaching Labs

1.1.1 Operation Procedures

The teaching lab department constructs, trains personnel and deploy procedures as outlined in *Appendix 01*.

1.1.2 Specific safety protocols

For Biomedicine, Chemistry, and Virtual teaching labs:

- Complete lab safety training and submit the “Control of Substances Hazardous to Health” form before participating in any experiments upon request.
- Keep your workspace clean and organized. Wash your hands before entering and after leaving the lab. Clean and return all glassware and tools after use.
- For the following equipment, registrations must be recorded in the hard copies of Equipment Log Sheet prior to use:

1	UV-VIS Colo Novel-102S Spectrophotometer
2	Daihan FHX-12 Digital Muffle Furnace
3	Memmert UN110 Laboratory Oven
4	Memmert VO29 Vacuum Oven
5	Hermle Compact Centrifuge Z 206 A
6	AMSCOPE Trinocular Stereo Zoom Microscope
7	Azure c200 Gel Imaging Workstations
8	Benchmark Autoclave BioClave B4000-16-E
9	Benchmark Digital Incubator H2200-H
10	Benchmark Digital Incubator H2200-HC
11	Benchmark Mini BioMixer Nutating Rocker H3D1020
12	Benchmark Shaking Water Bath SB0012-E SB-12L
13	Biologix Gel Shaker SK-R1807
14	Bio-rad Horizontal Electrophoresis Wide Mini-Sub Cell GT
15	Bio-rad PowerPac Basic Power Supply
16	Bio-rad Vertical Electrophoresis and Blotting System Mini-PROTEAN Tetra and Mini Transblot Module
17	Denovix DS 11 FX+ Spectrophotometer/Fluorometer
18	Hettich Refrigerated Microcentrifuge Mikro 200R
19	Qsonica Q125 Sonicator Ultrasonic Processor
20	Qsonica Q55 Sonicator Ultrasonic Processor
21	ZEISS Primo Star Binocular Microscope
22	ZEISS PrimoStar 3 Microscope

- For research use of student laboratories, the principal investigator must contact the Lab Manager to schedule equipment use and submit a list of research assistants. If borrowing teaching lab equipment or tools, the borrower must complete both the handover and return records.

For Anatomy Lab:

- Students must sign in and out in the logbook during self-study hours.
- Do not place any items on the Pirogov or Anatomage tables. Users must shut down the machine and clean it with the provided soft cloth—no liquids allowed.
- Keep your workspace clean and organized. Return all equipment and anatomical models to their original condition after use.

1.1.3 Special equipment guideline

- Wear provided gloves when handling plastinated cadaver models. Keep the preservation cabinet closed and do not alter the models' original shape.
- Taking photos of plastinated cadavers or posting them online is strictly prohibited. Violations will result in disciplinary action.

1.2. CECS Labs

1.2.1 Operation Procedures

The teaching lab department constructs, trains personnel and deploy the procedures according to appendix 01.

1.2.2 Specific safety protocols

- Access and Authorization
 - Only authorized personnel and students may enter laboratory facilities.
 - All individuals must complete mandatory laboratory safety training before engaging in lab activities, if applicable.
 - Students must make a reservation through the system to use the lab outside of course's lab hours.
 - Visitors are not permitted without prior approval and must be accompanied by authorized staff.
- Equipment and Work Practices
 - Operate equipment only after receiving training and approval from supervising staff.
 - Perform a pre-use inspection of all tools and devices, checking for damage, wear, or exposed wiring.
 - Always follow manufacturer guidelines and lab-specific operating procedures.
 - Immediately stop using and notify the instructors and lab manager if encounter any problems.
 - Turn off and unplug equipment before adjusting, repairing, or cleaning.
 - Do not tamper with or modify electrical or mechanical systems unless assigned and supervised.
 - Keep your workspace clean and organized.
 - Users must shut down the machine and return all equipment to their original condition after use.
- Electrical and Fire Safety
 - Be aware of the location of main power switches, fire extinguishers, and emergency exits.
 - Report any electrical faults, sparks, or exposed wires immediately.
 - Do not overload power sockets or use damaged extension cords.
 - Never operate electrical equipment with wet hands or near water sources.
- Emergency Response
 - In case of an accident, equipment failure, or hazardous situation:
 - Immediately stop work and notify the lab manager or nearest responsible staff.
 - Use the first aid kit or fire extinguisher if trained and safe to do so.
 - Evacuate the area using designated exits if instructed or necessary.
 - All incidents must be documented in the lab incident log, including time, description, and people involved.

1.3. Research Labs (CEI)

1.3.1 Operation Procedures

- Preparation Before Experiment: Inspect the functionality of the magnetic stirrer, fume hood, electrochemical machine, vacuum furnace, and drying oven, ensuring no signs of damage. Refer to the equipment manual to confirm correct operating procedures.
- Conducting Experiments: Use the magnetic stirrer to mix solutions, adjusting speed and temperature appropriately (below 150°C to prevent solvent ignition). Work inside the fume hood when handling volatile chemicals. Record all experimental parameters in the lab notebook.
- Completion: Turn off all equipment after use and allow them to cool naturally before cleaning. Clean the areas around the magnetic stirrer and fume hood, ensuring no chemical residues remain.

1.3.2 Specific safety protocols

- Magnetic Stirrer: Place the solution in a heat-resistant container, avoiding spills. In case of issues (e.g., overheating), immediately disconnect the power and report the incident.
- Fume Hood: Handle hazardous chemicals (acids, organic solvents) only inside the fume hood, ensuring the sash is at a safe level (approx. 30 cm from the bottom). Verify airflow before use.
- Equipment Manual: Strictly follow the guidelines in the manual, especially regarding temperature limits, speed settings, and troubleshooting for each piece of equipment.
- General: Keep the equipment area dry to reduce the risk of electrical hazards or rapid chemical evaporation.

1.3.3 Special Equipment guidelines

- Magnetic Stirrer: Position the container centrally on the stirrer and use a stir bar appropriate for the container size. If needed, verify the temperature with a separate thermometer, and avoid running the stirrer without a load.
- Fume Hood: Ensure no objects obstruct the airflow and clean the interior surface after each use to prevent chemical buildup. Refer to the equipment manual for optimal airflow settings.
- Equipment Manual: Use the manual to schedule regular maintenance (e.g., checking the vacuum furnace seals, calibrating the electrochemical machine). Record all maintenance activities in the manual.

2. Inspection and maintainance guidelines

2.1 Inspection Schedule

Equipment in labs will be checked periodically by the lab's equipment engineer according to appendix 02.

2.2 Inspection and maintainance Procedures

The lab department constructs, executes according to plan, self-inspects, and periodically maintain lab equipment (by manufacturer/ distributor's engineer), emergency equipment according to appendix 02. Maintained equipment is labeled with green label and expiry date.

Abbreviations

Abbreviations	Full text
CHS	College of Health and Science
CECS	College of Engineering and Computer Science
CEI	Center for Environmental Innovation
Lab	Laboratory
PPE	Personal Protective Equipment
ME	Mechanical Engineering
CE	Computer Engineering
EE	Electrical Engineering
SOP	Standard Operating Procedure
COSHH	Control of Substances Hazardous to Health
SDS	Safety Data Sheet
HVAC	Heating, Ventilation, and Air Conditioning
UV-VIS	Ultraviolet-Visible
IT	Information Technology
PIC	Person In Charge
RACE	Rescue, Activate, Confine, Evacuate/Extinguish
ID	Identification
GMOs	Genetically Modified Organisms

III. Appendices and Forms

APPENDIX 01 – Standard Operation Procedures for Equipment of Teaching Laboratory

APPENDIX 02 – Scope and Frequency of Inspection and Maintenance of the Labs' Equipment

FORM01 – COSHH

FORM02 – Anatomy Lab – Equipment Log Sheet

FORM03 – Equipment & tools handover record

FORM04 – Equipment & tools return record