



Curating a responsible digital world

LAB SAFETY MANUAL

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1. INTRODUCTION

The purpose of this manual is to make all users of Digital University Kerala Lab facilities aware of safety and emergency protocols (dos and don'ts) that must be followed. Consistent violation of safety protocols or wilful neglect of safety would result in strict penalties that include probations, fines, and in extreme cases, disciplinary action.

The University works with several hazardous materials and equipment. The following manual contains guidelines on various aspects of safety and health standards at work in laboratories, particularly in those where hazardous substances are stored, handled or used. Remember, the aim is to give you general safety guidelines. While it does cover a wide category of hazards, such as chemical, physical, and biological hazards, those most relevant to the R & D activities of the University. Please use your discretion and, more importantly, common sense. Remember that the ultimate responsibility of conducting a safe experiment resides with the experimenter himself/herself.

This manual mainly aims at:

- (1) helping supervisory staff of laboratories to assess the current safety & health standards at work and consequently to improve and maintain the same.
- (2) Provide practical guidelines to all laboratory staff on practices that contribute to a safe and constructive work atmosphere in their laboratory.

2. GENERAL SAFETY INSTRUCTIONS

1. Each lab should have a designated lab-in-charge who is responsible for the day-to-day enforcement of safety protocols. Each lab will also have a scientist associated with it who is ultimately responsible for safety in the lab. Schools shall ensure the same.
2. Known and anticipated hazards are considered for all materials or equipment being used. Before using unfamiliar chemicals, equipment, or new products, please read the labels, material safety data sheets (MSDS) and/or user manuals. If in doubt, do some research on the issue and/or

discuss it with an authority. Training should be provided for all new lab users. Training of existing users must also be provided when new hazards are introduced into a lab, e.g. during the introduction of new substances, processes, or equipment.

4. Only proper equipment, in good condition, should be used. Before trying something very different from equipment's intended use, please talk to the lab-in-charge.

5. Boxes, chairs, cartons, shelves, chairs with wheels, or anything else that is not a ladder, should not be used as a ladder.

6. Emergency equipment (e.g. fire extinguishers, emergency eyewash/shower units, etc.) Should be unobstructed, clearly visible, and in good working condition.

7. First aid kits are available in quickly accessible, visible and designated places. Ensure that first-aid kits have not expired.

8. Eating, drinking, or applying cosmetics near hazardous materials (radioactive, bio-hazardous, or chemical) is not permitted. **NO FOOD/DRINK SHOULD BE ALLOWED INSIDE THE LAB.** Food and drinks should not be stored in the refrigerator or freezer used to store hazardous materials.

10. All labs must maintain a working landline which is kept near the door.

11. All labs must maintain a list of emergency contact numbers posted very near the phone at eye level. The emergency list should include the cell phone numbers of the faculty in charge, the lab in charge, the emergency response team, and other regular lab users. The emergency list should also include the number for the campus health centre, the campus security, as well as the local police and the fire station.

12. Follow the Buddy system. Never work alone in a lab, especially at night and during weekends. Buddy is a fellow lab-user who is working close enough to notice if you are in any distress. Friends on cell phones, in offices, or in hostels don't count.

3. EMERGENCY CONTACT INFORMATION

1. Emergency Helpline: 112

2. Fire or Personal Injuries: 101
3. Local Police:100
4. Ambulance: 108
5. DUK Helpline no: 0471-2788000
6. Primary Health Centre, Mangalapuram: 0471-2424100

4. LAB SPECIFIC GUIDELINES

4.1 CHEMICAL LAB

GENERAL SAFETY GUIDELINES

- Always Wear appropriate Personal Protective Equipment (PPE) when working in the laboratory. Inspect PPE for damage before each use and replace damaged items immediately.
- Never reuse disposable PPE. Common types of PPE in a chemical laboratory include Safety glasses or goggles, Lab coats, Gloves (chemical-resistant material), Closed-toe shoes
- Keep the sinks, and eyewashes free of glassware, etc. Eyewash should be checked every fortnight, and safety showers should be checked every month. Regular maintenance of eyewash and safety showers should be carried out and documented.
- Inspect glassware for cracks or chips before use. Discard damaged glassware to avoid cuts.
- Make sure samples are capped tightly and labelled properly. A current and comprehensive inventory of all chemicals in the laboratory must be maintained. This inventory should be readily accessible to all laboratory personnel.
- Never wear gloves outside of the lab and do not touch the door handle wearing a glove.
- Maintain a clean and organized work environment.
- Never Pipette by Mouth. Use a pipette bulb or mechanical pipetting device.
- All containers of chemicals must be clearly labelled with the chemical name, concentration (if applicable), hazard pictograms (e.g., flammable, toxic), signal word (e.g., danger, warning), date received.
- Always close and latch freezer doors completely when not in use.
- No Eating, Drinking, or Applying Cosmetics activities are allowed inside the lab.

- Handle chemicals with care to avoid spills and splashes.
- Always close the sash of the chemical fume hood when you are not working inside it.
- Please check the label before you open a new chemical to ensure proper storage and disposal methods. **IF YOU HAVE DOUBTS, PLEASE ASK.**
- To set up a higher scale reaction (more than 1 gram), you need a permission from your supervisor
- Before working with any organometallic reagents, you need special training, which will be given by authorized personnel.
- Heating reaction in the night time is not allowed without the safety heating equipment.
- Any liquids more than 1 litre should not transfer by holding it with your hands. It must be transferred inside a bucket.
- Flammable liquids more than 1 litre should not be kept on the working bench overnight. It should be returned to the designated cabinet.
- Please do not take out the exact maximum amount of reagent/solvent using a syringe, e.g. do not take out 20 ml solvent using a 20 ml syringe.
- Never dispose of chemicals down the drain unless specifically instructed to do so. Follow designated waste disposal procedures
- Minor spills can often be cleaned up by trained personnel using appropriate personal protective equipment. For major spills, evacuate the area immediately and inform your supervisor or the designated safety officer.
- Avoid working alone in the laboratory, especially when using hazardous chemicals. Inform someone of your whereabouts and the procedures you will be conducting.
- Safety Data Sheets (SDS) should provide detailed information on the physical and health hazards of a chemical, as well as safe handling and disposal procedures. SDSs must be readily accessible to all laboratory personnel, either in hard copy or electronically.
- If a fire occurs, activate the fire alarm and evacuate the laboratory immediately. Do not attempt to fight a fire unless you are trained in the use of fire extinguishers.
- Seek immediate medical attention for any injuries sustained in the laboratory, regardless of how minor they may seem.

4.2 ELECTRICAL LAB

GENERAL SAFETY GUIDELINES

- Always maintain orderly movement around the laboratory and access corridors.
- Keep walkways clear of bags, coats, and other obstructions.
- Safety goggles must always be worn when handling harmful chemicals or moving parts.
- Report any accident or breakage to the instructor immediately.
- Always Wear appropriate Personal Protective Equipment (PPE) if needed:
 - Closed footwear
 - Safety glasses
 - Gloves
 - Lab coats
 - Ear protectors
- Bare feet or sandals are strictly prohibited.
- Fasten loose clothing and tie back long hair when using machinery. Remove all jewellery and rings to avoid being caught in moving parts.
- Do not eat, drink, smoke, apply cosmetics, or have wet hands in the laboratory.



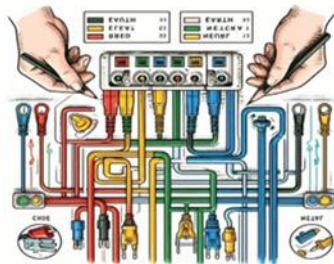
- Do not run or engage in reckless behaviour in the labs.
- Mobile phones must not be used in laboratories. If your phone rings, either terminate the call or answer it outside. Similarly, leave iPods and other distracting devices outside the classroom.



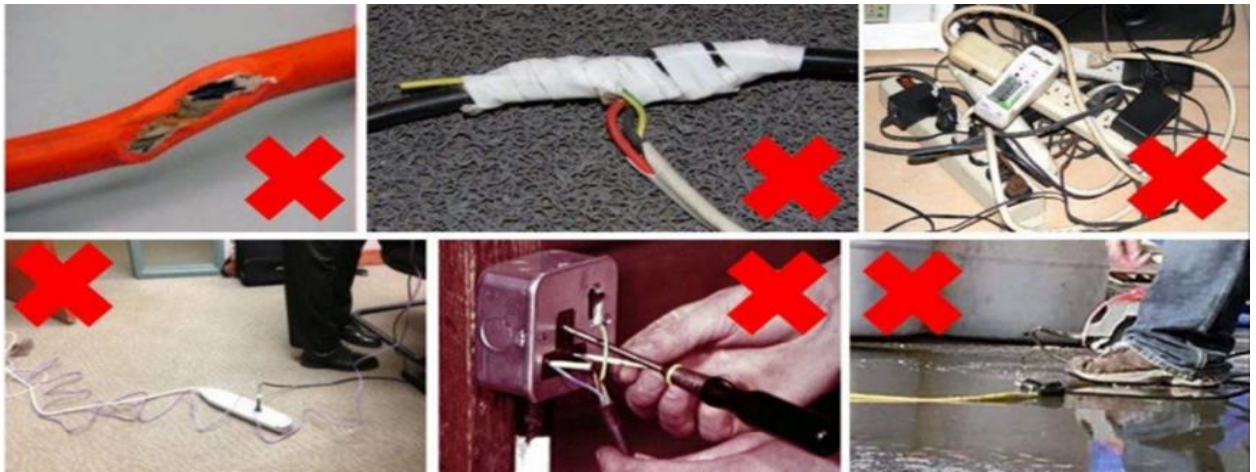
- Avoid lifting heavy objects; use lifting devices and trolleys where appropriate. If lifting is unavoidable, seek assistance and share the load, ensuring to bend your knees
- Ensure all power is switched off to equipment before making connections.
- Do not use any equipment, machine, or laboratory device without prior instruction by the teaching assistant or technical staff. Adhere to the standard operating procedures while using equipment. Ask for assistance if unfamiliar with the operation of specific equipment.
- Plan connections before experimentation by preparing a schematic.



- Use a color-coded system to limit confusion when making wiring connections:
 - Three-phase: red, yellow, blue
 - Neutral: black
 - Earth: green



- Report any defective equipment to the responsible laboratory technician immediately.
- Avoid these unsafe Practices.



ELECTRICAL SAFETY

- Do not wear personal audio devices and turn off cell phones to ensure you can quickly hear warnings or calls for help.
- Do not touch any exposed circuit with the power applied (except for low voltage circuits below +/- 15 Volts).
- Use one hand only when inserting probes (keep one hand behind your back or under the test bench to reduce the chance of fatal electrocution).
- Do not leave any objects loose on the equipment, such as screws, nuts, or washers.
- Ground/earth yourself properly before handling or replacing integrated circuits or electronic parts by touching the outside metal casing of the equipment. Use an anti-static wrist strap connected to the chassis/case/earth/ground if possible.
- Ensure the equipment is grounded before removing its case to minimize the chance of Electrostatic Damage (ESD).
- Get instructor approval before working on any equipment.
- Have the appropriate documentation before troubleshooting electronic equipment.
- Always maintain a clean and safe work area.
- Don't rush your work, as this increases the risk of problems.

- If you are unsure about a procedure, ask for help. IF IN DOUBT, DON'T TOUCH/DO IT - ASK FOR HELP.
- Access to electrical equipment (e.g., plugs and switches) should be maintained free from obstruction.
- The electrical apparatus is equipped with ground plugs or is properly grounded.
- Ensure live terminals are not exposed to direct or indirect touching in all switches and outlets.
- Ground fault circuit breakers are used as needed.
- Two-pin appliances (un-grounded) are not within a 5-foot radius of flammable materials.
- All current-transmitting parts of electrical devices are enclosed.
- Do not handle electrical connections with wet hands or when standing in or near water.
- Do not bypass safety devices (e.g., fuses) on electrical equipment.
- Disconnect electrical equipment from outlets or circuits when being adjusted, lubricated, moved, or cleaned.
- Maintain electrical plugs, cords, and extension cords in good condition.
- Minimize the use of power strips and extension cords; use cords that are as short as possible.
- Do not use a series of surge protectors as a replacement for permanent plug points. If additional plug points are needed, ask BMS.
- Place cords in areas where they are not exposed to physical damage; do not run them through doorways, ceilings, or under carpets.
- Do not splice extension cords or electrical cords without properly insulating the junction with insulation tape.
- Do not overload electrical outlets (e.g., do not connect a 15A device to a 5A socket); overloading may lead to fire.
- Never try to extinguish an electrical fire with water. Use only the proper fire extinguisher to avoid electric shock if the burning wires are still live.

HOUSEKEEPING

- Keep floors and bench-tops dry and clear of bags and any other clutter to provide more workspace and to avoid unintended contact with electrical equipment (i.e. cables or wires), which in turn might cause accidents.
- Keep aisles free from obstructions to avoid tripping hazards. This includes clear electrical cables and CRO leads.
- If a piece of equipment fails when being used, report it immediately.
- If you receive a mild shock from a piece of equipment, turn it in for repair and place a tag or label stating “UNSAFE – DO NOT USE” and briefly describe the problem.
- Do not attempt to repair any electrical equipment yourself. Only qualified and trained people should repair or modify electrical or electronic equipment.
- Windows must be open to keep the area ventilated or use a fume displacement unit.

4.3 MECHANICAL LAB

GENERAL SAFETY GUIDELINES

- There should be at least one other person in the room when operating workshop equipment.
- Never operate any workshop equipment unless you have been suitably trained for it. Only those authorized by the Workshop Manager may use workshop equipment. Work involving hazardous equipment may be operated only in the presence of and under the direct supervision of a Workshop Manager.
- To ensure a safe work environment, all workshop equipment must be maintained in proper working order. Equipment identified as malfunctioning should be clearly marked as "Out of Service" and secured to prevent accidental use.
- All guards and related accessories for personal safety provided with a machine should be installed and made use of as appropriate.
- Maintain a state of readiness for emergencies by ensuring the availability and proper functioning of appropriate first-aid supplies, fire-fighting equipment, and any other essential emergency gear.

- Take care to minimize distractions while using workshop equipment. Avoid non-essential conversations.
- The power to electrical equipment, especially power tools, must be disconnected before making any adjustments to them. Never try to service energized equipment.
- Always take appropriate steps to minimize the release of dust or noxious fumes, especially in a closed environment. Use a fume extractor where possible.
- Take appropriate precautions against fire when performing work that generates heat or sparks or involves open flames or flammable substances.
- Keep the workshop clean and tidy. When not in use, store tools, equipment, and supplies properly. Clean up after you complete your work.
- Always inspect an equipment, big or small, before use for obvious defects. Make sure that all the cables, plugs and sockets are in good order and not damaged. Ensure that all electrical equipment is properly earthed. Ensure that cables are long enough and not strained when undertaking the work.
- Take regular breaks when operating vibrating tools for long periods.
- Before leaving the workshop, ensure that all the electrical equipment that has been used are turned off.
- Eating and drinking in the mechanical workshop area are strictly prohibited. Avoid standing on damp or wet surfaces when using electrical equipment. If an equipment becomes wet, disconnect it immediately from the power source, and inform the workshop manager. It should be allowed to dry and checked by a competent person before further use.

CLOTHING, FOOTWEAR & PPE

To prevent entanglement hazards, avoid wearing loose-fitting clothes, neckties or dangling jewellery when near machines with moving parts. The loose ends of clothing (e.g. shirts hanging out) must be tucked in. Long hair must be appropriately secured.

In the workshop, Personal Protective Equipment (PPE) must be mandatorily used as designated. Barrier cream, lab coats/overalls, eye and hearing protection and dust masks must be used as the work/risk assessment dictates. Shoes must be worn at all times. Approved safety

glasses must always be worn whenever you're in the vicinity of operational tools or machinery, regardless of whether you're directly involved in the work. Always wear ear protection when in the vicinity of operating pneumatic tools. Also wear any other personal protective equipment as advised by the workshop manager.

TABLE SAW (MACHINES WITH BLADES) SAFETY RULES

1. Extreme care is needed when operating a table saw. Accidents can result in very serious injury.
2. You may use the table saw only after getting specific permission from the Workshop Manager.
3. Do not use the table saw to cut material that contains nails or screws or anything similar.
4. Before cutting, disconnect the power. Select the correct blade.
5. Before operating, ensure that:
 - the blade is secured, sharp and turns freely.
 - the throat plate, blade guard and spreader are positioned properly.
 - the table is clean and free of obstructions.
 - the blade height is set 6 mm higher than necessary to clear the stock.
6. Always feed work only against the direction of blade rotation.
7. Always use rip fence, mitre gauge, hold downs, push sticks, anti-kickback devices, and feather boards as instructed. Always hold the work firmly against the mitre gauge or rip fence. Do not cut without using the mitre gauge or rip fence. Use both the mitre gauge and the rip fence only when they can both be positioned on the same side of the blade.
8. Always operate the saw with your body positioned out of line with the blade. Avoid awkward positions that could lead to a sudden slip and contact with the blade. Never reach behind or over the blade.
9. Feed wood with a push stick when the fence is positioned within 6 inches of the blade and when making the last 6 inches of a cut.
10. When cross cutting, remove rip fence. Do not use fence as a cut-off gauge.
11. Always support the material that extends beyond the table using table extensions or roller tables.

12. Never operate the table saw without the guard in place.

4.4 BIO/ ECOLOGICAL LAB

GENERAL LABORATORY GUIDELINES

The use of appropriate clothing and Personal Protective Equipment (PPE) is essential to safety in a lab environment. The following guidelines are to be always followed by students, faculty and research personnel in Digital University Kerala laboratory settings. The Faculty in Charge or instructor is responsible for assuring that all persons in the lab are appropriately attired. Faculty or staff may ask students in wet labs to cease activity and leave the lab if they fail to adhere to these guidelines.

BASIC RULES

- Safety goggles are mandatory for all lab workers.
- Lab workers should not work alone inside the laboratory.
- Everyone should wear lab coats and full pants while working in the lab.
- Lab coats are not allowed outside the laboratory.
- Lab workers should be familiar with the location and proper operation of the laboratory safety equipment.
- They should know the emergency exits in the laboratory and the building.
- The use of blast shields is strongly recommended while doing potentially dangerous reactions.
- Lab workers should wear chemical-resistant gloves and should remove them before touching surfaces outside the work area (i.e., doorknobs, computers etc).
- Feet should be entirely covered with shoes containing reasonable heel heights.
- Open toe sandals and half pants/shorts should be avoided in the lab.
- Good Personal habits & behaviour.
- Students should act professionally at all times.
- Eating, drinking, or chewing candies are prohibited in the laboratory.
- Using mobile phones is strictly prohibited inside the laboratory.
- Do not smell or taste chemicals.

- Before handling any unknown chemicals/biological samples, students/researchers should consult the respective Faculty/lab in-charge.
- Skin contact with chemicals should be avoided.
- Hands should be washed thoroughly before leaving the lab.

HOUSEKEEPING

- Lab areas are to be kept clean and uncluttered.
- Spills should be cleaned up immediately from work areas and floors.
- Equipment and instrumentation shall be cleaned to remove spillage and contamination before repair or calibration service is requested.
- Personnel must be able to see clearly through the protective glass sashes on fume hoods.
- Clear aisles, exits, and hallways for obstructions leading to slipping or tripping hazards (e.g., boxes, electrical cords or other items on the floor).
- Ensure unblocked access to all of the following:
 - Eyewash/safety showers
 - Electrical panels
 - Fire extinguishers
 - Chemical storage cabinets
 - Fume hoods
 - Waste containers

POSSIBLE WAYS TO AVOID CLUTTERS IN LABS

Laboratories that are cluttered present a variety of safety hazards to researchers, students, and visitors. Some common methods for controlling clutter in laboratories are as follows:

- Properly dispose of chemicals and equipment that are no longer needed.
- Do not buy chemicals, solvents or other inventories in bulk unless space is available to store the material safely.
- Students should go through the lab inventory developed by each lab.
- Regularly schedule "lab clean-up days"

- Remove clutter from fume hoods, and ensure that they are not used for long-term storage of equipment, chemicals, or supplies that are not regularly used in the fume hood.
- Empty containers of unwanted materials (including trash) on a regular basis, and never allow them to overflow.
- Store excess materials in a neat, secure manner that provides easy access and reduces the potential for falling, collapsing, rolling, or spreading of the material.
- Limit overhead storage to lightweight, non-hazardous items.
- Chemical containers, supplies, and equipment are to be stored away from the edges of benches and shelves.
- Never stack chemical containers directly on top of one another (unless in original boxes that can be safely stacked) and/or with incompatible chemicals (such as acids with bases or flammables with oxidizers).
- Containers holding chemicals should not be stored on the floor. When this is unavoidable, store containers in plastic tubs or other secondary containment.
- Clean up all spills promptly. Never leave puddles, powders, or unknown materials on floors or work surfaces.
- Daisy-chaining of extension cords and/or power strips is not permitted. Store equipment, chemicals, glassware, and supplies not in regular use away from workstations.
- Do not use leg space beneath benches and desks in a way that prevents proper ergonomic posture.
- Keep personal desk spaces and other areas clean (free of all hazardous research materials).
- Neatly store lab coats and safety glasses away from potential sources of contamination.
- Never store hazardous materials in refrigerators that contain food.
- Only eat or store food in designated areas. Maintain sufficient open space within the laboratory to manage the acquisition and disposition of materials.

GHS (Globally Harmonized System)

GHS stands for the Globally Harmonized System of Classification and Labelling of Chemicals, which defines and classifies the hazards of chemical products and communicates health and

safety information. The goal is that the same set of rules for classifying hazards, as well as the same format and content for labels and safety data sheets (SDS), will be adopted and used worldwide. Those working with chemicals must know all the signs and symbols on the chemical containers. The following is the symbol and related hazard information that are commonly encountered in research labs.

GENERAL SAFETY

People who work in laboratories are exposed to various hazards. Most workplaces have hazards that are well recognized (those of ordinary fire, for example) with well-defined actions to control the situation. Laboratories, however, involve a greater variety of possible hazards, and some of these hazards need precautions that are not ordinarily encountered. An introduction to safe practices for a variety of widely used laboratory procedures is listed below.

GENERAL SAFETY AND OPERATIONAL RULES

- No running or jumping in a laboratory is permitted. Stored items or equipment shall not block access to the fire extinguisher(s), safety equipment, or other emergency items.
- Stairways, hallways, passageways/aisles and access to emergency equipment and/or exits must be kept dry and unobstructed, i.e., no storage, no equipment, phone or other wiring.
- No combustible material, such as paper, wooden boxes, pallets, etc., shall be stored under stairwells or in hallways. Hallways shall be kept free of boxes and materials so that exits and normal paths of travel are not blocked.
- Eating or drinking within laboratories is not permitted.
- No food or beverage may be stored in the cold rooms/Laboratory refrigerators and freezers.
- Working core hours at DUK are 9 am – 5:35 pm (Monday-Friday). No students shall work alone in a laboratory or chemical storage area outside the core working hours. Permission for students and staff to work outside of the core time must be granted by the FACULTY in charge.
- Animals, except those that are the subject of experimentation (approved by the Animal Ethical Committee) are to be excluded from all laboratory areas.

- Clothing worn in the laboratory should offer protection from splashes and spills, should be easily removable in case of an accident. Non-flammable, nonporous aprons offer the most satisfactory and the least expensive protection. Lab jackets or coats should have snap fasteners rather than buttons so that they can be readily removed. These coats are to be fastened closed while working and removed prior to exit from the laboratory. It is highly recommended that no sandals or open-toed shoes shall be worn by laboratory personnel in the laboratory. Laboratory clothing should be kept clean and replaced when necessary. In procedure performed in biosafety level 2 and chemical operations it is required that lab coats, gloves, closed shoes and safety glasses are worn.
- Mouth pipetting is never allowed.

ELECTRICAL SAFETY

- Electrical equipment and wiring comprise a major part of the laboratory, thus posing a new set of possible laboratory hazards. Periodic laboratory inspections should pay particular attention to electrical safety.

HANDLING GLASSWARE

- Glass breakage is a common cause of injuries in laboratories. Only glass in good condition should be used.
- Clean all glassware before sending for repair. Glassware that has been in contact with infectious agents shall be disinfected before disposal or repair.
- Protect hands with leather gloves when inserting glass tubing. Hold elbows close to the body to limit movement when handling tubing.
- Use glassware of the proper size. Allow at least 20% free space. Grasp a three-neck flask by the middle neck, not a side neck.
- Conventional laboratory glassware must never be pressurized or used with vacuum.

FUME HOOD SAFETY AND VENTILATION

General laboratory ventilation shall provide airflow into the laboratory from non- laboratory areas and out to the exterior of the building. Laboratory doors should remain closed, except for

exit and entrance. All reactions must be performed within a fume hood. The hood sash should remain closed or at a minimal safe height while working in the lab. Ventilation problems or fume hood alarms should be reported to the concerned lab supervisor who shall submit repair requests to facilities maintenance.

SAFE HANDLING OF CHEMICALS AND GASES

Working with potentially harmful chemicals is an everyday occurrence in a laboratory. Employees are requested to inform themselves about toxicological information and procedures for handling and storage of chemicals used. For most commercially available substances, detailed instructions are available in the Material Safety Data Sheet (MSDS). A hardcopy of MSDS for each lab is required.

GATHERING GENERAL INFORMATION ON CHEMICALS

The Material Safety Data Sheet (MSDS) describes properties, reactivities, potential chemical hazards, and safe handling procedures for commercially available chemicals you are working with. These sheets must be archived in a specified folder; all lab personnel must know where it is kept. This MSDS log must be updated at regular intervals. Information that is contained in the Material Safety Data Sheets is also required by law to be conveyed to employees on a chemical-by-chemical basis.

HANDLING AND TRANSPORTATION OF CHEMICALS

- Many laboratory accidents occur when chemicals are carried from one place or transferred from one container to another. The chemicals used in a laboratory are often corrosive, toxic or flammable, and any accident involving these chemicals has the potential for personal injury. Therefore, assuming that all chemicals are potentially hazardous is good practice.
- When large bottles of acids, solvents, or other liquids are transported within the laboratory without a cart, only one bottle should be carried at a time. The bottle should be carried with both hands, one on the neck of the bottle and the other underneath. Do

not hook a finger through the glass ring on top of the bottle, allowing it to dangle while being transported. Never carry or attempt to pick up a bottle by the cap.

- Large quantities of concentrated mineral acids, e.g., sulfuric, nitric and hydrochloric acids, shall be kept in specific storage rooms or cabinets for corrosive substances.

CHEMICAL STORAGE

Proper storage of chemicals is necessary to maximize lab workers' safety concerning chemical compatibility, spill control, fire/explosion control, to provide security, identification, and a "user friendly" system concerning point-of-use.

- All containers used for storage (even short term) shall be labelled.
- Quantities greater than one litre of highly flammable liquids (Methanol, Chloroform) should be stored in specified metal cabinets. Quantities smaller than or equal to one litre of chemicals may be held at individual workstations, but only one of the same kinds. Chemicals should be stored as close as feasible to the point of use to maximize efficiency and minimize transport distance.
- Out-of-date chemicals shall be disposed of periodically to reduce overall hazard potential and minimize inventory tracking and updating.
- Reduce large inventory of chemicals in the laboratory.
- Never pipette by mouth. Always use a bulb to pipette.
- The chemical containers that have been emptied have to be cleaned off the remaining residues by triple rinsing them with water or other suitable solvent and air-dried before disposal.

CHEMICAL SPILLS

Any chemical is a possible threat to your personal health and your colleagues. In case of an accident causing the release of hazardous chemicals, calm and determined action is required to prevent an escalation of the emergency. Thus, for any individual incident, isolation of the spill and securing the area is best before or simultaneously with contacting concerned personnel. This should be done according to all available information on the chemical nature of the spill. Under all circumstances, a laboratory coat, safety glasses, and gloves should be used for self- protection.

- Spill Kits may be obtained from Stores.
- Always send for help first and report the necessary information.
- If the spill presents an immediate danger, leave the spill site and warn others, control entry to the spill site, and report to reception.
- Remove contaminated clothing. Flush skin/eyes with water at least 15 to 30 minutes; use soap for intermediate and final cleaning of skin areas.
- Protect yourself, then remove injured person(s) to fresh air, if safe to do so.
- Notify nearby persons and evacuate as necessary. Prevent entry, as necessary, by posting a guard in a safe area and/or shutting doors.
- If flammable vapours are involved, electrical switches should not be operated unless motorized equipment is turned off. Try to turn off or remove heat sources where it is safe to do so. **TURN OFF ELECTRIC AT THE MAINS, NOT AT THE SWITCHES INSIDE THE LABORATORY.**
- Do not touch the spill without protection, gloves etc.
- Where the spill does not present immediate personal danger, try to control the spread or volume of the spill. This could mean shutting a door, moving nearby equipment to prevent further contamination, repositioning an over-turned container or one that has a hole in the bottom or side, creating a dike by putting an absorbent around a spill or opening the sashes on the fume hoods to facilitate removal of vapours.
- Never assume gases or vapours do not exist or are harmless because of lack of smell.
- Increase ventilation by opening closed fume hood sashes to the 12 inch or fully open position. Exterior doors may be opened to ventilate non-toxic vapours.
- Use absorbents to collect substances. Reduce vapor concentrations by covering the surface of a liquid spill with absorbent. Control enlargement of the spill area by diking with absorbent.
- Spilled Liquids
- Confine or contain the spill to a small area. Do not let it spread.

- For small quantities of inorganic acids or bases, use a neutralizing agent or an absorbent mixture (e.g., soda ash or diatomaceous earth). For small quantities of other materials, absorb the spill with a nonreactive material (such as vermiculite, clay, dry sand, or towels).
- For larger amounts of inorganic acids and bases, flush with large amounts of water (provided, the water will not cause additional damage to refer to MSDS for this information). Flooding is not recommended in storerooms where violent spattering may cause additional hazards or in areas where water-reactive chemicals may be present.
- Mop up the spill, wringing out the mop in a sink or a pail equipped with rollers.
- Carefully pick up and clean any cartons or bottles that have been splashed or immersed.
- If needed, vacuum the area with a HEPA filtered vacuum cleaner designed and approved for the material involved.
- If the spilled material is extremely volatile, let it evaporate and be exhausted by the laboratory hood (provided that the hood is authorized for use with the spilled chemical).
- Spilled Solids

Sweep spilled solids of low toxicity into a dustpan and place them into a container suitable for that chemical. Additional precautions such as the use of a vacuum cleaner equipped with a HEPA filter may be necessary when cleaning up spills of more highly toxic solids.

- Dispose of residues according to safe disposal procedures. Remembering that personal protective equipment, brooms, dust pans, and other items may require special disposal procedures.
- Report the chemical spill in writing as required above to laboratory in-charge.

BIOLOGICAL SAFETY

Four biosafety levels are established to regulate laboratory practices, techniques and safety equipment appropriate for handling of biological agents. Currently, Bio-safety levels are not applicable to DUK.

WASTE DISPOSAL SYSTEM AT DUK

Toxic Chemical Waste: Chemical waste management in DUK is collecting, separating, recycling, and disposing of chemical waste in a safe and environmentally responsible manner.

EMERGENCY RESPONSE

Chemical emergency: Chemical emergencies such as large spills, spills involving highly hazardous or flammable materials, releases of toxic or corrosive gasses or substances should be treated as other types of emergencies. **PULL THE FIRE ALARM AND EVACUATE THE BUILDING.**

4.5. COMPUTER LAB

- Access Restriction: Only authorized students and staff are permitted to use the lab facilities.
- Identification Requirement: All users must always carry a valid university ID card.
- Cleanliness: Maintain a clean work area; no food or beverages are allowed.
- Device Policy: Bags, Laptops and mobile phones are prohibited in the lab. These must be stored outside / separately in the space allocated.
- Hardware Integrity: Do not tamper with, unplug, or remove any hardware components, including monitors, keyboards, mice, power cables, and network cables. Report any issues to the lab supervisor.
- Ergonomics: Adjust chairs and monitors to ensure proper posture.
- Software Usage: Only authorized and licensed software provided by the university may be used. Installation of personal / unwanted software is strictly prohibited.
- System Shutdown: Properly log out and shut down the computer after use.
- Internet Access: Utilize the university's Wi-Fi or wired network for internet connectivity. Connecting personal internet connection to any University system is strictly prohibited.
- Data Responsibility: Users are responsible for saving and backing up their work. The university is not liable for any data loss.
- Data Storage: Do not store sensitive, confidential, or personal information on lab computers. Private or confidential data with respect to any individual or organisation should not be stored in any university system.
- Download Policy: Avoid downloading large files unless necessary for academic purposes.

- Lab systems are to be used for accessing academic related information / data only.
- Software Issues: For software-related issues, contact the lab supervisor or lab instructor.
- Technical Support: Report any technical or hardware problems to the lab supervisor or IT support.
- Lab systems to be used with “User” credentials. Login with Admin privilege only with specific permission with faculty / system administrator and the same has to be done with prior permission from the supervisor.
- Rule Enforcement: Report any violations of lab rules to the lab supervisor immediately.

5. ERGONOMICS GUIDELINES

Aim to mitigate Work-Related Musculoskeletal Disorders (WRMSDs) by addressing ergonomic stressors in the workplace. MSDs, including cumulative trauma disorders (CTDs) and repetitive strain injuries (RSIs), are targeted through hazard identification and control strategies.

A. MINIMIZING ERGONOMIC-RELATED INJURIES

1. Management leadership

- Management Leadership Establish effective MSD reporting systems and ensure prompt responses.
- Communicate the Ergonomics Program through training sessions, publications, and online resources.

Employee Participation

Encourage early reporting of MSDs and involve employees in program implementation and evaluation.

- Engage staff in selecting and implementing ergonomically designed equipment.

Job Hazard Analysis and Control

- Identify and analyse ergonomic hazards, implementing feasible engineering and administrative controls.

- Conducted workplace assessments and implemented controls such as adjusting work components and recommending ergonomic equipment.

Training

- Provide comprehensive training on ergonomics principles, MSD recognition, and hazard identification.
- Ensure managers, supervisors, and employees understand their roles in the Ergonomics Program.

Program Evaluation

- Regularly review program effectiveness through measures such as reductions in MSDs and hazard control.
- Address deficiencies in the program promptly and encourage employee participation.

2. Responsibilities

Faculty / Managers

- Learn about MSD causes and control options, provide resources, and restructure job tasks.
- Train supervisors and employees, integrating ergonomics into department safety management.

Supervisors

- Promote a safe work environment, maintain awareness of ergonomic risk factors, and report injuries promptly.
- Provide proper workstations, seek assistance for ergonomic issues, and integrate ergonomics into safety management.

Employees

- Promptly report ergonomic problems, follow safe work practices, and utilize recovery periods effectively.
- Adjust and use workstations and equipment as per ergonomic guidelines.

Occupational Safety Unit (OSU)

- Coordinate the ergonomics program, guide on modifying the workplace, and offer training for employees and managers.
- Analyse trends in injury or incidence and assist in selecting ergonomically appropriate furniture and equipment.

Human Resources Department

- Provide guidance on procuring ergonomically appropriate furniture and equipment.

B. MINIMIZING ERGONOMIC HAZARDS

I. Awareness of Musculoskeletal Disorders (MSDs)

- MSD symptoms include pain, numbness, or tingling in the upper extremities.
- Back and neck problems can lead to radiating pain and limited motion.
- Causes include acute injury or cumulative trauma from poor practices.

II. Preventive Actions

- Evaluate workplace for MSD risk factors.
- Educate employees on ergonomics.
- Implement ergonomic work practices and adjustments.
- Use proper tools and furniture for posture support.
- Incorporate breaks during repetitive work.
- Intervene early when symptoms arise.
- Employ correct lifting techniques.

- Seek assistance for tasks beyond individual capabilities.

III. Early Intervention

- Swift reporting and evaluation are crucial for prevention.
- The gradual development of MSD symptoms is often overlooked.

IV. Workplace Evaluations

- Guidelines apply to all DUK personnel.
- Priority for those with reported symptoms or high-risk roles.
- Occupational Safety assists with workstation redesign.

V. Reporting

- Prompt reporting of MSD symptoms to supervisors.
- Online incident reports ensure proper notification.
- Encouragement to seek evaluation from the Health Service or own provider.

VI. Training

- New hires receive ergonomic training, and the HR Department to provide training.
- Annual safety training includes ergonomic principles.
- Occupational Safety provides individual education as needed.

VII. Record keeping

- Guidelines for proper body mechanics are provided.
- Covers workstation setup, lifting guidelines, and furniture selection.