BMU/HSE/POLICY-03

Baqai Medical University

Fire and Safety Plan

Prepared By	Special Committee
Approved By	Board of Governors
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This is comprehensive plan to manage university and hospital operation in reference with fire and safety requirements. This plan also consists of fire and safety awareness and training material. Considering internal university/hospital facilities and available resources. This document contains international standards and best practices to follow and incompliance in Hospital/ University environment.

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1. Fire Management Plan

1.1. Introduction:

Baqai Medical University stands on a campus of 72 acres with buildup area of 7,27,374 sq..ft in seven blocks of buildings. Housing 13 institutions, shouldering the teaching responsibility of 1800 students, awarding 19 degrees and diplomas in various specialties. It directly and indirectly employs more than 1000 individuals in different capacities. It is the only university in Pakistan established on the theme of Community Based and Community Oriented Medical Education. The futuristic mission of our Community Oriented University is being adhered to and continuous improvement and widening of paradigms of education being imparted to students is its integral component so that they can competes with all international standards.

The fire management plan has been sub divided in levels of emergency and required response as per emergency level. A RACE Strategy is use for level 1 emergency. If the fire extended emergency to level 2 then fire evacuation plan will be activated.

1.1.1. Purpose:

The Baqai Medical University Fire Management plan gives awareness and provides basic guidelines to staff, Doctors, students and managing personals that how to respond in case of fir outbreak. This document helps them to understand and practice emergency situation before its accordance.

Emergency evacuation plan has been activated whenever an emergency cannot be managed through normal procedures as described in this plan. Response to emergency can be tasted once in a year within the framework of the plan.

Fire management plan is developed to counter fire by active and passive approach. This plan will help to protect lives and property with the effective use of available resources.

This plan identifies departmental responsible persons for critical emergency service and provides management structure for coordinating and deploying essential resources. This plan also guide about external coordination as well as internal coordination with emergency rescue platforms and resources.

1.1.2. Scope:

It is an official university plan that briefs about the fire management within the university premises during emergency conditions. However this plan doesn't limit the use of common sense and judgment if not foreseen or covered by the elements of this plan. Preferably this plan helps in conducting preparation workshops, trainings and drill to avoid any major loss in case of fire emergency

1.1.3. Fire Emergency Management Committee:

This committee consists of senior management and delegates for emergency action plan coordination externally and internally. This senior leadership acts as key responsible persons for taking any action and communicating this all team members. This committee advice changes for the convenience of evacuation, also helps in allocating resources for physically implementation of plan. Members of the committee are as following:

1.1.4. Fire Emergency Levels:

Level 2- Minor Incident:

Baqai medical university is equipped with fire extinguishers and emergency alarm system (Hooter/Siren Alarm) and has trained staff for evacuation and counter fire. In the event of fire our hospital strategy based on RACE (Rescue, Alarm, Confined and Extinguish/evacuate). This strategy is common strategy mostly use in emergency situation for dealing with fire emergencies the description for this strategy is given below:

Level 3-Emergency:

A major incident that completely interrupt the basic facilities and need urgent evacuation categorized as level 2 emergency. In this kind of incident persons can be injured as well as infrastructure could be damage with in departmental premises. This type of incident requires urgent closer of operations and inform via emergency alarm system (hooter) with the hierarchy of communication. In such case emergency evacuation plan will be activated

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1.1.5. Method of Evacuation

1.1.6. Patients Prioritization in Fire Emergency

1.2. Fire Prevention Plan:

All departments of university should deploy 2 members that should be trained on fire man course and rapidly react in case of fire to extinguish before fire transfer. Fire extinguisher training and emergency evacuation training needs to be provided to all staff, students and faculty by HSE Department however for level 2 emergencies a fire fighting team should be called on the given extension to counter fire emergency situation.

Responsible persons to cut off fuel source:

Departmental representatives are responsible to cut off fuel sources within departmental premises while utility in-charge is responsible to cut off LPG supply from the point of cylinder valve location.

1.3. General Guidelines in Fire Emergency:

1. If you discover a fire:
   1.1. Activate the nearest fire alarm.
   1.2. Notify your Emergency Coordinator and other occupants.
2. Fight the fire ONLY if:
   2.1. You have followed first point, AND
   2.2. The fire is small and confined to its area of origin, AND
   2.3. You have a way out and can fight the fire with your back to the exit, AND
   2.4. You have the proper extinguisher, in good working order, AND know how to use it.
   2.5. If you are not sure of your ability or the fire extinguishers capacity to contain the fire, leave the area.
3. If you hear a fire alarm:
   3.1. Evacuate the area. Close windows, turn off gas jets, and close doors as you leave.

3.2. Leave the building and move away from exits and out of the way of emergency operations.
3.3. Assemble in a designated area.
3.4. Report to the monitor so he/she can determine that all personnel have evacuated your area.
3.5. Remain outside until competent authority (Physical Security, Office of Health and Safety, or your supervisor) states that it is safe to re-enter.

4. Evacuation Routes
4.1. Learn at least two escape routes, and emergency exits from your area.
4.2. Never use an elevator as part of your escape route.
4.3. Learn to activate a fire alarm.
4.4. Learn to recognize alarm sounds.
4.5. Take an active part in fire evacuation drills. Have a Sound Fire Safety and Escape Plan It is vitally important to make and practice escape plans. In the event of a fire, remember, time is the biggest enemy and every second counts! Involve the assistance of a building manager, family member, or an entrusted friend when practicing your fire escape plan. Know at least two exits from every room. If you use a walker or wheelchair, check all exits to make sure they get through the doorways. Practice opening locked or barred doors and windows. When a fire occurs, do not waste any time saving property. Leave the home immediately. Once out, stay out.

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1.4. Fire Basics Training Material

Basic fire knowledge is an important skill that can save your life on or off the job. Accidental fires are an unusual occurrence in most workplaces. So it is easy to take for granted some of the everyday hazards that, if overlooked, can contribute to the occurrence of these fires.

Types of Fires:

Fire classes	European Standard	American Standard	Australian Standard
Class A	Carbonated solid (wood , paper , fabric etc.)	Carbonated solid (wood , paper , fabric etc.)	Carbonated solid (wood , paper , fabric etc.)
Class B	Flammable liquid (gasoline , alcohol etc.)	Flammable liquid (gasoline , alcohol etc.) & Flammable gases (propane , butane etc.)	Flammable liquid (gasoline , alcohol etc.)
Class C	Flammable gases (propane , butane etc.	Electrical fire .	Flammable gases (propane , butane etc.
Class D	Flammable metal (Sodium , Magnesium etc.)	Flammable metal (Sodium , Magnesium etc.)	Flammable metal (Sodium , Magnesium etc.)
Class E	Not specified	Not specified	Electrical fire .
Class F	Kitchen fire .	Not specified	Kitchen fire .
Class K	Not specified	Kitchen fire	Not specified

Principles of combustion:

To support fire, you must have; HEAT, FUEL, OXYGEN, and SUSTAINED CHEMICAL REACTION, similarly in order to counter fire if any one resource cut of through chemical reaction the fire could be eliminated. The best method is to use to do fire risk assessment to avoid any possible fire outbreak.

The fire is the result of chain reaction between heat, fuel and oxygen.

Heat transfer:

The fire can be extending by following methods:

Conduction:

The process by which heat can be transferred by any source of medium or material including wall or other combustible material. The process of conduction of fire is starts

with the temperature rise and can be controlled with the method of cooling, as explained in fire extinguishing methods.

Convection:

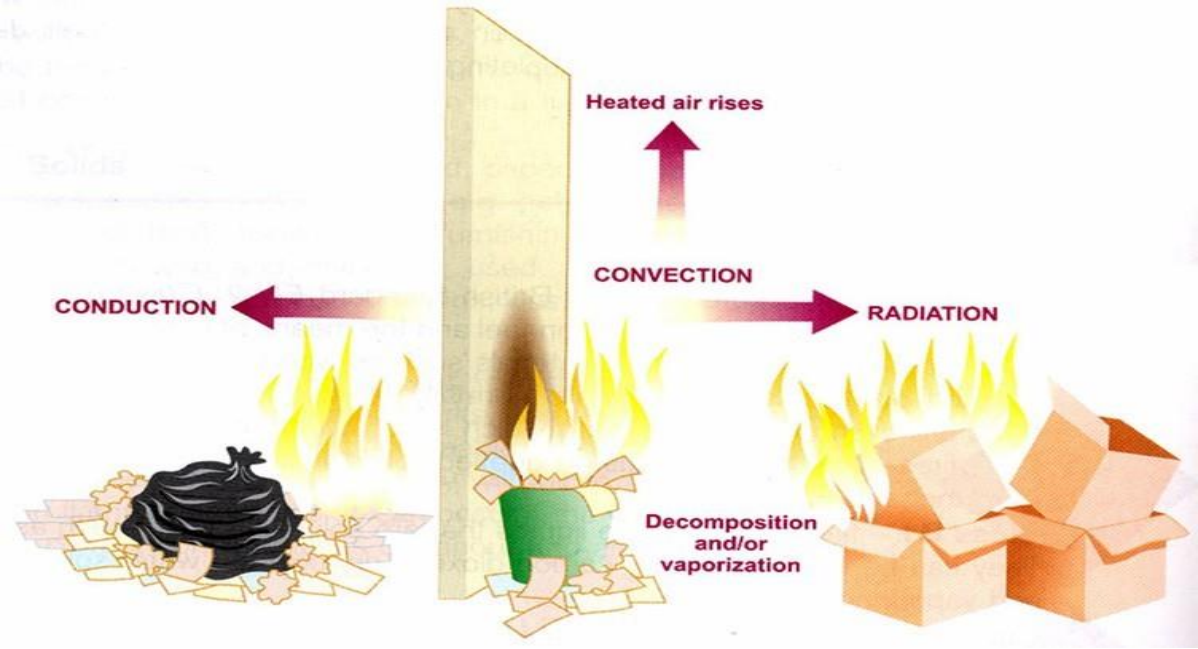
Convection is the process by which heat transferred in bulk movement of molecules in the air. The extension of heat rises with the movement of molecules with in liquid or gases or by the motion of fluid. The energy raises with the fire in combustible material, the molecules tries to move towards low energy level to get stabilized and start worming cold surface away from heat source. The rise in temperature of another surface causes fire and start burning. The convection of fire can be controlled by enclosing heat source and controlling air flow depends of emergency situation use best method to control air intake by closing windows or any area.

Radiation:

Radiation is the process by which heat transferred for ignition source to other ignitable material in the form of radiation. The heat radiation is visible to naked eye and heat transferred by radiation can be easily seen. The flame can be controlled by cooling the heat source and radiation

Decomposition/ vaporization:

The decomposition/ vaporization take place when any ignitable source breakdown into different kind of material/ chemical and vaporized into the environment taking flame extension. The decomposition and vaporization of present burning element can be controlled by collecting the residuals of burned area enclosing in fire protection clothing.



Flammable and combustible:

Flammable material will ignite (catch on fire) and burn easily at normal working temperatures. Combustible materials have the ability to burn at temperatures that are usually above working temperatures.

CHARACTERISTICS OF FIRE

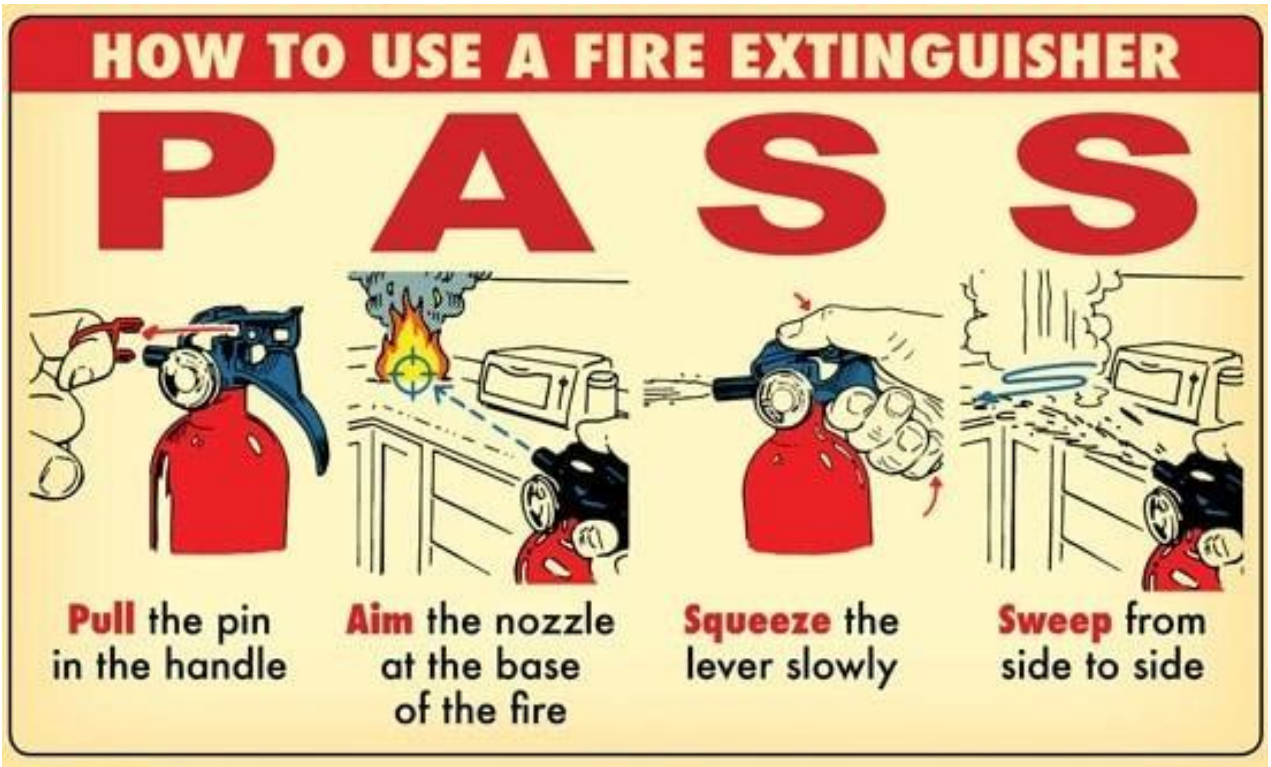
- A small fire can grow out of control in as little as 30 seconds.
- A room involved with a fire can have a temperature of 100°C at floor level and 600°C at eye level.
- Fire starts bright but will quickly turn the room pitch black from releasing smoke and toxic gases. Be familiar with your surroundings and evacuation routes!

Fire Extinguishing methods:

Remove one element or more of fire triangle, by:

- **Starving** it of fuel
- **Smothering (Cover the fire)** to exclude oxygen
- **Cooling** it to reduce temperature

Fire Extinguisher Usage Guideline:



Fire Blanket User Guidelines:

1. Pull the tapes to release the blanket from its box
2. Hold the blanket in a shield position and if possible wrap the blanket around your hands for protection
3. Wrap the fire blanket around the person who is on fire to smother the flames

FIRE SAFETY TIPS:

- Clear away rubbish and waste regularly to the designated areas.
- Never attempt to dispose of rubbish by burning it.
- Electrical systems, including temporary supplies, must only be installed by a competent electrician and must be regularly maintained.
- High Intensity Lights should not be covered or placed near combustible material. They must be securely fixed to prevent them falling over.
- Smoking is strictly prohibitive in university and hospital premises.
- Hot Work should be controlled by a Safe System of Work or a Permit to Work where appropriate to ensure all risks are adequately controlled.
- Ensure you know your part in the fire safety plan. Know where extinguishers are, what types they are and that you know how to use them.
- Make sure you know the evacuation procedure and where your escape routes are.
- Check you are aware of the site alarm arrangements; is there a bell, siren or air horn or a verbal shout?

⟶ *Where are the nearest extinguishers to my workplace? Am I trained to use an extinguisher?*

⟶ *What can I do to prevent a fire?*

⟶ *Are emergency routes clear in case a fire breaks out?*

⟶ *Has anyone ever seen a near-miss or actual fire during their time? If so, why did it happen and how could it have been prevented?*

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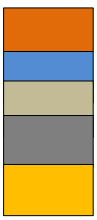
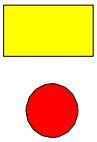
1.5. High Risk Fire Prone Areas Identification

- Flammable liquid fire prone areas
- Record document fire prone areas
- Combustible material (Cotton, foam) fire prone areas
- Oxygen supply areas



- Generator room
- Kitchen
- LPG storage



1.6. Departmental High-Risk Fire Prone Areas:

High risk fire prone areas are highly dangerous and should be evacuate on urgent bases. A emergency evacuation team member is responsible to evacuate high risk prone areas on urgent bases. Also train staff and students to evacuate from other side of high-risk prone areas means to take best possible route to reach assembly area. Staff responsible for fire prone areas should be trained to close all windows and doors, cut of gas supply before leaving fire prone area

BLOCK A	**BLOCK B**	**BLOCK C**	**FATIMA HOSPITAL**	**PHARMACY DEPARTMENT**	**BIRDS**
Bio Chem. Lab	Micro Biology Lab	Prosthodontics Lab	Micro Biology Lab	Pharmaceutical Lab	Generator room
	Chemistry Lab				

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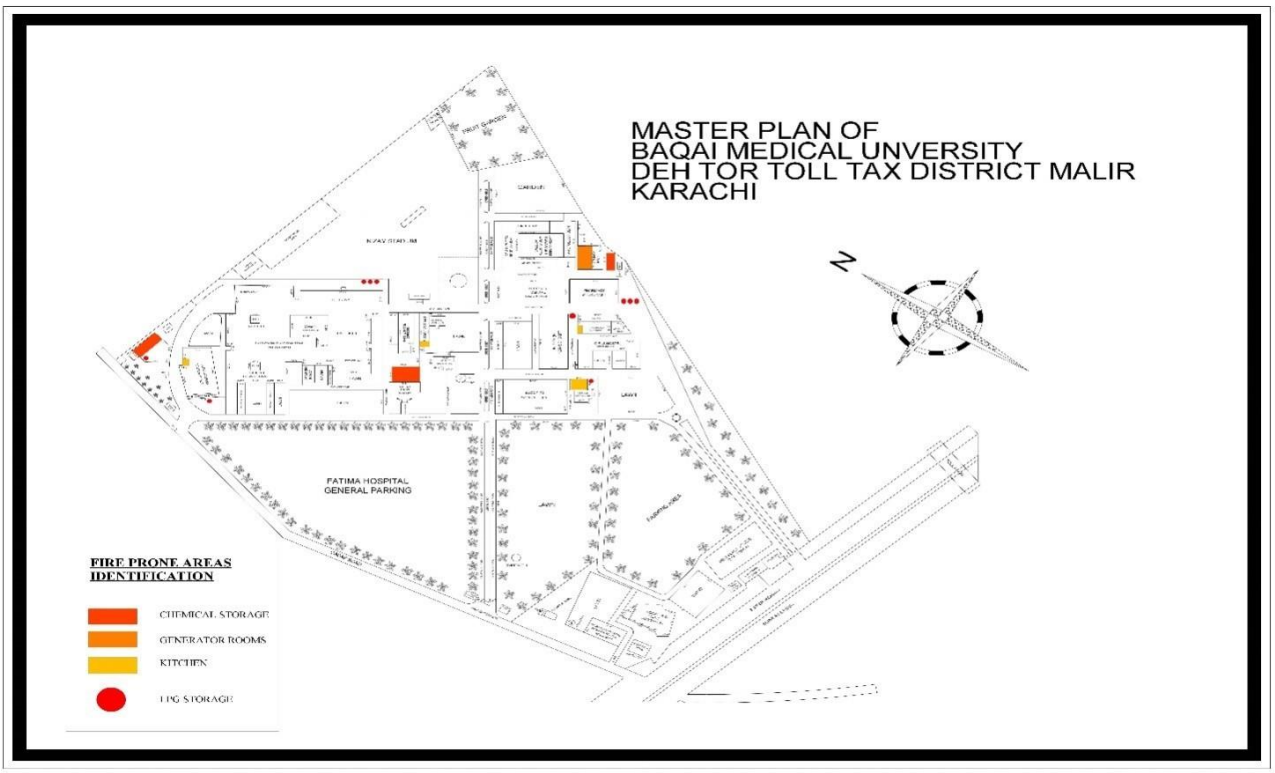
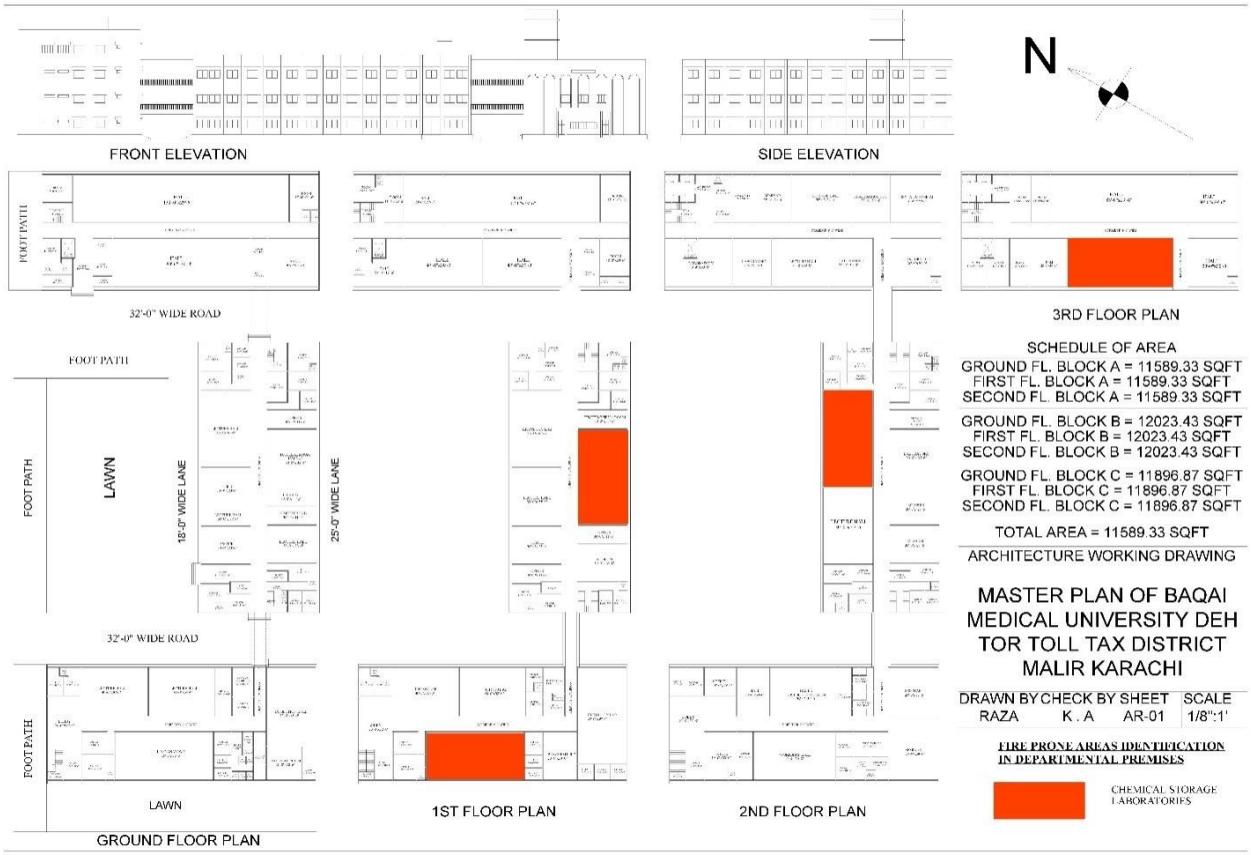
1.7. Fire Prone Areas by Map:

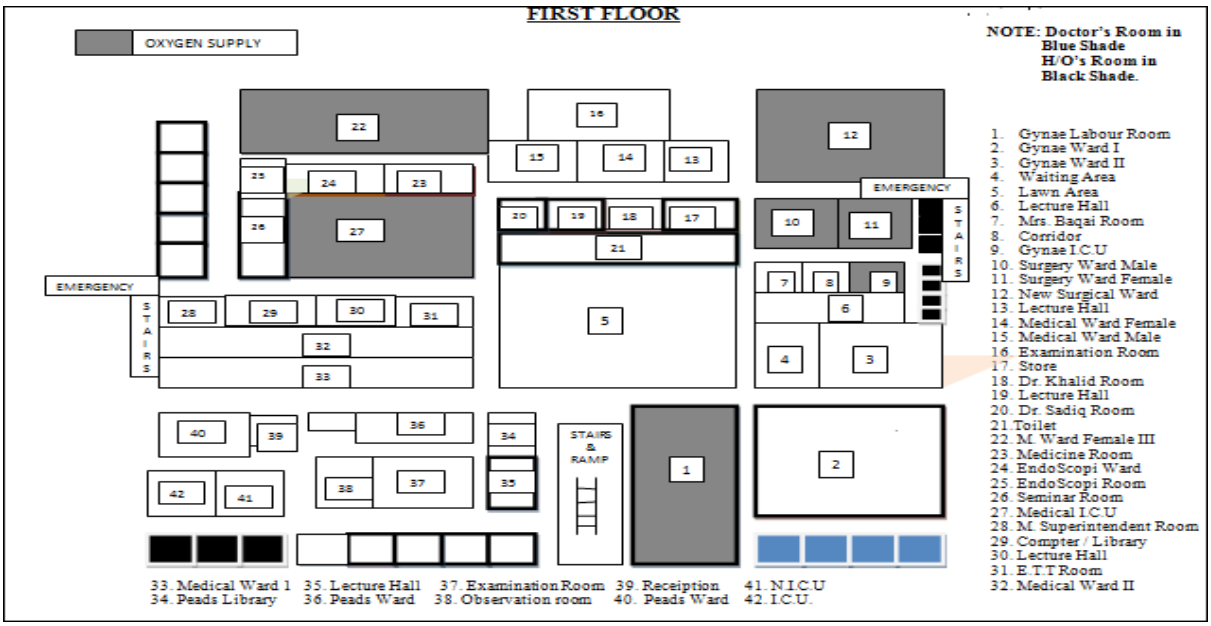
BMU Map Identifying Fire Prone Areas:

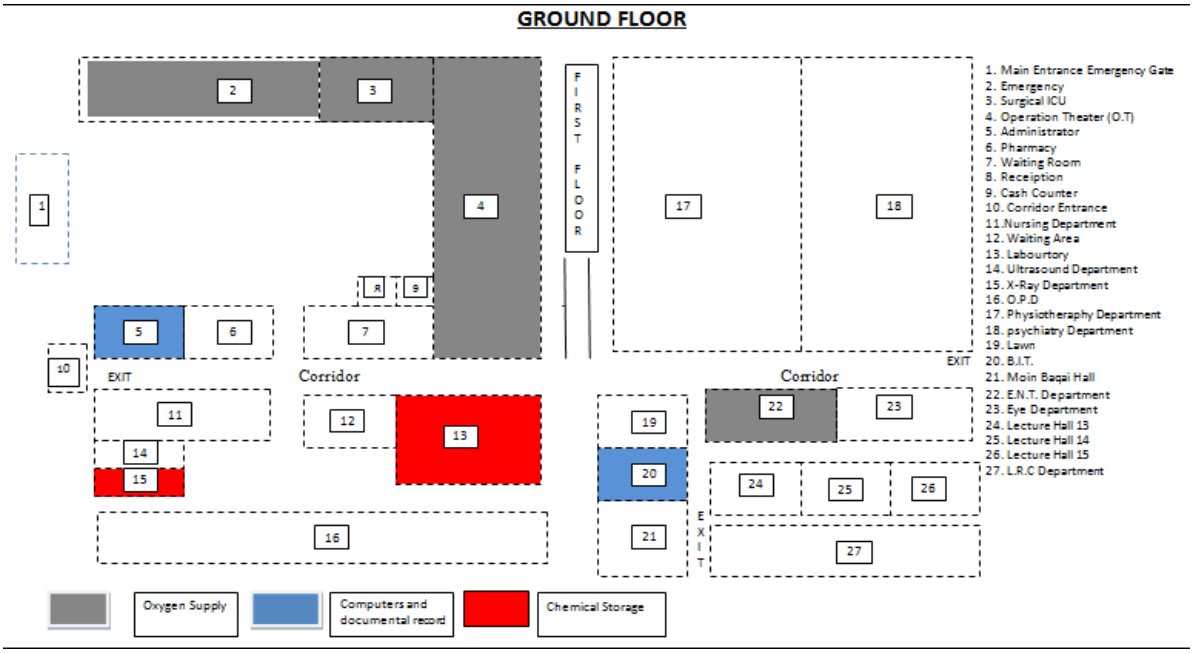


Block A, B and C Identification of Chemical Storage Laboratories:



Fatima Hospital:





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1.8. Fire Response Team:

Emergency response team plays vital role while executing emergency evacuation plan. This team evacuates the incidental areas in coordination with management personals. Also they will cordon of the affected areas and act as a wall between effected area and external people to involve in evacuation. They will also control the panic situation to avoid any chaos.

Fire Response Team, Standing Orders

Following departments under their respective HOD's are hereby designated to extinguish fire in case of outbreak of fire. HOD's should make sure that the individual in the department must be made to understand the importance of fire fighting.

Fire Fighting Team:

Normally, a fire fighting team is divided into three different parties. These parties are required to initially fight the fire, before the arrival of Fire Brigade.

1. Fire Fighting Party
2. Salvage Party
3. Cordon Party

1. **Fire Fighting Party:**

This is the party whose department is under fire and who physically fights the fire on its outbreak. The party must effectively use fire extinguishers, and all available means to extinguish fire, so as to control the spread of fire, before the arrival of Fire Bridge.

- Maximum use of water from available water source and fire extinguisher will be used to extinguish fire, by fire fighting party.
- Assistance: all neighboring departments of the department under fire, will immediately reach the spot for assistance to extinguish fire.

2. **Salvage Party:**

   All remaining individuals will be grouped by the respective HOD's to perform the responsibilities to salvage all properties, which are not yet under fire & to evacuate the casualties if any. All female staff will also be immediately evacuated out of the building.

3. **Cordon Party:**

   This party normally consists of security guards along with the staff of administration department. They will cordon off the premises, so as to ensure and guard against unauthorized person entering during confusion, with intension of looting & plundering in the grip to help control fire, University gate will also be sealed to prevent outsides entering University.

This standing order's & responsibilities will be changed after every six months.

General Precautions:

Every effort will be made to keep the area and building free from sources of spontaneous ignition and highly inflammable substances. Following points need to be coordinated before hand:-

(a) Presence of Mind:

Speed is the essential factor of fire-aid & firefighting. If person are present at the actual outbreak of a fire, provided that the outbreak is not already overwhelming, much can be done by fire extinguishers and with water in the largest quantities available. In addition, or alternatively, the burning object should be isolated by the removal of other inflammable objects nearby.

(b) Liaison:

Close liaison with local fire service is essential. Local police should be included in all discussions which involve public safety.

2. Safety Management Plan

The HSE Management System defines the principles by which Baqai Medical University conduct their operation including educational activities and medical services with regards to health, safety, and the environment considering as priority

Management communicates the HSE philosophy to all employees, contractors, and third parties associated with the university and hospital, and each organizational unit must provide positive evidence of conformance to the system.

THE HSE MANAGEMENT SYSTEM MODEL COMPRISES OF EIGHT INTERRELATED COMPONENTS:

- Commitment and leadership and accountability
- Policies and objectives
- Organization and resources
- Contractor and supplier management
- Risk management
- Business processes
- Performance monitoring and improvement
- Audits and reviews.

These are continuously improved by conformance checks

- On day-to-day standards and procedures (controls)
- On the management system (correction)
- Through modifications to the management system (improvement).

2.1. Blood Pathogens:

Blood borne pathogens are microorganisms, normally carried in infected blood and bodily fluids, that can cause diseases, some fatal, such as Hepatitis B and C, as well as HIV.

Blood borne pathogens must find a direct route of entry into the body for infection to be possible. Bodily fluids can also splash into the eyes and cause infection. Exchange of these body fluids must be direct. Thus, you cannot contract a bloodborne pathogen disease when an infected person touches you or sneezes/coughs on you.

Precautions:

- If a coworker has a minor accident that causes bleeding, try to have the victim bandage his or her own wound.
- If the injury is serious, call the emergency response team.
- If you don't have time to wait for the emergency response team, make sure you take universal precautions.
- Remember that vomit, burns, abrasions, external and internal injuries can release bodily fluids.
- When removing disposable gloves, roll the first glove off the hand inside out.
- Place disposable gloves in an approved biohazard bag. Wash your hands immediately after removing any gloves.
- If you have been exposed to a victim's bodily fluid, wash the affected area thoroughly with soap and water.
- Contact a medical professional and report the incident to your employer for further action, should it be appropriate.

2.2. Slip and Trip:

Slips, trips and falls can result in all types of serious injuries and sometimes leave the victim with a lifelong disability or even lead to death.

Slips, trips and falls account for roughly 20% of all work-related injuries. This incident is second only to auto accidents. This is why slip and fall awareness and protection are essential elements of personal safety. All departmental floors are slip resistant. The hospital ramp is also slip resistant. If any liquid found on floor. It has to be clean as and where bases.

SLIP:

Slips occur when there is too little friction between one's footwear and the walking surface. Common causes of slips are:

- Wet or oily surfaces;
- Weather hazards;
- Loose or unanchored rugs; and/or
- Flooring with changing degree of traction

TRIPS

Trips occur when one's foot collides with an object causing you to lose balance. Common causes of trips are:

- Obstructed view;
- Poor lighting;
- Poor housekeeping;

2.3. Housekeeping:

Housekeeping at work is as important as it is at home, especially if you want a safe workplace. People who must function every day in a messy, disorderly work environment have lower morale and poor housekeeping may result in employee injuries or even death.

Housekeeping starts at the beginning of the shift and needs to continue throughout the entire workday. Don't let scrap materials build up; dispose of them daily.

Guidelines:

- Housekeeping is everyone's responsibility!
- Clean up after yourself. Pick up trash and debris and dispose of it properly. Keep your work area clean throughout the day, minimizing the time needed to clean a "larger mess" at the end of the day.
- Dispose of combustibles and flammables properly. If improperly discarded, they will increase the potential for a fire.
- Remove protruding nails and other sharp objects, or hammer them flat to prevent someone from stepping on them.
- Stack materials and supplies in an orderly manner and secure them so they won't topple.
- Report all slips, trips, and falls, with or without injury, so the hazard can be corrected.
- Pay special attention to stairways, doorways, entrances and ladder access areas. Keep them clear of debris and trip hazards. No material or tools stored on stairs and landings.
- Route electrical cords to the side of walking paths and keep them out of doorways to avoid damage to the cord and trip hazards.
- Nails in scrap lumber must be bent over or removed.
- Floors, platforms, stairs, and landings must be free of ice, or other slippery conditions.
- Have adequate number of trash cans, and regularly dispose of the trash.

2.4. Electrical Wiring and Safety Procedure:

It is essential that all electrical installations and equipment are inspected and tested regularly, including earthling/grounding systems. Circuit-breakers and earth-fault-interrupters should be installed in appropriate laboratory electrical circuits. Circuit-breakers do not protect people; they are intended to protect wiring from being overloaded with electrical current and hence to prevent fires. Earth-fault-interrupters are intended to protect people from electric shock. All laboratory electrical equipment should be earthed/grounded, preferably through three-prong plugs. All laboratory electrical equipment and wiring should conform to national electrical safety standards and codes

Using electricity on site can be hazardous, in three areas especially tools, cords, and panels/generators. Most of us have received minor electrical shocks at one time or another. Shocks occur when an electrical current travel through your body until it is grounded.
You are likely to get a shock when you accidentally touch a live wire, or come into contact with electrical current passing through a poorly insulated power tool, electrical device or faulty electric cord. Other electrical hazards include sparks from electric motors or faulty cords, fires created by heat from overloaded circuits, explosions resulting from overheated equipment stored in an area with flammable liquids, vapors or dusts, burns, which may occur when you accidentally touch overheated wires or electrically operated equipment

- Always check the clearance of overhead power lines when working outdoors on a ladder
- Never overload outlets or circuits.
- Be sure the equipment you operate is grounded or double insulated
- Never use a damaged extension cord
- If an extension cord is needed to operate power tools or heavy equipment, use a heavy duty cord. Use weatherproof extension cords outside.
- Keep your work area clean. Especially be on the lookout for oily rags, papers, sawdust or other materials that can easily burn.
- Don’t perform electrical repairs yourself. Leave that to properly trained technicians.
- Don’t lay cords in the aisles or road where they can be walked on or run over.

Electrical System:

A safe electrical system will be installed in all buildings, with lighting to building standards.

5. The designated assemble area for the subject will be lawn in front of Main Baqai Hall.

6. Staff & faculty training will be carried out after every three months.

⟶ *Who should I contact in case of an electrical emergency?*
⟶ *Do I know what to do in case someone gets electrocuted?*
⟶ *Do I know what fire extinguisher to use in case of an electrical fire?*

LOTO System:

Lock-out/Tag-out means protecting employees from equipment startup or energy release while they are working on or servicing machinery. The person working on the equipment disconnects it and locks it off until they are done. No one else has access to the lock. That way, no one else can turn it on and accidently injure someone.

BASIC STEPS OF LOCKING AND TAGGING OUT A SYSTEM

1. Prepare for shutdown (authorized person identifies which sources of energy present and must be controlled).
2. Notify all affected employees (who, what, why etc.).
3. Equipment shutdown in normal manner.
4. Isolation of system from hazardous energy (Lock-out Procedure).
5. Dissipation of residual or stored energy.
6. Lock-out/ tag-out! Each device or lock should only have one key to prevent accidental removal or tampering (There should be as many locks as people working on system).
7. Verify isolation
8. Perform maintenance or service activity
9. Remove lock-out/tag-out devices

- Never tamper with or remove a lock-out device or tag when in place.
- Do not start or attempt to energize equipment that is locked out or tagged.
- Stay clear of all equipment, machines or sources of energy that are locked out or tagged out.

⟶ *Which employees require LOTO trainings?*
⟶ *Has there ever been an accident relating to LOTO failure?*

⟶ *Am I doing my part to make sure that LOTO is followed?*

2.5. Hand Tools:

Often times we overlook the hazards associated with the common tools that are used on a dailybasis. With this talk we hope to bring some awareness to the potential hazards of these tools and how to minimize these hazards.

Proper Use:

- Ensure you are wearing the correct PPE
- You should always wear eye protection
- Use the proper tool for the job
- Follow the manufacturer's instructions
- If unsure about use, ask a supervisor or coworker for clarification
- Ensure tools are not pointed at or operated in close proximity to other individuals
- Do not use excessive force to cut/drill through hard materials
- Store electric tools in dry areas
- Carefully inspect the tool for cracks, rust, wear or other damage. Make sure handles are secure and free of oil and grease. See that the hinges move freely and that blades are sharp.
- Plant your feet firmly, and don't lose your grip.
- Be sure to cut or chip away from your body.
- Keep your wrist straight, and don't use a tool while you're in an awkward position.
- Take breaks, and avoid repetitive tasks over prolonged periods of time.
- Never carry sharp tools or tools with pointed edges in your pockets.
- Carry tools in a tool belt or a tool box.
- Don't carry a tool so it obstructs your vision.
- Pass tools to other people by their handles.
- Clean off tools before putting them away. Be sure any guards or safety devices are in place when you carry tools and when you put them away.

2.6. Power Tools:

Power tools are a common part of our everyday lives and are present in nearly every industry. However, these simple tools can be hazardous and have the potential for causing severe injuries when used or maintained improperly. The employer is responsible for the safe condition of tools and equipment used by employees, but the employees have the responsibility for properly using and maintaining tools.

- Never carry a tool by the cord.
- Never yank the cord to disconnect it from the socket.
- Keep cords away from heat, oil, and sharp edges (including the cutting surface of a power saw or drill).
- Disconnect tools when not in use, before servicing, and when changing accessories such as blades, bits, etc.

- Avoid accidental starting. Do not hold fingers on the switch button while carrying a plugged-in tool.
- Use gloves and appropriate safety footwear when using electric tools.
- Store electric tools in a dry place when not in use.
- Do not use electric tools in damp or wet locations unless they are approved for that purpose.
- The greatest hazard of power tools is electric shock, so make sure the tool is properly grounded before it's turned on.
- Ensure that cords from electric tools do not present a tripping hazard.
- Remove all damaged portable electric tools from use and tag them: "Do Not Use."
- Keep your balance and proper footing when working with power tools, being careful not to overreach.
- When you've finished with the tool, put it down or store it so that it can't cause an injury to another worker.
- Keep the work area well lit and clean. Cluttered areas and benches invite accidents.

2.7. Radiation Exposure Safety:

The major aspect that must be considered when using radioactive sources is reducing the risk of exposure to radiation. Radioactive substances, known as ‘sources’, emit radiation and are used in some measuring devices. They are marked with a warning sign.

The generic rules for radiation protection applicable to all persons are:

- Do not interfere with, or dismantle, any radioactive source housing, shutter control, detector or warning sign.
- Report any visible defect immediately.
- Never enter an area where there is a radiation source without a permit to work.
- Contact the supervisor immediately in the event of an accident (including fire) involving radioactive source.
- Always wear full PPE.
- Equipment on may contain radiation sources which could emit harmful radiation in the event of damage to the source; if damage is suspected, avoid areas where the equipment is located.
- Employee exposure to radiation should be limited.
- Employees at continuous risk should wear personal monitoring equipment (Badges).
- Entry to radiation areas should be restricted and warning signs posted.
- Systems that produce radiation should be inspected and tested regularly.
- Incidents involving radiation exposure should be reported immediately.

⟶ *Has there been a near- miss involving radiation?*
⟶ *Do I wear my radiation badge daily and hand it over for regular inspection (after 3 months)?*
⟶ *Do I ask for a new badge to replace the old one?*
⟶ *Do I wear the appropriate PPEs when entering in a radiation zone?*
⟶ *Am I aware of what type of radiation is emitted from Medical Equipment I am working with?*
⟶ *What measures do I take against them?*

2.8. Permit to Work System (PTW):

PTW is documented system to ensure maintenance and project work to be done safely. It is written technical document to control work activities and avoid any major accident. In BMU this document is use by all departments that generate maintenance and work over requirements. The maintenance in charge keeps record of all work activities performing in the premises of BMU and responsible for safety of employees and equipments. HSE Department is equal responsible for safe practices and conduct periodic training regarding activities performed by maintenance department. HSE Department is also responsible for keeping all accidental record and periodic inspection of tools. HSE department has authority to stop activity if found unsafe and without permit display at the location of job. There are 3 permits applicable in BMU for safe working procedure during maintenance or routine jobs. The permits that are applicable are described below:

- Electrical work permit
- General work permit
- Hot work permit
- Cold work permit
- Work at Height

Electrical Work Permit:

Electrical work permit is written document to ensure safety of employee performing electrical job at site location. If the work can be done on energized line then this permit should be issued by maintenance department otherwise the work can be done with general work permit.

General Work Permit:

General work permit is use for general maintenance work that doesn't requires electrical powered equipment for the job.

Hot Work Permit:

Hot work permit is required when maintenance staff uses powered equipment and the job involves sparking or burning process e.g. welding, cutting, grinding etc

Cold Work Permit:

Cold work permit is required for job that involves powered equipment but doesn't create sparks.

Work at Height:

Work at height permit is use if work is required to be done at height greater than 6 ft almost 1.8 meter above floor level.

3. Biogas Safety

3.1. Biomedical Gas Handling Method

First install cylinder regulator with cylinder before its application for usage. For shifting from one location to another always secure cylinder position in stable state by the usage of cylinder trolley securing cylinder movement with chain or strip lock. Use cylinder bracket while installing to any usage location. The high gas pressure in cylinder may become projectile and injured any person. Majority of the incident recorded occurs in result of cylinder drop or bumping on floor resulting in pressure release. Ensure gas

cylinders are free from strain/oil and dust. Always check plastic tag installed with cylinder. If found any deformation do not use the cylinder because it might be exposed to heat. Always check the identity before using gas cylinder. If not sure, report urgently to the administration. Always check label attached with the regulator to ensure its in service period any without any fault, if found seal damage do not use regulator and inform administration to change it.

One you are sure about the cylinder conditions you are ready to use it with precautionary

measures. Do not use hand tools for tightening regulator with cylinder. First attach all necessary assembly such as flow meter/ suction devices. Now to operate open the cylinder valve antilock wise direction.

CONTAINER	STORAGE INFORMATION
Compressed gas cylinders and liquefied gas containers[a,b]	• Should be securely fixed (e.g. chained) to the wall or a solid bench so that they are not inadvertently dislodged. • Must be transported with their caps in place and supported on trolleys. • Should be stored in bulk in an appropriate facility at some distance from the laboratory. This area should be locked and appropriately identified. • Should not be placed near radiators, open flames other heat sources, sparking electrical equipment, or in direct sunlight.
Small, single-use gas cylinders[a,b]	• Must not be incinerated.

[a] The main high-pressure valve should be turned off when the equipment is not in use and when the room is unoccupied.
[b] Rooms where flammable gas cylinders are used and/or stored should be identified by warning notices on the doors.

1.

2.

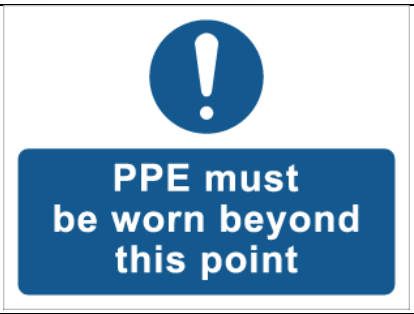
2.1.

2.2. Biomedical Gas Labeling and Precautions:

- Ensure good cylinder rotation considering oldest one first
- Secure cylinders with cylinder trolleys.
- Always check security valve seal prior to use.
- Do not crack open the valve before attaching pressure regulator as cylinder can be moved from its location unpredictably use secure location with chain lock
- Only trained person should be allowed to fit pressure regulator to avoid bumping the valve in open position.
- Always check cylinder content before usage such as type of gas, pressure gauge reading for sufficient application.

4. Fire and Safety Hazards and Precautions:

Sr. #	Location	Hazard	Precaution
1	Electrical Panels	Electrical Shock	
2	Roads	Accident/ Road Safety/ speed limit	
3	Chemical Storage Areas	Fire	
4	Generator Rooms	Fire	
5	Emergency Exit	Fire	

6	Restricted Areas	Air born diseases	
7	Labs	Hazardous Material	
8	No Parking	Accident/ Road Safety	
9	LPG Storage Areas	Fire	
10	Isolation Area	Air Borne Disease	

11	Assembly Area	Emergency Preparedness	

5. List of Annexures:

6	Work at Height Permit	Annexure-F	37

Annexure-A

1. **EMERGENCY CONTACT:**

S. NO.	EMERGENCY DEPARTMENT	FIRE STATION	CONTACT DETAIL
01	FIRE EMERGENCY	CENTRAL	16, 021-99215007
		SUPER HIGHWAY	021-36880381
		SORABH GOTH	021-99330031
02	AMBULANCE SERVICES	EDHI	115
		FATMID	021-32250500
		CHIPPA	021-111-111-134
03	POLICE STATION	MADADGAR	15
		AIRPORT	021-99248815
04	BOMB DISPOSAL	SQUAD	021-39212680
		CIVIL DEFENSE	021-32416626, 021-3241222, 32415111
05	HOSPITALS	FATIMA	021-34410293
		MEMON HOSPITAL	021-3491147

		JINNAH	021-35071854
06	EMERGENCY RESCUE	SERVICE	1122

Annexure-B

2. CHECKLISTS:

Daily Washroom Checklist

Month _____ **Washroom #** _____
Department _____ **Floor** _____

Days	Time	soap	dustbin	paper towels	housekeeping	sign
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

26						
27						
28						
29						
30						
31						

tick the boxes if found appropriate

Dusting Checklist

Month & Year _____ **Area** _____
Department _____ **Floor** _____

Days	Time	Equipment name	Equipment name	Equipment name	Equipment name	sign
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						

27						
28						
29						
30						
31						

Annexure-C

3. ELECTRICAL WORK PERMIT:

Baqai Medical University
Energized electrical work permit No. ___

To Be Completed by Requester

01. Description of circuit/ equipment location? _____

02. Description of work to be done? _____

03. Justification of why the circuit/ equipment cannot be de- energized or the work Differed until the next scheduled outrage? _____

Requester title _____ Date _____

To Be Completed by Electrically Qualified Persons Doing The Job

Detailed job description to be used in performing the above detailed work

Description of safe work practice to be employed _____

Result of shock hazard analysis _____
necessary shock personal and other protective equipments to safe
Perform assigned task? Yes ___ No _____
Result of flash hazard analysis _____
necessary arc flash and other protective equipments to safe perform assigned task

evidence of completion of job briefing, including discussion of any job related hazards

fire protection and removal of all flammable/combustable substance from working Area? Yes _____ No ___

Electrical Manager _____

Maintenance In charger _____ HSE Engineer_____

Annexure-D

4. GENERAL WORK PERMIT:

Baqai Medical University

GENERAL WORK PERMIT No. _____

Time ___ HRS Date _____

Person undertaking this work comply with all relevant health and safety laws And company health and safety policy, rules and provided copies of current. Public and employee's liability insurance and method statement on request. Only the work specified in to carried out and your work area must be left in safe and tidy condition at all times

JOB DETAILS LIST TOOL, EQUIPMENTS TO BE USED

STATE LOCATION OF WORK WHO COULD BE EFFECTED BY WORK

Special Instructions: _____

S.No.	CHECKS	YES	NO	N/A
1	Is person qualified and trained to perform this job			
2	has area been roped of and consider safe			
3	base of working platform is in stable condition			
4	if applicable, any other permit is attached			

5	job is being performed in the presence and supervision			

Protective Equipment Required			
body harness	___ Gloves	___ safety shoes	_____
Goggles	___ Dust Mask	___ Safety Belt	_____
lifeline	Live Air Respirators/Scott Air Pack		

Any special PPE's required _____

Initiated By	Reviewed By	Authorized By
_____	_____	_____
Department	HSE Engineer	Maintenance in charge

Annexure-E

5. COLD WORK PERMIT:

Baqai Medical University

Cold Work Permit No. _____

Time ___ HRS Date _____

Mr. _____ IS AUTHORIZED TO PERFORM _____			
_____ IN _____ AREA FROM _____ HRS. TO HRS.			
S.No.	CHECKS	YES	NO	N/A
1	is area berricaded properly			
2	Is area cleared from any ignition source			
3	does adequate floor mating has been done for cleaning purpose			
4	is there any use of flammable substance			
5	does machine or equipment is depressurized/ de energized			
6	does proper housekeeping has been done before start of job			

Special Instructions: _____

Protective Equipment Required

body harness _____ Gloves ___ safety shoes _____

Goggles _____ Dust Mask ___ Safety Belt _____

lifeline Live Air Respirators/Scott Air Pack

Any special PPE's required _____

Initiated By Reviewed By Authorized By

_____ _____ _____

Department HSE Engineer Maintenance in charge

Annexure-F

6. WORK AT HEIGHT PERMIT:

Baqai Medical University

Work at Height No. _____

Time ___ HRS Date _____

6. Abbreviations

Mr. _____ IS AUTHORIZED TO PERFORM _____

_____ IN _____ AREA FROM _____ HRS.

TO HRS.

S.No.	CHECKS	YES	NO	N/A
1	is area barricaded properly			
2	is there any high voltage lines near by working platform			
3	base of working platform is in stable condition			
4	working platform has toe board, guard rail, and mid rail?			
5	ladder is placed for working at height more than 6 ft			
6	ladder should be properly tagged with working platform			
7	is there any anchor point available for safety harness			
8	scaffolding is inspected and certified for operational purpose			
9	safety harness is inspected and safe for usage			

Special Instructions: _____

Protective Equipment Required

body harness _____ Gloves ___ safety shoes _____

Goggles _____ Dust Mask ___ Safety Belt _____

lifeline Live Air Respirators/Scott Air Pack

Any special PPE's required _____

Initiated By Reviewed By Authorized By

_____ _____ _____

Department HSE Engineer Maintenance in charge

- BMU- Baqai Medical University
- RACE- Rescue, Alarm, Confined, Extinguish
- LPG- Liquefied Petroleum Gas

- HSE- Health, Safety and Environment
- BIRDS- Baqai Institute of Reproductive and Development Sciences
- HODs- Head of Departments
- HIV- Human immune deficiency Virus
- LOTO- Lock Out Tag Out

7. References

- https://www.nfpa.org/assets/files/AboutTheCodes/101/NFPA101FactSheet0809.pdf
- https://www.osha.gov/laws-regs/standardinterpretations/2004-11-04-0

https://www.osha.gov/control-hazardous-energy#:~:text=The%20OSHA%20standard%20for%20The,protect%20workers%20from%20hazardous%20energy.

- https://www.osha.gov/laws-regs/federalregister/2001-01-18
- https://www.osha.gov/sites/default/files/publications/bbfact01.pdf
- https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.132
- https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1200
- https://pubs.acs.org/doi/full/10.1021/acs.chas.0c00012