

A graphic featuring a yellow diamond shape with a white border. Inside the diamond are illustrations of laboratory glassware: a large Erlenmeyer flask on the left, a microscope in the center, and two test tubes on the right. The background is a blue gradient with a horizontal line across the top. The text 'LABORATORY SAFETY' is written in bold red letters across the middle of the diamond.

# **LABORATORY SAFETY**

**LABORATORY**

# INTRODUCTION

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Environmental protection,  
Occupational Safety and Health  
are the **Responsibility** of all staff,  
students and collaborators  
working in MSE.

# OBJECTIVES

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- To lay down general safety specifications and requirements
- To provide primary information for various safety issues
- To promote awareness on safety

# AUTHORIZATION OF LAB USE

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- Compulsory for all staff/students to attend Safety Briefing or read the Safety Manual before working in MSE Lab.
- Read and sign the agreement to abide to “**Rules and Regulations**” instructions.
- Orientate on the Emergency escape, Safety Facilities and Emergency Contact Number.

# EMERGENCY RESPONSE PLAN

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## **AWARENESS** of:

- **Emergency Evacuation Procedures**
- Location of the designated **Assembly Area** (Blk N4-B4 Car Park) during Evacuation
- **Escape Routes** in offices/Labs;
- **Fire Fighting Equipment & Fire Alarm Call-Points**

# WHEN DO WE EVACUATE?

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***REAL EMERGENCY*** such as:

- **FIRE** (Unexpected or uncontrolled fires)
- **EXPLOSION**
- **HAZARDOUS GAS LEAKAGE**
- **MAJOR CHEMICAL SPILLAGE**
- **BIOLOGICAL THREAT**

# WHAT DO YOU DO IN CASE OF FIRE?

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- Alert surrounding people to leave the scene.
- Retreat to a safe area.
- Call 6790 **4033**
- Be Calm! State your **location**, **type** of incident/accident, **Name & Contact no.**, **Number & Nature of Injury** (if any).
- Stop people from going near the scene

# WHEN HEARING FIRE ALARM!

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1<sup>ST</sup> Alarm(<1min) – Investigation

2<sup>nd</sup> Alarm (long & continuous) –  
**Evacuation**

- Evacuate by the nearest exit staircase.
- Follow instruction given by the fire wardens.
- Do not use lifts!

# EMERGENCY EVACUATION PROCEDURES

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- **Stop** all activities (shutdown equipment, remove all heating/ electrical processes, stop gas supply, etc if safe to do so)
- **Leave** the building in orderly manner via the nearest EXIT/ staircases
- **Proceed** to designated Assembly Site (N4-B4 Car Park)
- **Assemble** according to Lab/ Department/ Visitors & report to Fire Warden for roll call.
- **DO NOT** use lift. Use staircases.
- **DO NOT** re-enter the building unless authorized.

# INCIDENTAL EMERGENCY RESPONSE

Incident	Call ERT No.:6-790-	Response Procedures
Small Fires	4033	Use fire extinguisher, if fail to put out then evacuate
Incidental Chemical Spills	6156	Use PPE and Spill kit to contain & dispose as waste chemical
Minor Biohazards spill	6286	Use PPE, pour decontaminant, sorbent to absorb, autoclave & dispose as biohazard waste
Non-hazardous Gas leakage	6286	Shut off leakage source, open window & door for ventilation
Radiation Exposure	6158	Switch off apparatus, identify & isolate affected person, monitoring

# MEDICAL EMERGENCY

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- Call ERT (Medical) @ ext **6161**
- If clothing on fire, roll person on floor or douse with water
- If chemical spill on body, flood area for 15 mins. & remove clothing
- If chemical enter eye, wash it with water for 15 mins.

# INCIDENT/ ACCIDENT REPORTING

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## Reporting Accident/ Incident:

- **Office hour:** Call **ERT/ TIC**
- **Non-office hour:** call **TIC / 6790 4777**
- Campus **Security:** **6790 5200**
- Submit the “**MSE Accident/ Incident Report**” within **24 hours**

# IN CASE OF EMERGENCY

## PLEASE CONTACT :

**FIRE & AMBULANCE : (9) 995      POLICE : (9) 999**

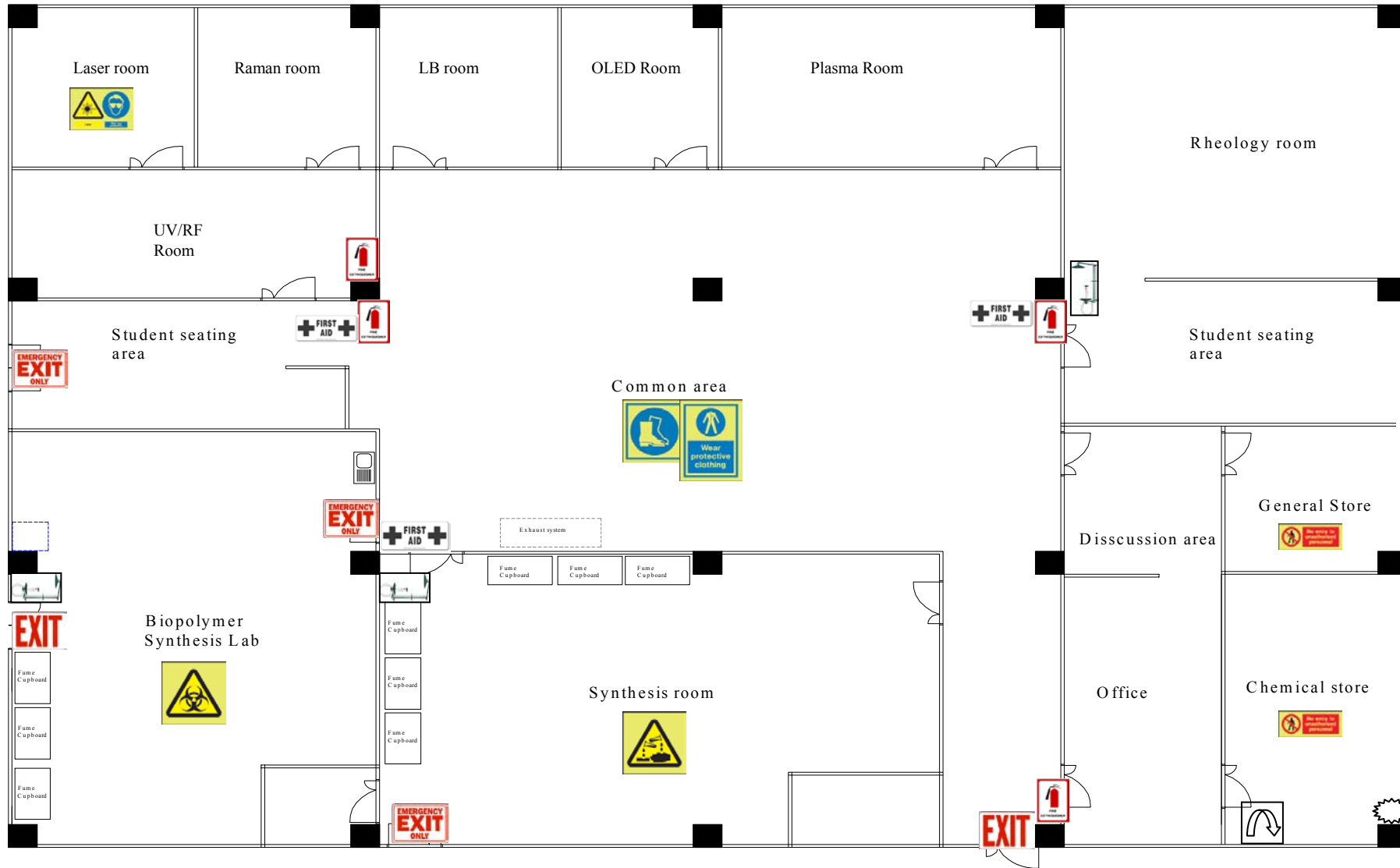
**CAMPUS SECURITY : (9) 6790 5200**














**24 HRS FAULT REPORTING CENTRE : (9) 6790 4777**

**LABORATORY MANAGER, SWEE SING : 9477 9633 HP**

**REMEMBER!! Try to be calm & clear when you speak.**

**State your location clearly : N4.1-B2-03, Polymer Lab.**



- |  |                             |   |                                |   |                          |   |                                   |   |                                  |
|--|-----------------------------|---|--------------------------------|---|--------------------------|---|-----------------------------------|---|----------------------------------|
|  | ---- First Aid box          |  | ---- Emergency Exit Only       |  | ---- Exit                |  | ---- Chemical Spill clean up kits |  | ---- Chemical Waste Dispose Area |
|  | ---- Cover Shoes required   |  | ---- Protective Cloth required |  | ---- Eyes Wash/shower    |  | ---- Authorized Entry Only        |   |                                  |
|  | ---- Chemical Risk Location |  | ---- Fire Extinguisher         |  | ---- Laser Risk Location |  | ---- Biological Risk Location     |   |                                  |

# GENERAL SAFETY

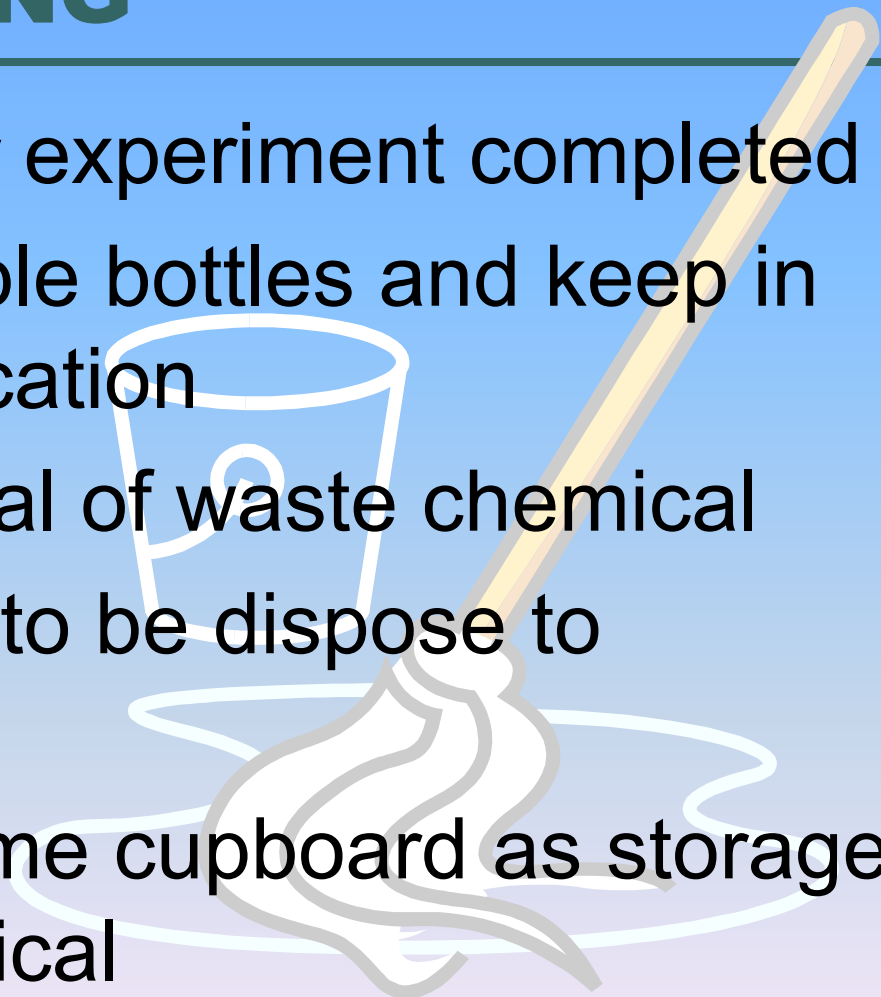
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- **Lab coat & Cover shoes** must be worn at all time in the lab
- **NO food & drink** in working area
- Proper **PPE** (e.g. Goggles, Gloves, Masks, etc) must be worn as required
- Read **MSDS** before handling hazardous substances
- Ask for **HELP** when in doubt or not sure

# HOUSEKEEPING

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- Clean up after experiment completed
- Label all sample bottles and keep in designated location
- Proper disposal of waste chemical
- Broken Glass to be dispose to “Sharps Bin”
- Do not use fume cupboard as storage area for chemical



# GOOG HOUSEKEEPING (5S)

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## MAINTAIN THESE 5 STANDARDS

- ❖ **SEIRI** – **Organisation**  
Sort out items and discard the unnecessary
- ❖ **SEITON** – **Neatness**  
Arrange a place for everything, everything in its place
- ❖ **SEISO** – **Cleaning**  
About cleaning to be done by everyone in the organisation
- ❖ **SEIKETSU** – **Standardisation**  
Continually maintaining your Organisation, Neatness & Cleaning
- ❖ **SHITSUKE** – **Discipline**  
Train people to be self-disciplined

# SECURITY MATTER

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## Working After Office Hours

- ❖ All lab users are **not allow** to **work alone**
- ❖ FYP's must be under supervision
- ❖ Lab users are not allowed to bring in outsider
- ❖ Check all room, switch 'OFF' light and key lock the door before leave.

# COMPRESSED GAS SAFETY

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- Secure Gas Cylinders at all time
- Ensure regulator and valve fittings are compatible
- NEVER use oil or grease on the gas regulator
- Transport Gas Cylinder using gas trolley

# CRYOGENIC LIQUIDS

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- Causes cool burn as that of thermal burn
- Cryo-Gloves and Eye Protection should be worn
- Adequate ventilation required to prevent build up of vapour

# PRESSURE VESSEL SAFETY

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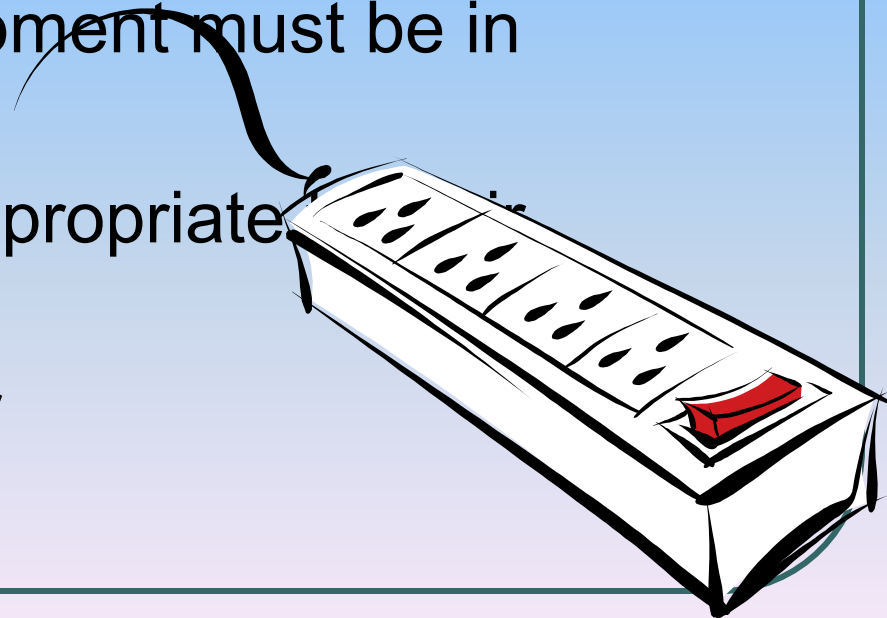
- **Potential bomb** if is not properly maintain or misuse
- Check for MOM certification and testing validity
- Always shut down and drain the pressure & water after used.

# ELECTRICAL SAFETY

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## Precautions

- Do not use extension cords for permanent wiring
- Electrical cords on equipment must be in good condition
- Cables used must be appropriate loading
- Avoid contact with water



# **RADIATION & LASER SAFETY**

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- Dosimeter must be worn while using Radiation Equipment
- Control measures are required for Class 3b and Class 4 lasers
- Protective eyewear must be wore
- Training of operators and personnel working on or near lasers

# MACHANICAL SAFETY

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## Potential Hazards:

- Cuts & Crushed fingers

## Protection:

- Dangerous movable part must be provided with guard.
- Concentrate while working
- Regular maintenance

# BIOSAFETY

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**Biohazard** are Infectious agent or biologically derives infectious materials that will post risk to human health.

## **Exposure control:**

- Gloves, Mask & Biological Safety Cabinets
- Cleaning/ Disinfecting/ Sterilization

# **BIOHAZARD WASTES DISPOSAL**

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- 1) Labeled clearly
- 2) Disinfect (Chlorox)
- 3) Autoclave in autoclavable bags

## **Special Disposal Required:**

- All sharps, e.g. glass implements, needles, syringes, blades, etc.
- Biologically-cultured stocks & plates, human blood or tissues

# CHEMICAL SAFETY

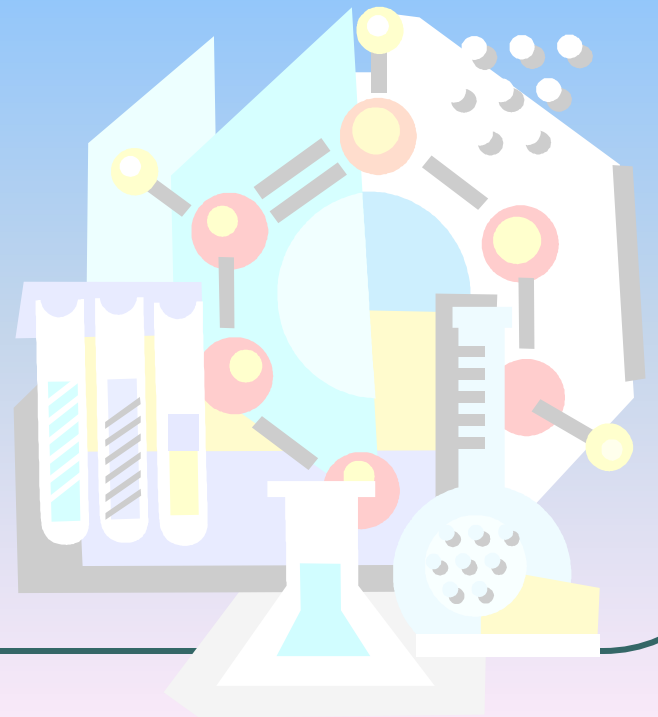
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## **Chemical Hazards** - Health, Fire & Explosion

- Read **MSDS** & understand the hazardness before handling

### Definition:

MSDS contains information on chemical identification, composition, and physical properties along with health, physical, environment hazards and disposal consideration.



# CHEMICAL HANDLING & STORAGE PROCEDURES

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- Wear proper personal protective equipment (PPE)
- Use fume hoods or other ventilation equipment to control exposure to airborne substances
- All containers must be labeled with **chemical name**, **concentration** and **hazardous warning**.
- Do not store materials in the fume hood or on the floor
- Posting of **warning sign** near dangerous equipment or experiment



# CLASSIFICATION OF CHEMICAL WASTES

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- **Non-Chlorinated** Organic Solvent Waste
- **Chlorinated** Organic Solvent Waste
- **Diluted Inorganic Acid** Waste
- Other **Aqueous** Chemical Waste
- Separate storage for **Special Chemical** (e.g. developer, fixer, photoresist, perchloric acid, mercury, HF, etc.)

