

University of Malaya

SAFETY HANDBOOK



EMERGENCY CONTACT INFORMATION

UNIVERSITY NUMBERS

University Malaya Security Office (Pejabat Keselamatan)	03-7967 7070 / 3582
University Malaya Medical Centre (UMMC) (Pusat Perubatan Universiti Malaya)	03-7949 2898 / 2190
Student's Health Clinic (Klinik Kesihatan Pelajar)	03-7949 2837 / 3737
Radiation Protection Service Unit (UPPS) (Unit Perkhidmatan Perlindungan Sinaran)	03-7967 6963
Office of Safety and Health (OSH) (Pejabat Keselamatan dan Kesihatan)	03-7967 7925
Institutional Biosafety Committee (IBC) (Jawatankuasa Institusi Biokeselamatan)	03-7967 2414

EXTERNAL NUMBERS

National Emergency No.	999 (Mobile phone, dial 112)
Pantai Fire Station (BOMBA, Jalan Pantai Baru)	03-2282 4444
Pantai Police Station (Balai Polis, Jalan Pantai Baru)	03-2282 4222 / 03-2282 2207

Important numbers of your Faculty & Department Numbers

Dean's Office (Pejabat Dekan)	_____
Head of Department's Office (Pejabat Ketua Jabatan)	_____
Safety & Health Committee Chairperson (Pengerusi Jawatankuasa Keselamatan dan Kesihatan)	_____
Unit Penyelenggaraan / Juruteknik (Maintenance Unit / Technician)	_____

PREFACE

The publication of this safety handbook is timely as a step forward in ensuring a safe workplace and environment campus wide. I take this opportunity to thank all those who were directly involved and who had indirectly contributed to the publication of this safety handbook.

This safety handbook provides a general guide in support of the University's Safety Policy launched by our Vice-Chancellor, Tan Sri Ghauth Jasmon in 2009. This first edition is a culmination of input and expertise from the various faculties serves as a general reference to provide standard guidelines on safety for the University's staff, students and visitors about our procedures on safe work, handling of hazardous materials and the requirements to ensure safety at the workplace.

One of the major risks in the workplace is the very people working at the workplace. Therefore, this safety handbook is aimed at preparing our staff, students and all parties to observe at all times, safe methods of work and to ensure a safe, healthy, stress-free and conducive working environment for everyone.

I urge all staff and students to comply with the rules and safety codes in this handbook for the effective enforcement of the University's Safety Policy and the implementation of a safety program. It is everyone's responsibility to ensure a safe workplace which can prevent unnecessary accidents and illnesses.

I thank all of you for reading this safety book and for pledging your personal commitment to comply with all the safety procedures to ensure UM is a safe and accident free workplace. I hope that you will assimilate the safety work culture, and that you are committed to do it right from here on. Always be alert as safety is a state of mindfulness, while accidents happen when safety awareness ends.

All users of the laboratories and workshops, including students and visitors, must read the safety book and sign the Occupational Safety & Health Declaration Form and return the completed form to the respective Departmental Heads prior to entry to use the premises and facilities.

This safety handbook will be reviewed periodically to incorporate feedback, latest information and changes for continuous improvement and to ensure its relevance to meet the rapidly changing times and technological advancements.

Professor Dr. Mohd Hamdi Abdul Shukor
Deputy Vice-Chancellor (Academic & International)
University of Malaya

ACKNOWLEDGMENT

This Safety Handbook was prepared by The Laboratory Safety Book Committee (Jawatankuasa Buku Panduan Keselamatan Makmal) which is headed by Prof. Dr. Wan Haliza Abdul Majid, Deputy Dean (Higher Degree), Faculty of Science.

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TABLE OF CONTENTS

INTRODUCTION

SAFETY AND HEALTH POLICY

1.0 INDIVIDUAL RESPONSIBILITY

2.1 SAFETY AND HEALTH REGULATIONS AND CODES OF PRACTICE IN THE UNIVERSITY

2.2 Emergency Procedures

2.3 First Aid and Accident & Incident Reporting

2.4 Policy on Working Alone / Out of Hours

2.5 Visitors, Children and Infants on University Premises

2.6 Smoking

2.7 Hazards and Risk Assessment Procedure

3.1 ACCESS, HOUSEKEEPING AND GENERAL SAFETY RULES IN LABORATORIES, WORKSHOPS AND STORES

3.2 General Safety Rules

3.3 Access

3.4 Housekeeping

4.1 SAFETY IN OFFICES, READING ROOMS AND CLASSROOMS

4.2 Walking Surfaces

4.3 Bookcases, Shelves, Cabinets, Office Equipment

4.4 Electrical Hazards

4.5 Computer Workstation Ergonomics

5.1 SAFETY IN WORKSHOPS

5.2 General Workshop Behavior

5.3 Guards

5.4 Machine Tools

5.5 Lifting Heavy Objects

5.6 Hazardous Chemicals

6.1 SAFETY IN LABORATORIES

6.2 Chemicals

6.3 Chemicals on the skin or in the eyes

6.4 Chemical spillages

6.5 Flammable/Toxic Vapours

6.6 Cryogenic materials

6.7 Apparatus and Equipment

6.8 Autoclave Safety

6.9 Gas Safety

6.10 Glassware

6.11 Hygiene

6.12 Labeling Reagent Bottles

6.13 Pipetting

6.14 Sharps

6.15 Personal Protective Equipment (PPE) and Equipment

7.1 GOOD MICROBIOLOGICAL PRACTICE (GMP)

7.2 Safety Procedures in Microbiology Laboratories

8.1 WASTE DISPOSAL

8.2 Clinical Waste

8.3 Animal Waste

8.4 Chemical Waste

8.5 Sharp Waste

9.1 RADIOACTIVE MATERIALS

9.2 Safety Procedures when Working with Radiation Sources

10.1 GENETICALLY MODIFIED ORGANISMS (GMO)

10.2 Working with GMO

APPENDICES

APPENDIX A

Occupational Safety and Health Declaration Form

APPENDIX B

Emergency Procedures

APPENDIX C

Accident Investigation Report

APPENDIX D

Accident/Incident Report

APPENDIX E

Victim"s Report

APPENDIX F

Witness"s Report

APPENDIX G

Hazard Identification, Risk Assessment & Risk Control
(HIRARC)

INTRODUCTION

The University of Malaya has implemented the Safety and Health Policy to comply with current legislation under the Occupational Safety and Health Act 1994 and its responsibility as an employer is to ensure as far as is reasonably practicable, the health, safety and welfare of members of staff, students and of other people who may be affected by its activities. With the increased risk of accidents occurring in the workplace, the need for adopting safety precautions has been acknowledged. Therefore, this safety guide book is an important reference document for the University as it provides a general safety guideline for students, staff and visitors at the workplace. The guide book should be read in its entirety to give users a basic understanding of the safety procedures as outlined in the individual sections that are applicable at workplaces in the various Faculties and within the University.

This safety handbook covers the following topics:

1. Individual Responsibility
2. Safety and Health Regulations and Code of Practice in the University
3. Access, Housekeeping and General Safety Rules in Laboratories, Workshops and Stores
4. Safety in the Office, Reading Rooms and Classrooms
5. Safety in Workshops
6. Safety in Laboratories
7. Good Microbiological Practice
8. Waste Disposal
9. Radioactive Materials
10. Genetically Modified Organisms

Further information on safety procedures in specialized facilities, laboratories or workshops should be obtained from the respective unit heads/laboratory supervisors

For more information on radiation safety and working with radioactive materials, please contact UM Radiation Protection Service Unit (*Unit Perkhidmatan Perlindungan Sinaran*).

Additional information on safety can be obtained from the Office of Safety and Health (*Pejabat Keselamatan dan Kesihatan OSH*) of Universiti Malaya or from any Safety and Health Committee (SHC) of the respective Faculties.

The University recognizes that no Safety and Health Policy is likely to be successful unless it actively involves all University employees and students. Hence, cooperation from all parties is necessary and vital.

All students, both undergraduates and postgraduates, and visitors are required to read the safety handbook and complete the *Occupational Safety & Health Declaration Form* (**Appendix A**), before embarking on any work in laboratories, workshops and using any equipment. The form must be returned to the respective Departments as a confirmation that you have read and understood the safety handbook in its entirety and agree to abide by the safety rules stated within it.

SAFETY & HEALTH POLICY

University of Malaya is committed in ensuring the safety and health of all members of the staff, students and other parties dealing with it.

To accomplish this policy, the University of Malaya will:

Core Value

Make occupational safety and health as part of its organisational core values.

Legal Requirements

Comply with legal requirements as well as the related safety and health regulations of the nation.

Safety Responsibilities

Prepare and coordinate an administrative system and work environment that are safe and healthy.

Training & Support

Enhance the level of awareness among the campus community on the importance of occupational safety and health by providing adequate information, instructions, training and supervision.

Risk Control

Conduct activities to identify hazards as well as evaluate and control risks at the workplace.

Accident Investigations

Investigate and record accidents, poisoning and illness at work as well as dangerous incidents and take measures to ensure such incidents do not recur.

Continual Improvement

Conduct inspections, audits and policy revisions periodically to ensure continuous improvement.

Resources

Allocate sufficient resources to implement the above objectives.

The Administration and the campus community of the University of Malaya will work together to achieve the goals and objectives of this policy through negotiation and cooperation.



PROFESSOR DATO' DR. MOHD. AMIN JALALUDIN

Vice-Chancellor

7th March 2014

1.0 Individual Responsibility

The safety of the workplace and its environment is a high priority and should be the responsibility of every staff, student, and visitor in the University.

The University requires that all staff, students and visitors accept this responsibility and that they will:

- 1.1 Take reasonable care for the safety and health of themselves and of other persons at the workplace who may be affected by their acts or omissions of their acts.
- 1.2 Report accidents, near misses, occupational poisonings, occupational diseases, hazardous conditions and safety concerns immediately to their supervisors, instructors, hosts, and/or emergency management personnel, as appropriate.
- 1.3 Abide by safe practices and procedures established by the University.
- 1.4 Cooperate fully with the Safety & Health Committee and the University's Office of Safety and Health (referred to in the acronym as OSH) in addressing safety and health issues.
- 1.5 Adhere to all Malaysian laws and other subscribed standards concerning safety, health and environmental issues.

2.1 Safety and Health Regulations and Codes of Practice in the University

All staff, students and visitors should familiarize themselves with the safety regulations and codes of practice of the University, the location of nearest emergency exits and safety equipment such as fire extinguishers.

2.2 Emergency Procedures

This section covers various procedures during an emergency, such as fire, chemical spill, biological spill, radioactive leakage, gas leakage, earthquake, or bomb threat. (Please refer to [Appendix B: Emergency Procedures](#))

- 2.2.1 When the fire alarm is triggered at your workplace, follow the Emergency Evacuation Procedures to the nearest exit as in the **Fire Evacuation Action** plan, and go immediately to the **assembly point** indicated. Do not attempt to re-enter the building

until permitted by the Emergency Manager or Fire & Rescue Department (*BOMBA*) officer.

- 2.2.2 You have the responsibility for raising the fire alarm when you have reason to believe there is a fire. If in doubt, make an alarm call. Where possible, try to put out a small fire.
- 2.2.3 All fires, however small (even when it has been put out), have to be reported to the Head of Department (HoD) and the Departmental Safety & Health Committee (SHC) immediately for further action.
- 2.2.4 Any interference with or misuse of fire-fighting equipment or tampering with the fire alarm, or sounding the alarm maliciously is a serious offence, and may lead to disciplinary and other action by the University or other relevant authorities.

2.3 First Aid and Accident & Incident Reporting

- 2.3.1 Any accident, however small, must be reported immediately to the staff in charge, a member of the administrative staff or a laboratory technician and to the Departmental SHC. Appropriate first aid should be given and, when necessary, the emergency services should be alerted. The academic or technician in-charge can decide to deal with it themselves, using the nearest first aid box until the first aider arrives or to send the victim to the EMS (Emergency Medical Services / UH). Do not carry-out first aid maneuvers if you have not been trained. Persons who are in need of or is receiving first aid should not be left on their own. Someone should stay with them to reassure them until qualified staff takes over.

All accidents involving injury, death or damage, occurring, either on or off University premises, **must** be reported to the Head of Department, Departmental SHC, the Dean and the Chairman of the Faculty SHC (Deputy Dean of Development or assigned staff) and Director of Office of Safety and Health (OSH) without delay. Investigation will be carried out and reports filed using the Accident Investigation Report Form (*Laporan Siasatan Kemalangan*, see **Appendix C**). Accident and Incident Report Form (*Laporan Kemalangan*, see

Appendix D) and. These forms can be downloaded from the UMPortal (OSH folder) or obtained from the respective SHC.

- 2.3.2 Accident victim(s) and witness(es) are required to complete the respective forms, Victim's Report (*Laporan Mangsa*, **Appendix E**) and Witness's Report (*Laporan Mangsa*, **Appendix F**).

2.4 Policy on Working Alone / Out of Hours

- 2.4.1 No student is allowed to work alone in a laboratory or workshop. At all times there must be at least two people working in an adjacent area on the same floor to ensure safety and when required, one of them can go to seek help.
- 2.4.2 No undergraduate student is allowed to work even in any teaching laboratories at any time outside the specified laboratory hours without explicit permission from the lecturer in-charge. This includes before and after the class and during lunch break.
- 2.4.3 No undergraduate project student is allowed to work **out of hours** unless he/she is closely supervised by his/her supervisor. **Out of hours** is defined as before 0830 and after 1730 and at weekends, public holidays or semester break.
- 2.4.4 Postgraduate students can work unsupervised during normal working hours. They must obtain permission from their supervisor to work **out of hours**, and are required to sign a logbook kept at the entrance when they enter and leave the building. The book provides a quick means of ascertaining who are in the building during these hours, and in the event of any accident or major catastrophe, and will permit suitable action taken to locate them and bring them to a place of safety. Academic supervisors must assess the risk prior to granting permission to work after hours.

2.5 Visitors, Children and Infants on University Premises

- 2.5.1 Visitors are not allowed in any laboratory or workshop without the permission of the Head of Department.

- 2.5.2 Children are not allowed in any laboratory or workshop. Children are defined as persons under the age of 12 years. Under special circumstances, such as school visits, children are allowed to enter the laboratories or workshops under the strict supervision by authorized university staff accompanied by their teachers. However, if there is any hazardous experiment or work being carried out at the time, children are not allowed to enter. Admission of children to the laboratories and workshops must be with written permission from the Head of Department after assessing the risk of such a visit.
- 2.5.3 Infants are not allowed in the laboratory or workshop. Infants are defined as children under the age of 6 years.
- 2.4.3 No child or infant is allowed during fieldwork.

2.6 Smoking

Smoking is prohibited in ALL university buildings, vehicles and open areas in the campus. The entire university is a no smoking zone.

2.7 Hazards and Risk Assessment Procedure

- 2.7.1 Under the Malaysian occupational safety and health legislation, it is a requirement for workplaces to control the hazards of all its activities which may impact the health and safety of the staff, students, contractors and visitors. The major hazard groups likely to be present at the University are:
- (a) Physical (electrical, mechanical, natural disaster, event, radiation, temperature, noise, etc)
 - (b) Chemical (chemical substances, liquids, gases, fumes, vapors, flammables, explosives, corrosives, poisons, etc)
 - (c) Biological (animals, plants, pathogens, human or animal tissue and fluids, parasites, etc)
 - (d) Ergonomics (poor lighting, improperly adjusted workstations or chairs, poor posture, repetition of same awkward movements, etc)

- (e) Psychosocial (working alone, stress, bullying, sexual harassment, working in remote locations, etc.)
- 2.7.2 The Hazard Identification, Risk Assessment and Risk Control (HIRARC) forms (**Appendix G**) must be completed by staff and students. It will be used to identify the hazards in the workplace and to provide guidance of appropriate control measures. Control measures should be implemented in accordance to the hierarchy of control:
- (a) Elimination – Can the process, use of the substance or the equipment be stopped?
 - (b) Substitution – Substitute with a safer alternative.
 - (c) Isolation – Isolating the worker from the hazardous equipment, substance or process.
 - (d) Engineering Controls – Often involves enclosure, exhaust ventilation or guarding.
 - (e) Administrative Control – Briefing/training sessions, standard operating procedures, information sheets, signage.
 - (f) Personal Protective Equipment – Suitable protection equipment such as overalls, aprons, footwear, lab coats, safety glasses, goggles, respirators, gloves and face shields.
- 2.7.3 A hazard assessment is required for all tasks involving all the hazards listed in item 2.6.1

3.1 Access, Housekeeping and General Safety Rules in Laboratories, Workshops and Stores

3.2 General Safety Rules

- 321 Students are not permitted to enter any laboratory, workshop and store area without permission.
- 322 Students are only permitted in laboratories for official research or during practical classes.
- 323 Running in the corridors, laboratories, and workshops or on the staircases should be avoided.

- 324 Coats, bags and other personal belongings must NOT be taken into laboratories or workshops. From a security point of view, it is not advisable to leave valuables, laptops or other personal belongings on walkways, staircases or landings.
- 325 Lab coats should not be worn outside the laboratory or workshop.
- 326 At the end of a practical class, all electronic and electrical equipment should be switched off (unless otherwise instructed).
- 327 All hazardous materials or apparatus must be rendered safe, or disposed off, in the manner indicated by the academic or technical staff on duty or by established procedures before leaving the laboratory.
- 328 Eating, drinking, storing of food, and applying cosmetics are strictly prohibited inside any laboratory or workshop

3.3 Access

- 331 Fire doors must be closed at all times except for the fire doors that are designed to be open under normal conditions and close automatically in the event of fire (held by magnetic devices linked to the fire alarm system).
- 332 Carpet or electrical cords are not allowed to run under (through) the fire doors.
- 333 Care should be exercised when opening and closing doors (especially those which open outwards).
- 334 All laboratory door exits, access to emergency equipment and passage ways must be kept clear of obstructions.

3.4 Housekeeping

- 341 All laboratory benches must be cleaned and kept clear of trash, spills, debris, apparatus, glassware and/or chemicals not currently in use.
- 342 At the end of the workday in any laboratory or workshop, all work areas, benches and sinks must be left in a clean and tidy condition. It is the **user's responsibility to clear up any mess after using**

- the laboratory or workshop.** Dust should be removed using an appropriate vacuum cleaner. The use of brooms is not recommended.
- 343 All hazardous materials or apparatus must be rendered safe, or disposed off, in the manner indicated by the academic or technical staff in charge or by established procedures before leaving the laboratory.
- 344 Stacked materials should be in stable condition.
- 345 The space in between two machines should be at least 60 cm wide and kept clear of any materials.
- 346 No bottles, plastic containers or experiment materials are allowed to be kept under the benches, on the floor or less than 15 cm from the edge of the bench top.
- 347 Laboratory benches should not be used as a general storage area. Apparatus, glassware and/or chemicals not in use should be kept in the proper storage area.
- 348 Fume hoods and biosafety cabinets should not be used as a storage area.
- 349 Disposal of waste should be done safely and promptly using the designated bins/containers. The technician/staff in-charge should provide the necessary guidance to dispose waste.
- 3410 All radioactive, chemical and biological materials must be properly labelled and stored inside its designated cabinets.
- 3411 Proper inventory of the materials have to be kept updated at all the times. The inventory level of hazardous and combustible materials should be as minimal as possible.
- 3412 The storage of chemicals must be in accordance with the recommendations of the relevant Safety Data Sheet (SDS). Incompatible chemicals and/or materials must not be stored together. Combustible chemicals cannot be kept near heat or ignition source. Chemicals with low ignition point should be kept in the appropriate temperature.

34.13 All chemical bottles or containers must be capped with proper cap or seal except when being used.

34.14 Section 3.3.14 – The use of floor marking (or line marking) to designated working areas or specific hazards Guidelines on the types of lines used are as follow:

Yellow Line

- use to mark a specific pathway which should be cleared of any obstacles or
- to mark a working area usually with hazard present

Blue Line

- use to mark an area reserved for movable items i.e. furniture or equipment.

Red Line

- is reserved for marking an area use to store hazardous waste i.e. chemical waste in the laboratories.

Tiger Line (diagonal yellow & black lines)

- used to bring attention to a specific hazard i.e. uneven floor or trip hazard.

4.1 Safety in Offices, Reading Rooms and Classrooms

4.2 Walking Surfaces

4.2.1 Walkways must not be obstructed, especially in the storage areas, with at least 90 cm wide clearance.

4.2.2 Walking surfaces should be clear of any materials that may present as a tripping hazard, such as electrical cords or wires stretched across the floor, short stacks of paper, or small pieces of equipment on the floor. Floors must not be slippery.

4.2.3 Carpets and mats should be secured to prevent slipping. Carpets and mats that are warped that may cause tripping should be replaced.

4.2.4 Walkways should be clearly marked using yellow lines.

4.3 Bookcases, Shelves, Cabinets, Office Equipment

- 4.3.1 Storage cabinets, filing cabinets, and bookcases should be secured to the wall to prevent tipping. Only one drawer should be opened at a time to prevent the cabinet from tipping over.
- 4.3.2 File drawers should be kept closed when not in use to prevent a tripping hazard.
- 4.3.3 Heavy items should be kept in the lower shelves. The stability of free-standing cabinets and cupboards is reduced if heavy parcels and equipment are stacked on them.
- 4.3.1 Paper cutters and other equipment that are potentially dangerous should be used carefully. Blades of guillotines should be guarded.
- 4.3.2 Some office machinery is too heavy for one person to carry; help should be sought if it is necessary to move such equipment.
- 4.3.3 Trolleys should not be loaded to the point of obscuring vision of the way ahead.
- 4.2.4 Ladders and step ladders should be of sound construction and used with care; when necessary they should be footed or secured to a suitable fixture.

4.4 Electrical Hazards

- 4.3.4 Extension cords should have three prongs for proper grounding and the cord should be in good condition to prevent accidental electrical exposure. Use surge protectors for computers, printers and other electrical equipments. The use of extension cords should be avoided to prevent overloading.
- 4.3.5 Limiting the length of extension cords helps prevent improper use, such as routing cords under rugs or through doorways.
- 4.3.6 Equipment power cords should be replaced if damaged in any way. Electrically operated equipment in offices is supplied through flexible leads. These should be inspected at frequent and regular intervals, particularly at the plug end where a wire may have been pulled away from a terminal

and so constitute an electrical shock hazard. Any signs of wear or loose connections should be brought to the attention of the supervisor.

- 437 The electrical distribution board must be accessible at all times. Furniture, equipment or storage of materials should not block its access. The minimum distance of 90 cm around the panel must be kept free from obstruction at all times.
- 438 Do not interfere with any electrical service job; all inspections and repairs must be carried out by a competent person approved by the Malaysian Energy Commission.

4.4 Computer Workstation Ergonomics

The correct ergonomics can help to reduce the risk of Repetitive Strain Injuries (RSI), which can lead to discomfort and crippling disorders. Below are some safety practices that can be used in office or computer labs:-

- 441 **Feet:** While sitting at your desk, make sure your feet can rest solidly and comfortably on the floor. The use of adjustable work surface and chair will allow your feet to rest firmly on the floor, or use a footrest.
- 442 **Knees:** Ensure sufficient space under your work surface for knees and legs. Avoid concentrated pressure points along the underside of your thigh near the knee and the backside of your lower leg. Stretch your legs and vary your leg posture throughout the day.
- 443 **Legs:** Get up from your desk frequently and take brief walks. Vary your leg positions throughout the day. Avoid placing boxes or other items under your desk which limits your legroom.
- 444 **Posture:** Sitting for long periods can cause discomfort and fatigue. Change postures often throughout the day and attention is to be given on adjusting your posture in the afternoon when there is a tendency of fatigue.
- 445 **Position of head:** Position your head so it is above the shoulders and not forward of the shoulders. This position is less tiring. Avoid holding the phone between ear and shoulder which can create

problems in the musculature of the neck and shoulder.

- 4.46 **Shoulders & Elbows:** When working on the computer, adjust chair height or keyboard height so that your shoulders are relaxed and your elbows hang comfortably at your sides. Adjust your keyboard slope so that your wrists are straight.
- 4.47 **Eyes:** Working on the computer for long periods can cause eyes to become tired and irritated. Give your eyes frequent breaks by looking away from the monitor and focus at a distant point. Blink your eyes to help keep your eyes naturally protected and lubricated to prevent dryness, which is a common source of discomfort.
- 4.48 **Monitor:** The monitor screen and your face should be parallel to each other. Tilt the monitor so that it faces your eyes.
- 4.49 **Breathe deeply:** Do breathe deeply and regularly. The intense mental concentration while working on the computer may tend to cause breath-holding or shallow breathing. Breathing deeply can help to reduce physical stress.

5.1 Safety in Workshops

Workshops can be potentially hazardous places in which to work in. Caution and safe work practices will reduce the risks associated with each hazard. Safe systems of work will only be successful if individuals observe the safety requirements at all times.

You should be familiar with:

- (a) Action to be taken in the event of any emergencies.
- (b) Safety procedures and posters displayed in workshops.
- (c) Safe work practice of an equipment.
- (d) Departmental/Faculty Laboratory/Workshop Safety Guidelines.

5.2 General Workshop Behavior

- 5.1.1 All users of workshop areas should follow all instructions given by the staff / technician in charge.
- 5.1.2 Do not use any equipment without proper training, usage instruction and authorization. Alternatively, use equipment in the presence of a lecturer, supervisor or technician in-charge. Do not conduct unauthorized experiments, activities or tasks in any of the workshops.
- 5.1.3 Remove ties, scarves, rings, watches, bracelets, necklaces and any type of jewelries before entering the workshop.
- 5.1.4 Safety shoes are required when handling, moving or working near heavy objects or moving parts. Perforated shoes, sandals and slippers are not permitted in the workshop.
- 5.1.5 Wear the special protective clothing, such as aprons, leggings, gloves, goggles, boots, when the hazardous nature of the material, area or process requires one to do so.
- 5.1.6 Wear appropriate eye protection or face shield when using hazardous materials or operating a machine or involving a process that produces flying particles, sparks or dust.
- 5.1.7 Student or staff considered to be dressed inappropriately for workshop may be asked to leave by the staff / technician in charge. Head scarves must be tucked in (under the clothes, lab coat or overall) and long hair should be tied back.
- 5.1.8 Be serious at work and always behave in a responsible manner. Pranks, running around in workshop and horseplay are prohibited.
- 5.1.9 Using devices that interfere with hearing, such as MP3 players, iPods, mobile phones is strictly prohibited.
- 5.1.10 Do not work on your own as in the event of an emergency, there will be no one around to provide help.

5.2 Guards

- 521 Machines having exposed moving or rotating parts must not be used unless adequately guarded; operator must be instructed and trained in the use of power-driven machinery.
- 522 All machine guards and emergency stop devices should be correctly fitted before a machine can be operated. When uncertain, ask the technician/staff in charge.
- 523 Equipment with inadequate guards should not be used.
- 524 Report defective or missing emergency stop devices, machine guards or safety interlocks to the technician in-charge and do not operate the machine.
- 525 Removing, modifying or disabling emergency stop devices, machine guards or safety interlocks is strictly prohibited.

5.3 Machine Tools

- 531 Before operating any machine tools, be sure to know the method to operate its emergency stop device. Ask for assistance from the technician / staff in charge if uncertain.
- 532 Always give your full concentration to the job when operating a machine. Stop the machine if you have to talk to someone. Never leave the machine unattended, even if it is only for a few seconds or a few meters away.
- 533 Always wear eye protection when operating a machine.
- 534 Before operating any machine, make sure it is in good order and has been properly adjusted and lubricated. If not, report it to your supervisor or technician and do not use the machine.
- 535 Before cleaning a machine, stop the machine and remove the plug to stop electrical supply (isolate it electrically). Machine cleaning should be done with proper training and direct supervision from the technician/staff in charge. Machine maintenance or

repairing is not allowed. Report the matter to your supervisor or technician in charge when the machine needs maintenance or repair.

5.4 Electrical Apparatus

- 541 Check the condition of electrical apparatus, especially portable tools before use. If in doubt, do not use it and report defects to the technician/staff in-charge.
- 542 Students are not allowed to work on the electrical components of any apparatus connected to voltages more than 50V unless supervised by a competent staff.
- 543 Switch off the electrical apparatus when it is not in use.

5.5 Lifting Heavy Objects

- 551 When lifting or moving heavy objects, the following factors should be considered:
 - The task
 - The load
 - The working environment
 - Individual capability
 - Other factors like protective clothing
- 552 Use your legs instead of your back to support the weight when lifting or moving objects.
- 553 Only properly trained and authorized persons are allowed to operate material handling equipment, such as forklifts or manually, electrically or pneumatically driven hoisting equipments.

5.6 Hazardous Chemicals

- 561 Hazardous chemicals refers to any chemical or preparation which:
 - (a) is listed in Schedule I or II of the Occupational Safety and Health (Use and Standards of Exposure of Chemicals Hazardous to Health) Regulations 2000;
 - (b) possesses any of the properties categorized in Part B of Schedule I of the Occupational Safety and Health (Classification, Packaging and

Labeling of Hazardous Chemicals) Regulations 1997;

- (c) comes under the definition of „pesticide“ under the Pesticides Act 1997;
- (d) is listed in the First Schedule of the Environmental Quality (Schedule Wastes) Regulations 1989.

- 562 Before using any hazardous chemicals, always read the Safety Data Sheets (SDS). Hazardous chemicals should be handled as specified in the SDS. The SDS shall define the classification of a chemical whether the chemical is very toxic, toxic, corrosive, harmful, irritant, carcinogenic, teratogenic, mutagenic, explosive, pyrophobic, oxidizing, extremely flammable, highly flammable or flammable. Always refer to the SDS and ask the lecturer/supervisor/technician in charge when uncertain.
- 563 Ensure that ventilation equipment is operating properly.
- 564 Wear personal protective equipment such as eye goggles, gloves, footwear, respirator clothing as recommended by the SDS.

6.1 Safety in Laboratories

All standard operating procedures and safe practices must be followed at all times. Please follow all the *Laboratory Safety Rules and Regulations*. Each laboratory usually has its own safety rules depending on the type of research activities that are being carried out. Exercising caution while working in the laboratories will reduce the occurrence of accidents and injuries. Identify the possible hazards and implement appropriate control measures in the laboratories.

6.2 Chemicals

The list of chemicals is recorded in the *Chemical Register* with relevant information for each laboratory. The SDS are available as reference materials in each laboratory, and are also readily available in the internet.

6.2.1 Respect the chemicals

Always respect the chemicals used - they can be a serious health and safety hazard. Read the SDS before using any chemicals to understand its properties, hazards, handling procedures and first aid measures. Obvious hazards are fire from flammable materials (not only solvents), burns from corrosive chemicals and poisoning from toxic materials. Avoid bringing incompatible materials into contact with one another which may give rise to serious consequences such as uncontrolled release of heat, emission of toxic fumes, or precipitation of unstable solids leading to explosion hazard.

6.2.2 Symbols

It is important to know the meaning and significance of the standard warning symbols for very toxic, toxic, corrosive, harmful, irritant, carcinogenic, mutagenic, teratogenic, explosive, oxidizing, extremely flammable, highly flammable, flammable, radioactive, biohazards, etc. When unsure of these, it is your responsibility to seek instruction from the laboratory staff or your supervisor.

6.2.3 Instructions for use of toxic or hazardous substance

Where laboratory notices specify the wearing of eye protectors, or other types of PPE, then YOU MUST WEAR THEM. When handling chemicals, care must be taken to minimize the inhalation of vapors, dust or fumes, contact with eyes or skin, and the possibility of swallowing them. Wear eye protectors and/or other types of PPE as recommended by the SDS of the chemical in use.

6.3 **Chemicals on the skin or in the eyes**

6.3.1 In the event of chemical substances coming in contact with the skin or the eyes, the general immediate remedy is to wash with plenty of running water for at least 20 minutes. Contaminated clothing must be removed to expose affected areas and allow maximum contact with water. First responder should note down the chemical (s) the victim has been exposed to.

- 6.3.2 If first aider assistance is required, he should be summoned immediately. Immediate medical attention from a registered medical practitioner is required after providing the basic first aid measure. A copy of the relevant SDS should be produced to the registered medical practitioner to deal with the emergency.
- 6.3.3 The relevant staff in-charge, HoD and SHC should be informed and the incident should be reported using the relevant incident forms to the Office of Safety and Health (OSH).

6.4 Chemical spillages

6.4.1 Immediate action

All spillages on benches and floors must be notified to the laboratory staff/technician in-charge of the laboratory, who will arrange for cleaning up. Protective clothing should be worn, especially eye-shields, respirator and disposable gloves.

6.4.2 Hazardous chemical spills

If it is a major or hazardous chemical spills, the lab should be evacuated. Emergency response team (and UM Security Office & BOMBA/HAZMAT) should be informed for containment, clean-up and decontamination of the area. The HoD, Dean/Director and SHC must be notified immediately. (See Emergency Procedures in [Appendix B](#))

6.4.3 Types of spillage

The nature of spillage must be notified to the technician and documented as incidents.

6.5 Flammable/Toxic Vapours

6.5.1 Local exhaust ventilation

Always use a fume cupboard or extraction unit when working with toxic substances. Wear suitable Personal Protective Equipment (PPE) as recommended by the SDS.

6.5.2 Source of ignition

Whenever possible, extinguish all flames if flammable substances are in use and whenever possible use a fume cupboard or extraction unit.

6.5.3 Aerosols

Where possible, all aerosols and sprays must be used in fume cupboards or fume hood extractors.

6.5.4 Low boiling point substances

Exercise extreme care when opening ampoules or Winchester bottles with low flash point/boiling point chemicals. Larger drums should be handled with tipping gear or siphons. Keep away sources of ignition and ensure mobile phones are not used in the vicinity of flammable vapors or liquids.

6.6 Cryogenic materials

6.6.1 Cryogenic materials are very cold and there are certain hazards associated with their use, such as cold burns, asphyxiation and explosion.

6.6.2 All persons handling cryogenic materials should be trained and must wear the correct personal protective equipment, especially for eye protection. Follow the safety procedures as below.

- (a) Ensure the container is dry and pour cryogenic liquids slowly into the receiving vessel to minimize splashing, spillage and thermal shock to the container.
- (b) Use tongs when placing objects into or removing them from cryogenic liquids.
- (c) Avoid use of wide-necked, shallow vessels to prevent excessive evaporation and the possibility of oxygen enrichment.
- (d) Never overfill Dewars.
- (e) DO NOT pour cryogenic liquids into the sink as they can crack waste pipes causing dangerous leaks.
- (f) DO NOT store cryogenic substances or allow them to vaporise in enclosed areas, such as

cold rooms and sealed rooms. **DO ensure** that the area in which the **cryogenic liquid is left to vaporize is well ventilated**. This can prevent the danger of asphyxiation.

- (g) When transporting Dewars, choose a route with the least traffic and ensure there is no trip hazards (including stairs) which could result in spillage. If transported on a trolley, ensure the route is passable (no steps/ kerbs).
- (h) NEVER travel in a lift with a Dewar (danger/risk of asphyxiation).

6.7 Apparatus and Equipment

6.7.1 Movements of apparatus and equipments

Apparatus or equipment **MUST NOT BE REMOVED** from the laboratory without permission from the technician in-charge. All movements of apparatus or equipment must be documented by filling in the relevant forms.

6.7.2 General Equipment

No apparatus or machinery is to be used without adequate supervision. Training must be provided before use and the instruction sheet must be issued to the operator before starting work on any instrument, apparatus or machine especially those that are potentially hazardous. The staff-in-charge/academic supervisor must check that:

- (a) any potentially hazardous apparatus/machine has been set up correctly for the operation required.
- (b) the electrical wiring has been inspected by the user and technician in-charge for signs of unsafe connection. Inspection should be periodically carried out.
- (c) all safety guards or devices fitted to the apparatus, equipment or machine are never be removed without the consent of the lecturer in charge of instrument.

6.7.3 Analytical Equipment

The analytical equipment is expensive to purchase and maintain, and therefore must be used with care and attention.

- (a) Students or staff must be properly trained and understand the purpose and function of the equipment before using it.
- (b) If the equipment develops a malfunction, unless otherwise instructed, switch off and immediately notify the technician in-charge.
- (c) Equipment should not be left running outside working hours unless ONLY WHEN IT IS ABSOLUTELY NECESSARY.

6.7.4 Out of Hours and unattended operation

No experiments, reactions or instrument are to be left on overnight unless approval for out of hours with an unattended operation is obtained from the academic supervisor or staff in charge. The approval must be based on their risk assessment. No experiments will be allowed to run overnight if the risk assessment shows "high" risk. The following procedure must be followed if an experiment is to be left unattended overnight. A notice containing the following information must be displayed near the experiment/instrument:

- (a) A warning to others: DO NOT SWITCH OFF.
- (b) An indication of any specific hazards.
- (c) A short note on the recommended switch off procedure in the event of an accident or failure of services or equipment
- (d) Name of user and supervisor.
- (e) Telephone number of user and supervisor.

A copy of this notice should be given to the supervisor and departmental office.

Any reaction or apparatus set up in the teaching laboratories, which is to be left on over the lunch hour must be reported to the supervisor and the

appropriate technician. *Responsibility for the safety of that reaction or apparatus remains with the user.*

6.7.5 Pressure Vessels

All equipment that operates under pressure, such as, compressors, autoclaves, must be regularly inspected and certified fit for use. Records of the testing should be kept in the area where the equipment is located. Users of such instruments must be trained before they are allowed to operate the equipment.

6.7.6 Breakages of apparatus or equipments

All breakages of apparatus or equipment must be reported to the academic supervisor and the technician-in-charge immediately. An “Out of Service” notice must be posted on the said apparatus.

6.8 Autoclave Safety

Autoclaves are common in many laboratories, but they are associated with various hazards (including physical hazards – heat, steam, pressure and electrical; biological hazards – improperly autoclaved infectious materials) to users. Due diligence must be undertaken when using autoclave to ensure it is operated in a safe, effective and efficient manner.

6.8.1 As required under the Factory Machinery Act (1967), all autoclaves (steam boilers) must have a valid certificate of fitness from the Department of Occupation Safety and Health Malaysia (DOSH). Annual inspection should be carried out on the autoclaves by a competent person.

6.8.2 The registration number plate of the autoclave should be affixed or displayed clearly on the instrument.

6.8.3 All users MUST be trained before operating an autoclave. Lab manager/supervisor, PI or academic supervisor is responsible for ensuring each user is appropriately trained. Training should cover the following:

- a) Operational aspects of the autoclave (relevant SOP on autoclave usage);

- b) PPE and safety on autoclave;
- c) Contingency plans (risk management) – what to do in the event of emergency, breakage, spills; procedure on de-contamination and clean-up procedure;
- d) Any other special requirements (associated to the autoclave usage) for the lab.

All training must be documented (See section on: Documentation & record keeping)

- 6.8.4 All users must wear personal protective equipment (PPE), such as heat-resistant gloves, safety glasses, shoes and laboratory coat when operating an autoclave.
- 6.8.5 Users must operate the autoclave following manufacturer's recommendations or manual. It is important to ensure there is sufficient water in the autoclave water reservoir (steam autoclave/sterilizers).
- 6.8.6 NEVER autoclave solvents, corrosives, flammables, volatile chemicals or radioactive materials.
- 6.8.7 Samples containing solvents or substances that may emit toxic fumes SHOULD NOT be autoclaved.
- 6.8.8 Load the samples into the autoclave properly. DO NOT overload.
- 6.8.9 All samples and materials to be autoclaved must be placed into proper secondary containment vessel to avoid accidental spills occurring inside the autoclave.
- 6.8.10 Make sure only proper heat-resistant materials are used in autoclaves: *Glassware* must be heat-resistant borosilicate; *Plastics* must be heat-resistant e.g: polycarbonate (PC), PTFE ("Teflon") and most polypropylene (PP) items. Not all plastics materials are suitable to be used for autoclaving. Inspect glassware for cracks before autoclaving.
- 6.8.11 Bottles or containers of liquid should not be filled more than 2/3 full, with lids loosened to avoid shattering of bottles during pressurization. Bottles

should be kept separated by 1-2 inches of space between them.

- 6.8.12 If steam escapes through the gaskets while autoclaving, SWITCH OFF the autoclave. DO NOT OPEN THE DOOR! Follow the procedure as in *Autoclave Malfunction*.
- 6.8.13 Sterilization verification – Each autoclave load should be tagged with sterilization indicator tape/strips to ensure the materials are properly sterilized.
- 6.8.14 Biohazard materials should be processed as soon as possible following requirements for the handling of infectious or biohazard materials. Such materials must be labeled properly and secured in containment vessels or autoclavable bags.
- 6.8.15 Removal of autoclaved materials – Users should wear proper PPE (heat-resistant gloves and rubber sleeve protectors, rubber apron, shoes and face shield or safety goggles).
- 6.8.16 Do not immediately open the autoclave door when the run is completed. Follow the manufacturer’s recommendation. Wait for the autoclave pressure to be normalized and temperature has cool down. As a precaution stand back and open the door carefully to about 1 inch to allow residual steam and pressure within liquids and containers to normalize for at least 10 minutes.
- 6.8.17 Do not agitate the bottles or containers of super-heated liquids or remove the caps before unloading. Watch out for autoclaved liquid bottles still bubbling. These bottles and the super-heated liquid water will remain very hot for a long time. After removal of the items from the autoclave, place these hot items in a suitable area which clearly indicates the items are 'hot' while they cool to room temperature.
- 6.8.18 Students and users are not allowed to perform any repairs or maintenance work on the autoclave.
- 6.8.19 Only competent and qualified personnel are allowed to perform maintenance work and/or minor repairs on the autoclave.

- 6.8.20 Autoclave malfunction – In the event that the autoclave is not working properly, stop using the machine immediately. Post a temporary sign “DO NOT USE” to alert others to not use the autoclave and record in the *Users’ Logbook*. The user MUST immediately report to the lab manager, lab supervisor, PI, or person in-charge. The lab manager or person in-charge MUST put a clear warning signage “DO NOT USE. UNDER REPAIRS” on the instrument and record the incident into the *Maintenance Logbook*. The autoclave must not be used until properly checked and repaired by competent qualified personnel.
- 6.8.21 Spills & Breakages – For all spills/breakages and clean-up procedure, the user must record the incident into the *Users’ Logbook*. The user is responsible for the clean-up. Spilled materials are to be contained (absorbed) using paper towel or suitable materials. Wait for the autoclave and materials to cool before cleaning up. Refer to MSDS to determine suitable PPE & procedure to use them. Dispose of the contaminated material appropriately. Broken/cracked glass materials not contaminated with hazardous materials are to be disposed of into the *Sharp Bin* (for Broken Glass).
- 6.8.22 Autoclave incidents (including spills and breakages) – All autoclave incidents must be reported to Departmental Safety Health Committee (SHC) for investigation and reviewing of the safety procedure for using autoclave. The usage of the autoclave will be suspended until the SHC has completed the investigation and its recommendations are implemented. The investigation report should be completed within 2 weeks. All incidents must be documented and records to be kept by the SHC and the Department. A copy of the report is to be forwarded to the Faculty’s / Responsibility Centre’s (PTJ) SHC.
- 6.8.23 Autoclave accidents – All autoclave accidents must be reported to the Head of Department, supervisors and lab manager immediately. If any injury occurs seek first aid or medical assistance. If clothing is soaked with hot water, steam or chemicals, remove clothing and cool the affected part in cool water (not

ice water), i.e. running tap water or soak in a basin of water. The lab manager or person in-charge should report to the Department and Faculty's SHCs on the same day and where possible, the SHC will visit the site for investigation. The usage of the autoclave will be suspended until the SHC has completed the investigation and its recommendations are implemented.

6.8.24 Documentation and record keeping – all records should be kept for inspection whenever required. The records required are:

- a) Inspection records, including the certificate of fitness (usually in Inspection Logbook) – after the first inspection of autoclave, a complete record of all particulars necessary (as determined by inspector/DOSH) to ascertain the state and condition of the instrument must be kept for comparisons for future inspections;
- b) Records of preventive maintenance and repairs (Maintenance Logbook). The records should indicate who performed the work, type of maintenance or repairs conducted and when (date) the autoclave was serviced.
- c) Autoclave User" Logbook (with user"s particulars, description of contents/material autoclaved, program/cycle selected, temperature achieved, and length of time autoclaved). Any problem faced while using the autoclaved must be recorded and reported to the lab manager (lab staff or officer in-charge of the lab/equipments). These records are used for planning maintenance schedules, reporting of incidents, accidents and equipment malfunctions.
- d) Users" training records.

6.9 Gas Safety

6.8.1. *Identification* – All gas cylinders should have legible marks or proper label to identify their contents. Use the chemical name or commercially accepted name.

6.8.2. *Storage* – Cylinders should be stored in compliance to the required regulations and standards. If

cylinders are stored in indoors storage rooms, the room should be well ventilated and dry. Ventilation prevents the formation of dangerous accumulations of gas. This is important in small or confined areas. When storing cylinders outdoors, they should be stored above ground on a suitable floor and protected against temperature extremes (including the direct sun rays).

- 6.8.3. DO NOT STORE gas cylinders near heavy traffic area, such as corridors, elevators, or in locations where heavy moving objects may knock or fall against them. Avoid storing cylinders along exit routes and at exits.
- 6.8.4. Full gas cylinders should not be stored with the empty ones. Empty cylinders should be returned to the gas supplier/provider to avoid paying excessive gas cylinder rental.
- 6.8.5. Oxygen and other oxidizers cylinders should be separated by a distance of at least 600 cm away from fuels such as acetylene, propane, hydrogen and etc, or separated by a wall.
- 6.8.6. Compressed gas cylinders should be located away from heat sources, including heat lamps. They should not be subjected to temperatures above 52°C (126°F).
- 6.8.7. Gas cylinders should be secured to sturdy walls in an upright position using suitable brackets or chains. Plastic chain or ropes should not be used.
- 6.8.8. It is recommended that gas cylinders be stored and placed outside the laboratory and connected to the instrument through proper suitable metal lines in accordance to the industrial or stipulated guidelines.
- 6.8.9. The regulator used for a gas cylinder should be of an approved type and the range of the pressure gauge should be suitable for the delivered pressure.
- 6.8.10. Check all gas pipes, hoses and connectors regularly. Perform gas leak tests at all joints and seals of the gas system regularly.
- 6.8.11. When the equipment is switched off, shut all gas cylinder valves tightly at the cylinder and bleed the

remainder of the line before turning the exhaust vent off.

- 6.8.12. When liquid nitrogen is used, the gas cylinder must be fitted with an over-pressure regulator which will vent the cylinder as necessary to prevent it from becoming a safety hazard. The room must be well ventilated (to avoid the danger of asphyxiation).
- 6.8.13. All gas cylinder storage area should have appropriate warning signage, and the emergency contact person and numbers.

6.9 Glassware

- 6.9.1. All glassware, reagent bottles and bulky pieces of apparatus must be carried on trays or trolleys. Never store glassware above bench level, except in cupboards designated for the purpose. When retrieving glassware from high cupboards do not use laboratory stools – Always use steps.
- 6.9.2. All glassware must be examined before use, and before and after cleaning. Any broken glassware should be removed and disposed off in the designated **sharps** disposal bin.
- 6.9.3. All vacuum dessicators and buchner flasks must be inspected before use. Large dessicators must be evacuated behind a screen. Admit air very slowly before opening. Avoid sudden changes of temperature and place the dessicator or flasks on a rubber mat.
- 6.9.4. Do not clamp any glass vessel of more than 500 ml capacity by the neck alone. Large vessels must be supported from below. Never use large thin walled glass vessels to transport solids or solutions.
- 6.9.5. Assemble all chemical apparatus with extreme care. It is good practice to get another competent person to check it before use.

6.10 Hygiene

- 6.10.1. No eating or drinking is permitted in any of the laboratories, workshops, balance rooms or any room where chemicals or hazardous materials are being used / stored.

- 6.10.2. Food and drink for human consumption must not be placed in laboratory refrigerators, ovens, hot plates or laboratory glassware and apparatus.
- 6.10.3. Laboratory chemicals e.g. salt, sucrose etc., cannot be used as food enhancers for human consumption.
- 6.10.4. Water supply in the laboratory should not be used for drinking. Do not drink water from distiller or water purifier from the laboratories.
- 6.10.5. ALWAYS clean up your lab area. Wash your hands before leaving the laboratory.

6.11 Labeling Reagent Bottles

- 6.11.1. All reagent bottles must be labeled with the chemical name of the compound. Unlabeled reagent bottles found in classes, refrigerators, storerooms, etc. will be appropriately disposed of immediately.
- 6.11.2. Any hazardous reagent must be labeled clearly with the symbol and warning notice e.g. "Very Toxic", "Explosive", "Highly Flammable", etc.
- 6.11.3. All bottles containing drying agents must be labeled as such. Exercise care when washing out any reagent/solvent bottle, especially when drying agents are used and they are not compatible to water.
- 6.11.4. Never store flasks or chemicals in direct sunlight or next to a source of heat.
- 6.11.5. Never cork apparatus containing hot, volatile liquids. Use a breather tube, paper cap or glass wool plug.
- 6.11.6. All solutions prepared should be labeled with:
 - (i) Name of solute
 - (ii) Name of solvent
 - (iii) Concentration
 - (iv) Date

6.12 Pipetting

MOUTH PIPETTING IS NOT ALLOWED IN ALL LABORATORIES. Use a bulb or pipette filler, or other safe device. For larger volume solutions, use a burette or measuring cylinder.

6.13 Sharps

All users using any sharp equipment should be properly trained on its operation and safety procedures before they are allowed to use the equipment, and **MUST** wear suitable PPE.

6.14 Personal Protective Equipment (PPE) and Equipment

6.14.1. Laboratory Coats

Suitable protective clothing should be worn to minimize the hazards to health. Students must wear approved laboratory coats in labs at all times. Students not in possession of a laboratory coat will **NOT** be allowed to work in these laboratories. This applies to **ALL** staff and **ALL** categories of students and visitors. Laboratory coats must be buttoned fast. Laboratory coats must be kept clean and in safe condition. Laboratory coats are not to be worn outside of the laboratories, especially in public areas such as canteen, tea room, staff rest area, reading rooms to avoid cross contamination.

UM issued staff lab coat is light blue in color for easy and quick identification. Students should wear white lab coat only.

6.14.2. Eye Protection

All persons must wear approved eye protection (safety glasses) at all times in the chemical laboratories. Safety glasses is also required whenever potentially hazardous work is carried out that causes flying particles, sparks and dust, and as per the recommendation of the relevant SDS.

6.14.3. Gloves

Gloves must be worn when handling chemicals or any hazardous materials. The correct type of gloves must be worn as per the recommendation of the relevant SDS – if in doubt, ask your supervisor. Selection of suitable gloves is important when dealing with electricity, materials that have extreme temperature, mechanical hazard and the possibility of laceration by sharp objects. Be careful not to contaminate switches, handles, plugs and other

equipment, door knobs, telephones when wearing protective gloves.

6.14.4. Footwear

All persons must wear proper closed-top shoes in all laboratories and workshops. Sandals and slippers are not allowed.

6.14.5. Masks/Respirators

Suitable masks / respirators must be worn whenever a process involves volatile chemicals or machines that churn out dust particles. The selection of masks or respirators for any chemical item used is as per the recommendation of the relevant SDS. Ventilation should also be employed whenever necessary.

6.14.6. Long hair & Scarves

Long hair must be tied back to avoid possible accident. Head scarves must be tucked inside the lab coat. No face veil, such as *purdah*, is allowed in laboratories. Accepted personal protective equipment for face area and respiratory protection are goggles, approved respirators and face shields.

6.14.7. Fume Cupboards

Extraction units must be used when working with toxic substances, obnoxious smells and hazardous materials. Always check that the fan is on and the vent is open. Keep the hood down. Do not use the cupboard for general storage except for foul-smelling chemicals. All records of the maintenance of fume cupboards must be properly kept.

6.14.8. Winchester Carriers

Large volumes (greater than 500 cm³ or ml quantities) of corrosive, volatile or flammable liquids should be transferred in Winchester carriers.

7.1 **Good Microbiological Practice (GMP)**

"Good Microbiological Practice" or GMP signifies the ability of the person to carry out procedures involving the handling of microorganisms in a safe manner, and minimizing risk to the

user, other persons and to the surrounding environment. GMP includes the prevention of contamination to pure cultures and the safe handling of any equipment used in practical work. The following rules must be abided by all microbiology lab users:

7.2 Safety Procedures in Microbiology Laboratories

- 721 Unsafe behaviour, such as chewing, spitting, sucking of writing instruments, applying cosmetics, and the consumption of any food or drinks in the Microbiology Laboratories, is STRICTLY forbidden.
- 722 All students and staff must wear laboratory coats.
- 723 Long hair must be made safe by the use of a hair net, ribbon, rubber band or other suitable means.
- 724 Personal belongings, such as jackets and bags, which are brought into microbiology laboratories should be kept in designated safe area only.
- 725 The laboratory door should be closed when work is in progress.
- 726 Bench tops must be disinfected before and after use.
- 727 Mouth pipetting is forbidden in the Microbiology class or experiments; use the safety device provided.
- 728 Flaming is essential in GMP as a sound aseptic technique, such as flaming the mouth of the vessel (when the lid is removed/closed), glass pipettes, open tops of bottles and tubes, wire loops, needles, etc. Before lighting the bunsen burner, make sure there is no flammable materials nearby. The burner should be resting on a heat-resistant mat, away not directly on the plastic-covered bench top. Make sure hot loops and holders are placed on a heat-resistant mat (away from flammable materials).
- 729 Use a Biosafety Cabinet when needed to protect biological research materials and when procedures may generate biohazardous aerosols.
- 7210 Personnel traffic in front of Biosafety Cabinet (BSC) should be minimized. Such movement causes air turbulence that affects the effectiveness of the BSC

airflow and may cause contaminants to be released into the work area and also contaminate the samples.

- 7211 Contaminated equipment or apparatus should preferably be heat sterilised by autoclaving or by other suitable methods.
- 7212 Hands must be disinfected or washed immediately when contamination is suspected, after handling infective materials, and also before leaving the laboratory.
- 7213 No unauthorized users should be allowed to bring in or out from the lab any microorganisms.
- 7214 Microbial stocks must be kept either in a slant position or lyophilised (freeze-dried) for long-term storage. Only authorized staff can deal with microbial stocks to prevent contamination.
- 7215 For short term storage, microbes can be kept on agar plates which must be kept in proper place (fridges, incubator), and old plates must be disposed by heat or moist sterilization.
- 7216 Ensure that all of the objects that may come into contact with the culture, such as loops and pipette tips, are sterile before use and not contaminated by casual contact with the bench, fingers or the outside of the bottle, etc during handling. All apparatus used are to be decontaminated or disposed off in a safe manner immediately after use.
- 7217 Used "sharps" (scalpel blades, syringes and needles, etc) must be disposed off into approved "sharps" containers and shall be disposed of using existing clinical/biohazard procedures. Containers must be changed regularly and not allowed to become over-full.
- 7218 The waste disposal procedures for all contaminated materials must be strictly followed to ensure the disposed materials are disposed safely and do not pose as a health risk or source of infection to the public.
- 7219 Another important consideration in GMP, for safety in general is the tidiness and orderliness in experimental work area. Always label tubes, bottles,

petri dishes, before the experiment begins to avoid making mistakes. Labeling of cultures to be incubated or stored, must be legible and with sufficient information. At the end of an experiment or practical class make sure you have cleared away materials and tidied up your work area. All work areas must be decontaminated immediately after use.

- 7220 Personal cleanliness and hygiene is extremely important in GMP and safety. Any wounds, cuts or abrasions should be treated and dressed properly. Washing hands thoroughly in a clean basin before leaving the laboratory is mandatory.
- 7221 Contagious microbes must be handled in the laboratory with appropriate BSL level, and it is mandatory to adhere to all additional procedures stipulated by these BSL labs.
- 7222 All accidents should be reported to the academic supervisor and laboratory manager/person in-charge so that appropriate action can be taken to minimize the risk and likelihood of illness developing. Reporting can help the person in-charge mitigate and prevent future occurrence of such incident.

8.1 Waste Disposal

All wastes should be properly stored and disposed following the established procedures.

8.2 Clinical Waste

8.2.1 Pipettes and petri dishes

Discard used pipettes (pointed end downwards) from microbiology studies immediately into the plastic jars with disinfectant provided. Ensure there is sufficient disinfectant in the jar (completely covering the pipettes). This disinfectant should be used for spreading over any spillages that has occurred. Used petri dishes must be discarded by placing them gently into the plastic disposal bags provided, not dropping the dishes as this leads to aerosol spreading infections. These dishes must be

made safe by autoclaving. Autoclaving is very important to ensure all pathogenic microbes are killed before disposing.

8.2.2 Biological or clinical samples

All clinical and biological waste including blood, serum etc should be placed in covered, leak-proof containers or bags that are color-coded and labeled. Sharps (broken glass, needles, pipettes) which are contaminated by such waste should be placed in a closable, labeled or color-coded leak-proof, puncture resistant, disposable containers. The clinical waste will be disposed of by an authorized contractor.

8.2.3 Ecological samples

Ecological samples, such as fresh fish and other aquatic fisheries samples, which are not subjected to any form of chemical treatment, can be disposed of as domestic waste. If samples were treated with preservative, such as formalin, samples should be disposed as solid chemical waste.

8.3 Animal Waste

Research animal waste and carcasses/body parts must be disposed of as clinical waste following established procedures. NEVER dispose animal waste as general/domestic waste.

8.4 Chemical Waste

Never dispose chemical whether solid or liquid or other hazardous materials in the general rubbish bins or pour into the sink (or down the drain). All waste must be kept in secondary containers, properly labeled and segregated according to the hazard class. Containers must be leak-proof. Chemical waste should be stored in a designated location in the laboratory or in a chemical bunker. Waste disposal will be conducted periodically by authorized waste disposal contractor.

8.5 Sharp Waste

Never dispose sharps in normal waste bins. All sharps bins must comply with BS 7320:1990 requirements. Only single use impenetrable sharps bin should be used for disposal of

sharps. The sharps bin should be yellow and have an aperture to prevent cross contamination and unintended removal of its contents. The sharps bin should be disposed of when it is 75% full.

Categories of sharps that should be handled with care are:

- i. All injection devices, including needles and syringes;
- ii. Contaminated glass such as glass slide, broken glassware, pipettes, etc;
- iii. Blades such as scalpels, razors, scissors, x-acto and other types of cutting devices.

Sharps should not be disassembled at all before disposal, i.e. separating needles from syringes. Spent syringes should not be recapped so as to prevent needle stick injuries (NSI) at workplace.

However, uncontaminated packing materials or glass shall not be disposed of into the sharps bin as this will unnecessarily increase the waste disposal cost.

9.1 Radioactive Materials

Any usage of radioactive materials and irradiating apparatus (radiation sources) in the University is governed by Act 304, Atomic Energy Licensing Act 1984 and its subsidiary regulations and conditions stipulated in the license LPTA/A/273 of University of Malaya. The UM Radiation Protection Service Unit manages the implementation of the Radiation Protection Program in the University in accordance to the requirements of the Act 304.

9.2 Safety Procedures when Working with Radiation Sources

- 921 All radiation sources used or stored in the University must be reported and registered with UM Radiation Protection Service Unit (known in the Bahasa Malaysia acronym as UPPS, *Unit Perkhidmatan Perlindungan Sinaran*).
- 922 Users must maintain all records of purchases, transportation, maintenance, disposal of radiation sources and such activities must be informed to UPPS.
- 923 All users must be trained in radiation safety and registered as radiation workers before they are allowed to use radiation sources.

- 924 All rooms or laboratories containing such materials and equipments as mentioned above must have proper radiation warning signage. These areas are restricted areas and only authorized personnel are allowed to enter.
- 925 All radiation workers must wear appropriate dosimeter badges in the working area.
- 926 Any work related to the radiation sources must be properly planned. Correct PPE and shielding (if required) must be used and all established procedures must be strictly followed at all times.
- 927 While working with radiation sources, always check (observe) the survey meter to ensure the radiation level has not exceeded the permissible level.
- 928 Always ensure your hand, legs and clothes are not contaminated by using the survey meter to check before you leave the workplace.
- 929 All radioactive materials must be stored in appropriate containers and must be kept in a secured area.
- 9210 Any malfunction of irradiating apparatus must be shut down immediately and should not be used until repaired by certified competent technician/engineers. Such incidents must be reported to UPPS.
- 9211 All materials and consumables (such as gloves, paper hand towel, and tissue paper) which have been contaminated with radioactive materials must be disposed of in designated bins for radioactive materials.
- 9212 Any disposal of radiation source must be informed to and endorsed by UPPS before any further action can be taken by the Department or JPPHB.
- 9213 Any theft of radioactive materials or equipments must be reported immediately to the laboratory manager, HoD/Director/Dean, RPO (Radiation Protection Officer). A police report must be made for such incident.
- 9214 In the event of any accident, UPPS must be informed immediately. Seal-off the area immediately (no one should be allowed to enter) and take action as per the emergency response plan. All accidents, incidents, near misses, occupational poisonings and

occupational diseases must be reported to the relevant lecturer/supervisor and HoD. All such records should be properly kept. The relevant lecturer/supervisor should then report the matter to the RPO and the Office of Safety and Health (OSH) using the specified documentations.

10.1 Genetically Modified Organisms (GMO)

Genetically Modified Organisms (GMO) or *Living Modified Organisms* (LMO) is as defined in the Biosafety Act 2007

10.2 Working with GMO

Any activity or work involving *Genetically Modified Organisms* (GMO) or *Living Modified Organisms* (LMO) must comply with the Biosafety Act 2007. Any enquiries or request for assistance should be directed to the Biosafety Officer (BSO) or Institutional Biosafety Committee (IBC).

- 1021 Prior to the use of any LMO or GMO (*i.e.* contained use activity, released use activity, and importation/exportation), the principal investigator must give notification or/and get approval from the National Biosafety Board (NBB) through the Institutional Biosafety Committee (IBC) following the Biosafety (Approval and Notification) Regulation 2010.
- 1022 All GMO or LMO must be kept safely and must not be released to the environment intentionally or unintentionally.
- 1023 For any contained use activity, released activity, or any importation/exportation of GMO or LMO, a risk assessment and a risk management report must be prepared and must be submitted to NBB through the IBC.
- 1024 An emergency response plan must be developed and personnel must be trained on the implementation of the plan in the event of a mishap/emergency.
- 1025 All workers (staff and students) conducting research with GMO or LMO must be trained with biosafety practices.

- 1026 All accidents, incidents, near misses, occupational poisonings and occupational diseases should be reported to the relevant lecturer/supervisor and recorded. The relevant lecturer/supervisor and HoD. These incidents should be reported to the Institutional Biosafety Committee and the Office of Safety and Health (OSH) using the specified documentations.
- 1027 Disposal and decontamination procedures must be strictly followed to ensure that all LMOs and GMOs are not accidentally released, and are properly sterilized or killed (especially when working with GM microbes) prior to disposal. Disposal should follow the established procedure.

Appendix A

 UNIVERSITI MALAYA <small>1946</small>	OCCUPATIONAL SAFETY AND HEALTH DECLARATION FORM
Full Name: (Please use block letters)	Department & Faculty:
NRIC / Passport No.: Nationality:	Student / Staff Matric No.: (If applicable) Name of Supervisor:
Position (Tick where applicable) <input type="checkbox"/> Staff (Academic / P&P) <input type="checkbox"/> Lab and Support Staff <input type="checkbox"/> Visiting Professor <input type="checkbox"/> Senior Research Fellow <input type="checkbox"/> Post-Doc. <input type="checkbox"/> Research Fellow <input type="checkbox"/> Student (Postgraduate) <input type="checkbox"/> Research Assistant <input type="checkbox"/> Student (Undergraduate) <input type="checkbox"/> Other: (specify)	
Declaration I, the above named, declare that I have read and understood the safety handbook and will therefore be able to ensure that my work is carried out in a safe manner in a safety conscious environment in compliance with all regulations as laid down by the faculty and the university. In the event of any accident which is due to my negligence and/or non-compliance to safety regulations and procedures, I will indemnify the University on all liabilities.	
Signed: Date: Witnessed By:..... Date: (Academic Supervisor/Officer in charge, <i>signed & stamped</i>)	
IMPORTANT NOTICE: <ul style="list-style-type: none"> • All lab users MUST complete and sign this form before they are allowed to work in the laboratories / workshops. • All students MUST complete 2 copies during registration / enrolment and return the forms to the Dean's Office for retention in the student personal file and with the HoD Office / Departmental Safety & Health Committee. Failure to do so will render the registration / enrolment incomplete and the student will be barred from working in the laboratories / workshops. 	

Appendix B

Emergency Procedures

A. Fire Emergency Procedure

1. When fire is detected, cease work.
2. Determine whether the fire is small or big.
3. If it is a small fire, switch off electrical equipment or machinery and try to extinguish it using an appropriate fire extinguisher.
 - a. CO₂ fire extinguishers are suitable for Class C electrical fires and to some extent Class B liquid fuel fires (solvents, petrol, oil-based paints). CO₂ fire extinguishers should be used with care. They can reduce the oxygen content of the atmosphere in a confined space to a dangerously low level. A fire needs oxygen to burn but you need oxygen to breathe.
 - b. ABC Dry Powder fire extinguishers are suitable for Class A combustible fires (paper, wood, cloth), Class B liquid fuel fires (solvents, petrol, oil based paints) and Class C electrical fires.
4. When the fire is put out, contact the Emergency Manager of the zone.
5. If the attempt is unsuccessful or the fire threatens the exits, immediately activate the fire alarm bell and contact the fire station at 03-22824444 and then the Security Office at 03-79677070. Avoid becoming a casualty yourself.
6. Take the laboratory attendance log book along when exiting the building.
7. Evacuate the building, walk calmly using the nearest and safest exit and assemble at the identified emergency assembly point. Elevators must not be used during any emergency.
8. Respond immediately to the Floor Warden during the headcount check by providing him/her the laboratory attendance log book and the headcount in the laboratory.
9. Follow all instructions given by the Floor Warden.

10. Do not attempt to re-enter the building until it is declared safe to do so by the Emergency Manager or Fire & Rescue Department (BOMBA) officer.

B. Chemical Spills Emergency Procedure

1. For small spills, the lecturer/supervisor/technician in-charge must be alerted.
2. Turn off all ignition and heat sources.
3. Open all windows and doors.
4. The release/spill must be controlled from further aggravation.
5. The clean-up process should be done under the supervision of the lecturer/supervisor/technician in charge.
6. When the clean-up is done, inform the relevant lecturer/supervisor and Head of Department (HoD) and the Office of Safety and Health (OSH).
7. When a big spill occurs (when the flow of the spillage is out of control or open flame starts or explosion occurs), immediately raise the alarm bell, alert the fire station (at 03-22824444) and contact the Security Office. (Inform the supervisor/lecturer and HoD as soon as possible).
8. Take the laboratory attendance log book along when exiting the building.
9. Evacuate the building, walk calmly using the nearest and safest exit and assemble at the identified emergency assembly point. Elevators shall not be used during emergency.
10. Respond appropriately to the Fire Warden during the headcount check by providing him/her the laboratory attendance log book and the headcount in the laboratory.
11. Follow all instructions given by the Fire Warden.
12. Do not attempt to re-enter the building until it is declared safe to do so by the Emergency Manager or the Fire & Rescue Department (BOMBA) officer.

C. Biological Spills Emergency Procedure

1. For any spills, decontamination shall be duly performed under the supervision by the lecturer/supervisor/technician in charge.
2. Proper PPE shall be worn during the decontamination process.
3. When the clean-up is done, inform the relevant lecturer/supervisor, HoD and the Office of Safety and Health (OSH).

D. Radioactive Leakage Emergency Procedure

1. For small spills, the radiation worker on duty at the department and the supervisor/lecturer should be alerted.
2. Any clean-up process shall be done under the supervision of the lecturer/supervisor/technician in charge.
3. When the clean-up is done, inform the relevant lecturer/supervisor, HoD and the Office of Safety and Health (OSH).
4. If the attempt for clean-up is unsuccessful or the spill is large or the survey meter shows abnormal reading, immediately contact any of the following persons:
 - a
 - b Nor Aina Mahazer @ 013-4591512
 - c Haji Harun Mohd Salleh @ 016-6064805
5. Whenever required, the persons in item 4 above shall seek help from the Atomic Energy Licensing Board for further support.

E. Gas Leakage Emergency Procedure

1. A gas leak can be detected by means of smell and the alarm from the gas detection system.
2. Inform the lecturer/supervisor/technician in-charge and the University's Department of Development and Asset Maintenance (JPPHB) at 03-79673566.

3. If the attempt to shut down or plug the leak is unsuccessful or open flame starts/explosion occurs, immediately raise the alarm bell and contact the fire station (at 03-22824444) and the Security Office. (Inform the supervisor/lecturer and HoD and OSH as soon as possible).
4. Take the laboratory attendance log book along when exiting the building.
5. Evacuate the building, walk calmly using the nearest and safest exit and assemble at the identified emergency assembly point. Elevators shall not be used during emergency.
6. Respond appropriately to the Fire Warden during headcount check by providing him/her the laboratory attendance log book and the headcount in the laboratory.
7. Follow all instructions given by the Fire Warden.
8. Do not attempt to re-enter the building until it is declared safe to do so by the Fire & Rescue Department (BOMBA) officer or HoD/lecturer in-charge).

F. Earthquake Emergency Procedure

1. Take the laboratory attendance log book along when exiting the building.
2. Walk calmly using the nearest and safest exit and assemble at the identified emergency assembly point. Elevators shall not be used during emergency.
3. Respond appropriately to the Floor Warden during headcount check by providing him/her the laboratory attendance log book and the headcount in the laboratory.
4. Follow all instructions given by the Floor Warden.
5. Do not attempt to re-enter the building until it is declared safe to do so by the Emergency Manager.

G. Bomb Threat Emergency Procedure

1. When there is a confirmed or suspected bomb threat, the Pantai Police Station 03-2282 4222 (*Balai Polis, Jalan Pantai Baru*)/ 03-2282 2207 and Security Office must be informed immediately (at 03-79677070). (The Dean/Director, HoD and OSH should be also informed as soon as possible).
2. Take the laboratory attendance log book along when exiting the building.
3. Evacuate the building - walk calmly using the nearest and safest exit and assemble at the identified emergency assembly point. Elevators shall not be used during emergency.
4. Respond appropriately to the Floor Warden during headcount check by providing him/her the laboratory attendance log book and the headcount in the laboratory.
5. Follow all instructions given by the Floor Warden.
6. Do not attempt to re-enter the building until it is declared safe to do so by the Royal Malaysian Police officer Emergency Manager or Security Office.

UNIVERSITI MALAYA



ACCIDENT INVESTIGATION REPORT

Instructions: To be completed by a member of the Faculty Safety Health Committee

Tick where applicable

SECTION I - RESPONSIBILITY CENTRE (FACULTY/ACADEMY) PARTICULARS

Name & Address:

Tel. No. : _____

Fax No. : _____

SECTION II - VICTIM'S PARTICULARS

Full Name:

I.C. No. : _____ (New) _____ (Old)

Age: _____ Years Sex: M F

Job/Position: _____

Victim's Routine Duties:

Duration of Service: _____ **Year** _____ **Month**

Service Status : Permanent Temporary Contract _____
(Others)

Residential Address:

SECTION III - ACCIDENT DETAILS

Date of Accident: _____ Time: _____

_____ am/pm During Working Hours: Normal

Shift Overtime _____
(Others)

Place of Accident:

Work Conducted at Time of Accident/Incident:

No. of Days of Medical Leave: _____ Start Date : _____ Until: _____

Type of Injury/Illness : Permanent Non Permanent Death
(Please Attach Medical Report, Death Certificate and Autopsy Certificate)

Please State Body Part Injured/Disabled/Diseased:

Treatment Received:

Hospital/Clinic :

Expenses Incurred:

Describe Damages to Property (If Any):

SECTION IV - PREVENTIVE MEASURES BEFORE THE ACCIDENT

Personal Protection Equipment (PPE) Provided to Victim :

- Safety Shoes Safety Helmet Ears protection
 Respiratory protection Eye protection _____

Supervision: Direct Indirect None Not Required

No. of Staff Supervised by the Supervisor: _____ Staff

Safety Procedures for Work Process Involved : Available None

Name of Supervisor: _____

Safety Features Available for the Equipment Involved (If Relevant):

List of Training/Courses Given to Victim (If Relevant):

Date	Training/Course Module	Place

SECTION V - ACCIDENT CHRONOLOGY

Record in sequence the events leading to the occurrence of the accident. Append with additional pages if necessary.

Time	Description of Activities

SECTION V - ACCIDENT CHRONOLOGY (Continued)

Please sketch/draw how the accident happened. Append with additional pages if necessary.

Attach photograph showing the equipment/machinery/place of accident.

SECTION VI - CAUSAL (CONTRIBUTORY) FACTORS OF ACCIDENT

Describe unsafe conditions:

Describe unsafe behaviour:

Describe other factors:

SECTION VII - CORRECTIVE AND PREVENTIVE MEASURES AGAINST THE RECURRENCE OF ACCIDENT

Immediate Measures:

Name of Officer in-charge: _____

Targetted Date: _____

Short-term Measures:

Name of Officer in-charge: _____

Targetted Date: _____

Long-term Measures:

Name of Officer in-charge: _____

Targetted Date: _____

SECTION VIII - DETAILS OF WITNESS (Please Attach Witness's Report If Available)

Name	Position	I.C.No.

SECTION IX - OTHER MATTERS (If Applicable)

SECTION XI - DETAILS OF THE SAFETY HEALTH COMMITTEE MEMBERS WHO ASSISTED IN THE PREPARATION OF THE REPORT

NAME	I.C. NO.	POSITION	SIGNATURE

SECTION XII - DETAILS OF THE HEAD OF THE RESPONSIBILITY CENTRE WHO VERIFIED THE REPORT

Name: _____

I.C. No.: _____

Position: _____

Signature

Date: _____

UNIVERSITI MALAYA



ACCIDENT/INCIDENT REPORT

SECTION I - PARTICULARS OF THE PERSON WHO REPORTED THE ACCIDENT/INCIDENT

Name : _____

Position (if working in UM): _____

Place of Work : _____

I.C. No. : _____(New) _____(Old)

Tel. No. : _____(Office) _____(House)

Correspondence Address:

SECTION II - DETAILS OF THE ACCIDENT/INCIDENT

Place of Accident/Incident: _____

Date of Accident/Incident : _____

Time of Accident/Incident: _____

Further Explanation on Accident/incident (Attach additional pages if necessary):

Signature

Date of Report: _____

Appendix E

UNIVERSITI MALAYA



VICTIM'S REPORT

SECTION I - VICTIM'S PARTICULARS

Name _____

I.C. No. : _____ (New) _____ (Old)

Date of Birth : _____

Sex : _____

Place of Work: _____

Position (If in Universiti Malaya): _____

Tel. No. : _____ (Office) _____ (House)

Correspondence Address:

SECTION II - DETAILS OF THE ACCIDENT

Type of Illness/Injury/Damage (give further details):

Place Illness/Accident/Incident/Damage was Detected: _____

Date Illness/Accident/Incident/Damage was Detected: _____

Time Illness/Accident/Incident/Damage was Detected: _____

Further Explanation on Illness/Accident/Incident/Damage :
(Attach additional pages if necessary)

Other comments (if any) :

(Please Attach Medical Check-up Report)

SECTION III - PARTICULARS OF THE PERSON WHO COMPLETED THIS FORM
(if this form is completed by person other than the victim)

Name: _____

Position (if in Universiti Malaya): _____

Place of Work: _____

Relationship With Victim: _____

Tel. No.: _____ (Office) _____ (Home)

Correspondence Address:

Signature

Date of Report: _____

*Completed form is to be forwarded to the Head of the Responsibility Centre (PTj) where the Illness/Accident/Incident/Damage occurred.

UNIVERSITI MALAYA



WITNESS'S REPORT

SECTION I - WITNESS'S PARTICULARS

Name: _____

Position (if in Universiti Malaya): _____

Place of Work: _____

Relationship With Victim : _____

Tel. No.: _____ (Office) _____ (Home)

Correspondence Address:

SECTION II - INFORMATION ON ACCIDENT/INCIDENT

Place of Accident/Incident: _____

Date of Accident/Incident: _____

Time of Accident/Incident: _____

Further Explanation on Illness/Accident/Incident/Damage :
(Attach additional pages if necessary)

I have read what is stated above/understood what is read to me and acknowledge that it is correct and true to the best of my knowledge.

Signature

Date of Report: _____

HAZARD IDENTIFICATION, RISK ASSESSMENT & RISK CONTROL (HIRARC)

A. WORKPLACE INFORMATION					
Responsibility Centre (PTj) :			Institute/Department :		
Laboratory/Workshop :			Location : <small>(Specify the Building BLOCK & FLOOR)</small>		
Lab Supervisor : <small>(Lab Support Staff)</small>			Lab Manager : <small>(Lecturer/Science Officer)</small>		
B. APPROVALS					
WORK PROCESS					
	Originator	1 st Reviewer <small>(1st Reviewer/Supervisor)</small>	2 nd Reviewer (if required) <small>(2nd Reviewer/Lecturer/Consultant)</small>	Approved by <small>(HOD/Director /Dean)</small>	Comments
Prepared by					
Position					
Signature					
Date					
Tel No & Email					
C. HISTORY					
Date	Originator	Approved by	Reason for Change	Summary of Change	

HIRARC (cont.)

D. HIRARC ANALYSIS											
Inst/Dept :						Lab/Workshop :					
Work Process :											
1. HAZARD IDENTIFICATION					2. RISK ANALYSIS			3. RISK CONTROL			
No	Work Activity	Hazards	Effects	Existing Risk Control (if any)	Likelihood	Severity	Risk	Recommended Control Measures	Proposed Action & Status	PIC (Person-In-Charge)	Date Due
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

