



NANYANG TECHNOLOGICAL UNIVERSITY  
SCHOOL OF BIOLOGICAL SCIENCES

**Undergraduate Policy and Safety**  
**Manual for**  
**Teaching Laboratories**

Updated on Nov 2013

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## 1.0 Introduction

The purpose of the School of Biological Sciences Undergraduate Policy and Safety Manual for Teaching Laboratories is:

- to provide the policy and safety rules in the teaching laboratory
- to assist students in adopting good laboratory practices
- to provide safe and conducive environment for the students in the teaching laboratory

This policy is mandatory for all students of the School of Biological Sciences in teaching laboratory. Students must observe correct procedures and practices outlined in this manual.

The school may notify the students from time to time any changes to the policies and safety rules in the teaching laboratories. This is to ensure that all students of SBS will receive the latest information and best practices for safe and conducive environment in the teaching laboratory.

This manual is not the only safety guides in terms of giving safety guidelines and instructions. For more details of the safety information, please refer to the full SBS Safety Manual. The students must also exercise common sense and alertness and use all relevant safety information when performing practical work in the teaching laboratory.

If there is any enquiry, please consult the Teaching assistants/ Teaching executives/ Course Coordinators/ Assistant Manager (Teaching laboratory) and the Safety Manager (for safety rules only).

## 1.1 Policy of Teaching Laboratory

- It is compulsory for all students in the School of Biological Sciences to attend the laboratory orientation. Upon completion, he/she will do an online quiz. A student is required to pass the online quiz before he/she starts practical work in the teaching laboratories.
- All SBS undergraduate students (Year 1, Year 2 and Year 3) must attempt and pass the online quiz at the start of every semester 1.
- The edveNTUre site under Community-Teaching laboratory contains the policies, safety rules, relevant information and updates for the teaching laboratory.
- Students are required to attend all laboratory sessions according to the date, timing and location assigned to their tutorial group.
- Students are required to sit according to the assigned list. Permission to change seats must be gained from the course coordinator.
- Switching of date, timing or tutorial group is not allowed. Students will be asked to leave the teaching laboratory if they attend the practical that is not assigned to them. Special exceptions can be made for students with legitimate reasons. However, they are required to seek approval at least 3-7 days in advance from the Assistant Manager (Teaching Laboratory).
- Students are required to obey the safety rules in the teaching laboratory.
- There will be random spot checks conducted by the Associate Chair (Academic), Safety Manager/ Assistant Manager (Teaching Laboratory).
- The first time a student is found to violate the safety rules the Teaching Executives/Assistant Manager (Teaching Laboratory) /Course coordinator/Safety Manager will give a warning and record it as a 'warning' in the attendance file.
- The second time a student is found to violate the safety rules they will be asked to leave the laboratory immediately, this will be recorded as a 'first violation'. The third time a student is found to violate the safety rules they will be asked to leave the laboratory immediately, this will be recorded as 'second violation'.
- Any student who gains one warning and commits two further violations of the laboratory safety rules will be asked to report to the Associate Chair (Academic) or the Assistant Chair (Academic).

Please be reminded that the safety rules are for your safety. They were established mostly based on collective experience over the years from laboratory workers

## 1.2 School Safety Committee

The School Safety Committee (SSC) is comprised of members so selected that they collectively have experience and expertise in: chemical, radiation and biological agents and technology; the capability to assess the safety of the research experiments; and, the capability to assess any potential risk to public health or the environment. The SSC conducts facility inspections in order to assist the school management in maintaining and using safe conditions and procedures in their laboratories, offices and other workstations.

The SSC consists of several members with expertise for specific aspects of safety. The roles of the committee members are not mutually exclusive, e.g. in the event of an accident any available committee member may be approached to attend and provide assistance, therefore it is essential that all members are familiar with possible risks and safety measures related to especially laboratory environment. Following are the names and contact numbers of the School Safety Committee:

Name	Position	Contact
Liu Chuan Fa	SSC Chairman	6316 2862
Peter Droge	Member	6316 2809
Tobias Carl Cornvik	Member	6586 9714
Ang Wei Kian Andy	Member	6513 7652
Tay Mei Xia	Member	6592 1795
Tin Tun	OHS Representative	6316 2810

The roles and actions of the School Safety Committee are endorsed by the Chair of the School of Biological Sciences.

The SSC is scheduled to **meet monthly or when necessary**. The SCC will meet on a regular basis. At such meetings:

1. The Chair, or a nominated deputy, will chair the meeting
2. The committee will formulate policies, programmes and codes of practice as necessary for safety issues.
3. The committee will develop and monitor a system designed to ensure adherence to safety rules and regulations including training of staff.
4. Safety Officer implements safety programmes and procedures formulated by the committee.
5. Safety Officer reports the committee any laboratory or individual that is violating safety rules and regulations.
6. Committee will discuss appropriate actions. Repeated offender may receive warnings and then be banned from workplace.
7. Committee has authority to shut down entire laboratory until evidence of adherence to safety rules and regulations is provided.

### 1.3 Teaching Laboratory Personnel

The teaching laboratory personnel include the teaching assistants, laboratory executives and assistant manager (teaching laboratory). They will conduct inspections to ensure that students observe the safety rules and procedures in the teaching laboratories. All violations of the rules will be recorded.

Teaching assistants are often graduate students from SBS. They will carry a teaching assistant badge and wear a green color laboratory coat. The duties of teaching assistants include:

- to enforce all safety regulations by explaining the regulations and how to work safely
- to brief the students on the practical
- to demonstrate techniques
- to actively engage the students in conversation about the practical and principles
- to ensure that all students understand the principles being applied in the practical
- to answer questions about the practical work

The laboratory executives are SBS staff and they wear blue colour laboratory coat. The duties of laboratory executives include:

- to plan and prepare the requisite material, consumables, equipments and workspace
- to ensure that the equipments are in good working conditions
- to enforce all safety regulations by explaining the regulations and how to work safely and record safety violations in the attendance file.

The duties of assistant manager (teaching laboratory) include:

- to oversee the overall operations of the teaching laboratory
- to assist the school management in the establishment and implementation of the teaching laboratory policy
- to work with the safety manager to ensure that the safety rules and regulations in the teaching laboratory are met
- to work with the teaching executives and teaching assistants to ensure that the policy and the safety rules in the teaching laboratory are met

<b>Name</b>	<b>Position</b>	<b>Contact</b>
Teaching lab office	Laboratory executives	63162960 63162837 63162809
Miss Tay Mei Xia	Senior Assistant Manager (Teaching laboratory)	65921795

## 1.4 Workplace Emergency

For workplace emergency within the school premise, we have Emergency Response Team (ERT) and Emergency Coordination Team (ECT) to assist staff or students. Team members are trained in Occupational First Aider, First Aider, Fire Responder, Chemical Safety and Biological Safety. First Aid box is available in the laboratory or department. Before seeking their assistance, injured staff or students should look at the seriousness of the injuries and perform self-treatment if possible.

On 24/7 basis, help can be obtained from the University Fault Reporting Centre (x4777) or Campus Security (x5200). Try to dial 999 or 995 only when the situation is beyond self-control.

Emergency Services	Phone Number	Purpose of Contact
Fire Brigade	995	When a fire unable to extinguish using school safety facility
Ambulance	995	When someone is seriously injured and need immediate medical aid (for life threatening cases)
Police	999	To handle suspicious or threatening person or article
Fault Reporting Centre	67904777	For assistance in remedy building faults related to electrical and architectural issues
NTU Medical Centre	67936828	When in need to seek immediate medical aid (like big cut, sprained ankle, etc.)

## 1.5 Reporting of Accidents & Incidents

The School is required to keep a register of all accidents, however slight, that result or had the potential to result in an injury or an unsafe situation. The School is to ensure the implementation of the incident reporting and investigation procedures according to the Standard Operating Procedure (SOP) issued by the Office of Health and Safety (OHS).

It is the responsibility of all students to report any accidents, near miss, unsafe condition, unsafe act, dangerous occurrence or occupational disease using the online Incident & Investigation Reporting Form (IIRF).

<http://intranet.ntu.edu.sg/ohs/IIRF%20Online%20Form/Forms/AllItems.aspx>

*Incident Reporting Procedures:*

- Student involved in the Incident reports **on-line (OHS Website)** - within 24 hours (Copy of report will be send to Chair/HoD). Please kindly seek the teaching laboratory manager/staff for assistance on the incident report.
- OHS / system receives report and informs Safety Officer/Representative
- Safety Officer / Representative / PI investigate. OHS will assist if necessary
- Reporting Officer /PI, Safety Officer / Representative submit investigation report, review risk assessment, and develop new safe work procedure.

## 1.6 Evacuation Procedures

The SBS fire evacuation plan, a regulation enforced by the Fire Safety Act, is to assist the staff members or related members of the School of Biological Sciences (SBS) to respond to evacuation in a systematic and orderly manner in times of fire occurring in the building.

SBS Building has installed with Simplex **4100EN single stage supervised fire alarm system**. The fire alarm system has the following features incorporated with the system:

- Fire automatic detection
- Fire zone indication
- Manual activation
- Sprinkler flow detector
- Pressurization fan engineering system

The main fire alarm panel is located within the SBS building fire command centre of North wing at the basement 4. The fire alarm system is also linked to the Fault Reporting Centre that located at North Academic Complex basement 1 and manned 24 hrs by FRC.

At each level, there is a floor fire alarm panel, emergency phone and break-glass fire alarm system located opposite the fireman's lift. The escape route sign boards are also shown at the passenger lift area. Fire extinguishers, sprinklers, smoke detectors, hose reel, gas leakage detector and break-glass fire alarm are found along the corridors and labs of each level. The fire extinguishers used for the SBS are as follows:

1. ABC dry powder – to fight fire Class A, B and C. Location install for all lab and common corridors
2. CO<sub>2</sub> – to fight fire Class B and C. Location install for computer lab and electrical switch rooms.

When a fire was noticed, the OFPM, the ERT and the ECT should be rapidly notified. The school stores an extensive amount of flammable chemicals/items. These chemicals/items may result in an explosion causing death and building damages, if necessary actions are not immediately acted.

In such a critical event, the first priority is to evacuate every person in the building to a safe place. **Thus it is the responsibility of every student within SBS to cooperate and act on the instructions, given in the following plans.**



When You Notice A Fire, Do Not Panic

1. **Shout "Fire" Loudly** and call for help or notify personnel in the immediate vicinity.
2. **Put out the fire** by using appropriate equipment (e.g fire extinguisher, damp cloth, etc) with another person. Do it without any risk.
3. **If someone is injured**, make first priority to attend to the injured person.
4. **Raise the alarm by** breaking the glass panel if you fail to put off the fire.

When The Alarm Activates (All access card doors are deactivated)

**GET READY** to evacuate from your work stations.

**TURN OFF** any power supply. Ensure all windows closed. Wait for instructions (During after office hours, there is no need to wait for instructions, leave building immediately)

**LEAVE** the building immediately when the staff of OFPM requested you to do so through the PA system. Close all doors when the last person makes an exit from a room or corridors.

**DO NOT** use lifts. Exit to the safest stairways that bring you to the meeting point on ground floor.

**ASSEMBLE** at the QUAD (Open space by the Auditorium)

**REPORT** to laboratory / department representative / ERT / ECT who will submit the list to the School Safety Officer.

**DO NOT** re-enter the building until further notice.

Fire escape routes are as below

Floor / Place	Fire Escape Route
Level 1 (GO, TCM & Main lobby)	Exit by lobby glass doors to assembly point at the QUAD
Classroom 2 to Classroom 7 (01N)	Exit to the bridge and turn right
Basement 1 (B1)	Exit by car park and meet at assembly point
Level 2 (02N & 02S)	Exit by open stairways to the assembly point
Basement 2 (B2N), Level 3 to Level 5 (N & S)	Exit by stairways near cargo lift and go to assembly point
Animal House / BSL-3	Exit to Nanyang Drive and join the staff at the QUAD

If fire escape routes are on fire, the ERT / ECT / Fire Wardens will lead to assembly point via another exit.

## 1.7 Threatening or Suspicious Person/Items

### Threatening or Suspicious Persons

If possible, remove yourself immediately from the vicinity. Move calmly. Do not challenge the person, and avoid direct eye contact. Once clear, notify the first person you see who is known to you. As soon as possible, report the incident to the School Safety Committee.

If you cannot remove yourself from the vicinity without closing with the person, lock yourself in the nearest secure room with a telephone and call the police and NTU security: POLICE: 999 SECURITY: ext. 5200 (24 HOURS)

If the situation is not immediately threatening, ring Security on ext. 5200 (24 HOURS), give details and ask for immediate assistance.

In an extreme emergency, out of hours, where you are in physical danger and you cannot ring the police, activate the fire alarm. This will bring professional help within 5 minutes.

### Threatening or Suspicious Items

During office hours, contact anybody you know, if possible notify the School Safety Committee first. After officer hours, contact anybody you know, and then immediately contact campus security.

## 1.8 Undergraduate Student Attachment & FYP Student Policy in the teaching laboratory

Undergraduate students under attachment and FYP are not allowed to carry out any experimental work or operate any laboratory equipment without supervision. Training on the use of equipment must be carried out by the staff in the laboratories that they are attached to. They are also discouraged to work alone in the laboratories at any time.

## 2.0 Safety Rules for Teaching Laboratory

- Read and understand the safety manual
- Know the Emergency & Evacuation procedures
- Know the location of the emergency facilities i.e. eye wash and safety shower
- All undergraduates must place their personal belongings in the lockers located at level B1 and Level 2 before they enter the teaching laboratories
- Use the appropriate Personal Protective Equipment (PPE) at all times, this may include: Lab coat, Gloves, Safety Goggles and other protective equipment
- Students must wear a laboratory coat in the teaching laboratory. Students with no laboratory coat will be asked to leave the teaching laboratory. If one forgets to bring his/her laboratory coat, they may borrow from friends and return to the teaching laboratory.
- Respect all chemicals. Be cautious and always wear safety goggles when you are handling hazardous chemicals.
- Long trousers (with covered ankles) must be worn at all times.
- No Open-toed Footwear i.e. sandal / slipper
- Long hair must be tied back at all times
- No Eating, Drinking & Smoking
- No Mobile phones
- No personal items on bench i.e. bags, water bottles, laptop and earphones
- No mouth pipetting
- Follow the procedures / instructions from the lecturers / teaching assistants/ teaching executives
- Dispose all waste appropriately
- Wash hands properly before leaving lab

## 2.1 Personal Protection Equipment

Laboratory safety measures and practical applications should go hand in hand to keep the SBS as a productive as well as safe working place. Laboratory coat bound areas have been identified for those who need to wear laboratory coat while working.

### Strict Laboratory Coat Areas

(Laboratory areas with limited public access)

- BSL-2 Laboratories
- Teaching laboratories
- Core facility areas
- NMR laboratory at B1
- X-ray laboratory at B1
- Gas cylinder area at B1

### Optional laboratory Coat Areas

Students may or may not wear laboratory coat for purpose of transit from one laboratory to another or core laboratory area. Many laboratory equipment are located in core laboratory areas where they need to access and use the shared facilities.

- Laboratory corridor
- Corridor at B1
- Passenger lift and its lobby except at level 1 (North wing & South wing) and at B1 (North Wing)
- Cargo lift and its lobby

### Strict No Laboratory Coat Areas

(Areas with most frequent public access)

- Offices
- Toilets
- Pantries
- Meeting rooms
- Classrooms and computer classroom
- Air-conditioned link at level 4
- Passenger lift and its lobby at Level 1 (North wing & South wing)
- Passenger lift and its lobby at B1 (North wing)
- SBS main lobby
- General store
- Car park at B1 except gas cylinder area

### 2.1.1 Disposable Glove Policy

Disposable gloves should be worn in the teaching laboratory when performing practical work. Disposable laboratory gloves are not to be worn in communal areas. Door handles, mobile phones, computer keyboards and mice (except in clearly labeled circumstances), face, hair etc. are not to be touched with gloves. If needed, wear one glove and use the ungloved hand to open doors etc.

In the event of potential contamination of communal items such as door handle, computer mouse, disinfection must be performed immediately.

#### Procedure:

- Dispose of potentially biohazardous gloves into biohazard waste.
- Wash hands
- Put on clean pair of gloves.
- Use 70% ethanol to disinfect surface.
- Do not spray directly onto surface.
- Wet paper towel or KimWipe with disinfectant and use this to wipe down the potentially contaminated surfaces.
- Dispose of used material and gloves in biohazard waste.
- Wash hands.

## 2.2 Waste Management & Disposal

Different types of waste are produced in the laboratory. The types of waste that must be handled according to instructions are:

1. General organic waste (flammable)
2. Halogenated hydrocarbons (non-flammable)
3. Chromic acid solutions
4. Lead, Silver and other heavy metals
5. Acids and Bases
6. Broken instruments
7. Broken glass and porcelain
8. Biohazardous waste

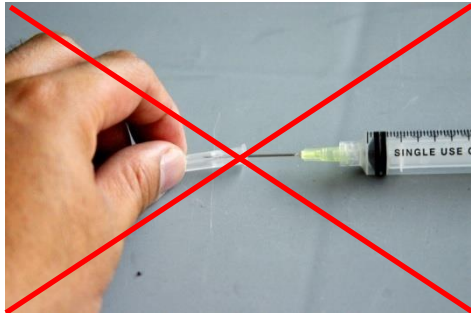
### Proper waste disposal

- Normal waste bin. Lined with black plastic bag.
  - ONLY for normal, uncontaminated waste like tissue paper, papers
  - No used gloves to be thrown in this bin
  - This waste is taken straight out of the building by normal cleaners



- Sharp bins

- ONLY for sharp and / or breakable objects like needles, microscope slides, cover slips, broken glassware
- Never re-sheath needles into plastic covers. You may slip and pierce your skin through the plastic cover



- Chemical waste containers

- Hazardous chemicals are to be disposed of into appropriate bottles or carboys and not flushed down the sink



- Biohazard waste bins
  - For ALL plastic ware/disposable wastes created after every practical session i.e. used gloves, used pipette tips, used tubes, agar plates, etc
  - This waste is autoclaved before disposal. The autoclave uses steam sterilization to kill all biohazardous substances including viruses, bacteria and cells





## 2.3 Disinfection, Decontamination and Sterilization

A basic knowledge of disinfection, decontamination and sterilization is crucial for biosafety in the laboratory.

The specific requirements for biosafety will depend on the type of experimental work and the nature of the infectious agent(s) being handled. It will therefore be necessary to develop more specific and standardized procedures to suit the needs of the various levels of biohazard involved in a particular laboratory.

Many different terms are used in dealing with the process of decontamination for biosafety.

The following are among the more common.

Antimicrobial	An agent that kills microorganisms or suppresses their growth and multiplication
Chemical germicide	A chemical or a mixture of chemicals used to kill microorganisms.
Decontamination	Any process for removing and/or killing microorganisms. The same term is also used for removing or neutralizing hazardous chemicals and radioactive materials
Disinfectant	A chemical or a mixture of chemicals used to kill microorganisms, but not necessarily their spores. Disinfectants are usually applied on inanimate surfaces or objects
Disinfection	A physical or chemical means of killing microorganisms, but not necessarily their spores
Microbicide	A chemical or a mixture of chemicals used to kill microorganisms. The term is often used in place of "biocide", "germicide" or "antimicrobial".
Sterilization	A process that destroys and removes all classes of microorganisms and their spores.

### **2.3.1 Disinfection of Biosafety Cabinets**

BSCs are designed to provide personal, environmental and product protection when appropriate practices and procedures are followed.

All items within BSCs, including equipment, should be surface-decontaminated and removed from the cabinet when work is completed, since residual culture media may provide an opportunity for microbial growth.

The interior surfaces of BSCs should be disinfected before and after each use. The work surfaces and interior walls should be wiped down with a disinfectant that will kill any microorganisms that might be found inside the cabinet. At the end of the practical, the final surface decontamination should include a wipe-down of the work surface, the sides, back and interior of the glass. A solution of 10% Clorox or 70% ethanol should be used where effective for target organisms. A second wiping with sterile water is needed when a corrosive disinfectant such as Clorox is used. It is recommended that the cabinet be left running. If not, it should run for 5min in order to purge the atmosphere inside before it is switched off.

## 2.4 Chemical Handling

1. Respect all chemicals and be cautious when handling them, especially those you know very little about. Read the Safety Data Sheets or books to know the hazards and procedures to handle the chemicals. When in doubt, consult the teaching assistants, teaching executives or course coordinators.
2. Corrosive, flammable and toxic chemicals and those producing strong odours must be handled in the fume hood.
3. Laboratory coats and safety glasses must be worn.
4. Never use your mouth to pipette dangerous liquids- Use a rubber safety bulb for all pipetting purposes.
5. Do not carry bottles containing corrosive liquids (concentrated acids, bromine etc) by their necks. There are baskets specially made for that purpose.
6. Do not pour or dispose of hazardous materials in the sink. Labeled residual bottles should be used and kept in the fume cupboard. When in doubt, consult the teaching assistants, teaching executives or course coordinators.
7. Compressed gas cylinders must be properly secured and not left standing on their own. A falling gas cylinder can easily break an arm or leg and cause other large accidents in the laboratory.

## 2.5 Chemical hazards

Students should be aware of the routes of the exposure, hazards and the proper procedure in handling the chemicals. The chemical hazards are dependent on the properties of the chemicals. Hazardous chemicals can be classified by the written transport regulations for dangerous goods or the hazards and extend of danger that they might impose.

### Routes of exposure

There are several routes of exposure to the chemicals:

**Inhalation**- leads to irritation, sensitization, allergic reactions, respiratory disease or cancer.

**Contact**- skin contact with chemicals may cause chemical burns, conjunctivitis of the eyes, or systemic poisoning.



**Ingestion**- accidental swallowing via mouth pipetting, or consumption of contamination food or drinks.

**Through broken skin**- enters the body via cuts, abrasions or needle-sticks.

### 2.5.1 Globally Harmonised System of Classification and Labelling of Chemicals (GHS)

The Globally Harmonised System of Classification and Labelling of Chemicals system is developed from United Nations to classify chemical and to communicate hazards through standardized labels and safety data sheets (SDS).

The GHS requires chemicals to be classified based on their inherent properties or hazards and in accordance with certain classification criteria. Below are some examples of the GHS pictograms, commonly found in the teaching laboratory.

GHS pictogram	Properties/Hazards
	Flammables Self-Reacting Pyrophorics Self-Heating Emits Flammable gas
	Corrosives








	Explosive Self-reactive Organic Peroxides
	Oxidizers Organic Peroxides
	Irritant Dermal/Skin Sensitizers Acute Toxicity (harmful) Transient target organ effects (narcotic or respiratory)
	Carcinogen Respiratory Sensitizer Reproductive toxicity Target Organ toxicity Mutagenicity Aspiration hazard
	Acute toxicity (severe)
	Environmental toxicity
	Gases under pressure

Table of GHS pictograms

## 2.6 Emergency Equipments

Fire extinguishers are located near the exit and not near the chemical cabinets. In the event of an explosion, a fire extinguisher near the explosion area might be rendered inaccessible or damaged.

Students must be familiar with the location and contents of SBS First Aid Kit, emergency shower and eye wash stations.

If a spill occurs, please inform the staff immediately.

## 2.7 Procedures for Medical Emergency

### Chemical or Biological Splash to the Eye

1. Immediately flush the eye with gentle stream of water for 15 min.
2. Be careful not to wash the contaminant to the other eye.
3. Use the emergency eyewash provided in the laboratory.
4. Seek medical attention if necessary.
5. Record incident (IN01) and report to the assistant manager and Safety Officer.

### Cuts and Abrasions

1. Immediately cleanse the wound and surrounding skin with antiseptic soap and running water and encourage bleeding.
2. Get first aid box and hold a sterile or clean pad firmly over the wound and apply a plaster.
3. If the cut is severe, keep the victim lying down and raise the bleeding part higher than the rest of the body.
4. Seek medical attention if necessary
5. Record incident (IN01) and report to the assistant manager and Safety Officer.

### Thermal Burns

1. If skin is unbroken, submerge the burned area in clean water.
2. Do not break any blister and do not use any medication.
3. Seek medical attention if necessary
4. Record incident (IN01) and report to the assistant manager and Safety Officer.

### Serious Medical Emergencies

(The victim is unconscious due to some medical complications such as heart attack, fall and head injury, etc.)

1. Let the victim rest lying down.
2. Take off all personal protected equipment (PPE) if he put on any.
3. Call NTU Medical Centre and SCDF Hazmat team for help.
4. Call the ERT personnel who have training in First Aid, Occupational First Aid (OFA), etc.
5. Inform the assistant manager and Safety Officer
6. Document the incident in details.

### 3.0 School Safety Resources

The following safety manuals are available at the school website.

- Emergency Management Plan (EMP)
- Biosafety and Operations Manual (BSL-3 facility)
- Emergency Response Plan (ERP) for BSL-3 & Animal Research Facility
- Undergraduate Practical Safety Manual for Teaching Laboratory

NTU Office of Health and Safety (OHS) for university WSH policy, Directives, SOPs and Guidelines. Available at [www.ntu.edu.sg/ohs](http://www.ntu.edu.sg/ohs).

Apart from the on-line safety videos, the school website contains other safety information from various institutions and websites:

National Institute For Occupational Safety And Health (NIOSH) Pocket Guide To Chemical Safety Hazards  
International Chemical Safety Cards Biosafety In Biomedical And Microbiological Laboratories

Toxicology Data Network (TOXNET) ChemIDplus Hazardous Substance Data Bank

Oxford University Chemical & Other Safety Information From The Physical And Theoretical Chemistry

Office Of Environmental Health And Safety, University Of Virginia (USA) Laboratory  
Survival Manual

Materials Safety Data Sheets (MSDS)

J.T. Baker Merck Safety Data Sheets Safety Links: Material Safety Data Sheets

## 4.0 References

1. Biosafety in Microbiological and Biomedical Laboratories at:  
<http://www.cdc.gov/od/ohs/biosfty/bmb14/bmb14toc.htm>
3. Primary Containment for Biohazards: Selection, Installation and Use of Biological Safety Cabinets at: <http://www.orcbs.msu.edu/biological/bsc/bsc.htm>
4. World Health Organisation Laboratory Biosafety Manual at:  
[http://www.who.int/csr/resources/publications/biosafety/who\\_cds\\_csr\\_lyo\\_20034/en/](http://www.who.int/csr/resources/publications/biosafety/who_cds_csr_lyo_20034/en/)
5. Mohun, Janet 2002 First Aid Manual (8th Edition). Dorling Kindersley. United Kingdom.
6. Diberarrdinis, Loius J. 2001 Guidelines For Laboratory Design: Health & Safety Considerations. Wiley Interscience. New York.
7. Furr, A. Keith 1995 CRC Handbook of Laboratory Safety (4th Edition). CRC Press, Inc. USA.
8. Fleming, Diane O. 2000 Biological Safety: Principles & Practices (3rd Edition). ASM Press. USA.
9. Workplace Safety & Health Act 2006. Singapore.
10. Biological Agents & Toxins Act 2005. Singapore
11. <https://www.wshc.sg/ghs>