

Lab Safety Guideline



Safety Guidelines for Students in Laboratories

Introduction

1. The goals of these guidelines are to:
 - a. Teach students about proper and safe behavior in the lab.
 - b. Introduce students to the dangers associated with working in lab.
 - c. Introduce students to the safety infrastructure and equipment that are at their disposal in lab.

We briefly describe how to deal with dangerous scenarios and how to act in cases of injury in the lab. These guidelines do not cover all hazards and possible dangerous scenarios and do not excuse the student from being alert to other hazards in the lab that are not covered by this guide.

Each student must always bear in mind that he or she is not alone in the lab, and that their actions may have some consequences on other people around them.

2. The guidelines are aimed at all students in the labs of the Department. Any behavior that does not obey these guidelines may lead to expulsion of the student from GTIIT.
3. All students must read the safety instructions and sign the attached confirmation slip. Without doing so, the student will not be allowed into the lab. The senior instructor of the lab will confirm that the student has participated in the safety tutorial prior to the beginning of the lab, by signing the authorization slip. Every student will keep his/her copy of the guidelines and the signed confirmation slip will be kept in the Departmental office.



General guidelines

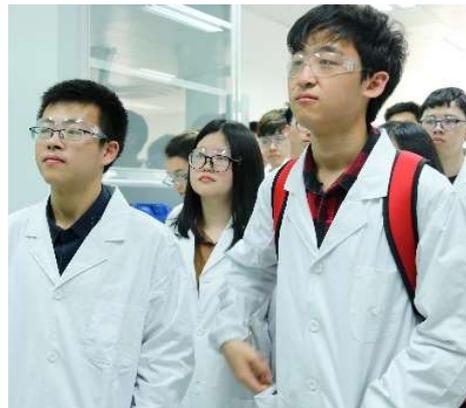
1. Every student must familiarize themselves with the safety infrastructure of the lab and with the emergency procedures. These include:
 - a. Location of all emergency exits and escape routes from the lab and the building.
 - b. Location of all emergency switches that turn off electricity and gas lines to the lab.
 - c. Location of the main gas line to the lab.
 - d. Location of telephone and/or emergency call buttons and relevant phone numbers in case of emergency.
 - e. Location of all emergency showers and eyewash stations and the mode of their operation
 - f. Location of firefighting equipment and the mode of their operation.
 - g. Location of the first aid box, its contents, the location of all other first aid equipment, and the mode of their operation.
 - h. Handling lab waste; location of waste solvents and sharp objects containers.
 - i. Location of all required objects for neutralization and absorption of hazardous substances and the mode of their operation.
2. Students are allowed to work in the lab only in the presence of instructors that are familiar with the work protocols and all the hazards.
3. In order to avoid accidents and injuries, in case of a doubt consult with your instructor or a supervising staff member before proceeding.
4. Before using any equipment, make sure you know how to operate it and how to turn it off.
5. Do not use any machine, equipment, device or substance that is broken or damaged. Inform your instructor immediately of any damaged or malfunctioning equipment.
6. Plan your work ahead of time. Make sure you understand all of procedures that you will be performing, and in particular perform appropriate risk assessment prior to commencing your experimental work to pinpoint hazards associated with the experiment to be done. In any case of doubt, consult your instructor.
7. Do not start any experiment without obtaining your instructor's permission. It is forbidden to perform an experiment, measurement or procedure that has not been specifically authorized by your instructor.
8. Do not touch any equipment, experimental system or chemicals that are not part of the experiment that you are performing.
9. Do not place personal items at your lab station. Clear the work space from objects that are not part of the conducted experiment. Maintain a neat and clean working area free of materials that are not pertinent to the work done.
10. Make sure all temporary solution containers are properly labeled with a non-erasing marker. Never return a chemical substance from a temporary container to its original one, instead all experimental residual substances must be classified as hazardous waste and discarded as per the laboratory personnel instructions.
11. Do not pour waste chemicals or throw other substance into the sink or the sewage system, unless your instructor authorizes you to do so.
12. Always keep volatile solvents in the fume-hood.
13. Do not bring food into the lab. Eating, drinking, chewing gum and smoking in the lab are strictly prohibited at all times.
14. It is strictly forbidden to wear contact lenses in labs.
15. When working with radioactive materials, follow the appropriate guidelines and regulations of the Institute and do it only after clear instructions from your supervisor.

16. Never run inside the laboratory. In case of an accident keep calm and evacuate without panicking.
17. In case of an accident don't try to rescue any of your personal belongings. Your life is more valuable.
18. It is prohibited to taste, smell or sniff chemical substances at all times.
19. Never mix chemicals without proper instructions—either written in the experimental protocol or oral from your instructor—and particularly not during waste disposal

Personal safety equipment

Student must use personal protective/safety equipment (PPE) at all times, including:

1. Safety glasses/goggles.
2. Long lab coat, buttoned with easily openable buttons ('Tic-Tac'), and with long sleeves.
3. Protective gloves in labs (when handling chemicals, or hot material)
4. Closed shoes, preferably leather or plastic (not fabric). Sandals (slippers), flip-flops as well as high heels are strictly forbidden in the lab.
5. Additional safety gear (safety mask, apron, or heat resistant gloves etc.) is required in special experiments according to the instructor's guidelines.
6. Hair must be adequately tied back (and preferably, covered) during work in the lab.
7. Hands must be washed frequently.



Completion of work in the lab

1. When you finish working in the lab, disconnect all systems and equipment from gas, water, electricity, according to your instructors' guidelines.
2. Return all chemicals and moveable equipment to their place, as soon as you are done using them.
3. Verify that there are no chemicals left on the working space or on the floor. Clean all glassware and dirty surfaces according to your instructors' instructions.
4. Decontaminate the work space and your personal safety gear, according to your instructors' guidelines.
5. Wash your hands with soap and water when you are done working.
6. In case of a chemical liquid or powder spill, use the designated equipment to treat it, following the guidelines given by your instructor. Remember to protect yourself with safety gear before using any neutralization solution or absorption chemical.
7. Handle chemical waste according to your instructors' guidelines, i.e., neutralize acidic/basic waste; pour organic solvents into appropriate waste containers.



8. Systems that are left to work continuously and do not require the presence of the user. It should be only receiving direct authorization from the lab instructor (preferably written) and will be operated only according to the instructors' guidelines.

Fire safety

1. Work in a laboratory presents increased fire hazards and everyone must act to minimize the chances of fire.
2. Working with an open flame is allowed only with authorization from your instructor. Never leave an open flame unattended. Turn off the burner as soon as you finish working with it.
3. Always be prepared and ready to put out a fire. Memorize the location of the fire-extinguishing equipment, the emergency call buttons, and be familiar with the escape routes.
4. Use a fire extinguisher to put out fires. In case you use an extinguisher, let your instructor know about it immediately, to ensure that it is refilled.
5. Do not use fire-extinguishing equipment for any other purpose.



Electricity

1. Before using any electrical device, study its operating instructions and make sure the power cable is intact.
2. Locate the emergency switch and learn how to use it. In case of electrocution or any malfunction, treat any electrical wire as though it is “alive”.
3. Do not modify or alter any electrical machine or device or perform any modifications to the lab electrical system.
4. Do not use a device, plug, or any part of a system if it is broken or defective. Alert your instructor immediately.
5. Never touch an electrical instrument or device, wire, or plug with wet hands. In case the instrument or the area around it is wet, alert your instructor immediately.
6. If a flammable liquid has been spilled on or around an electrical device, there is a danger of fire. Immediately remove people from the surroundings and alert your instructor. Do not turn on or off any electrical switches in the presence of a flammable liquid or a gas leak.
7. When you finish working, disconnect all electrical devices, according to your instructor’s guidelines.



Chemicals

1. Bringing in or removing chemicals from the lab will be done by the instructor or lab employees, only. Do not enter the chemical storeroom without specific instructions from your instructor and somebody authorized by him.
2. All chemicals must be transferred in appropriate vessels, which can contain them. Bottles and containers must be held appropriately (both hands holding, not only by the neck).
3. When moving inside the laboratory with chemicals avoid sudden moves, always speak loudly and warn others of your presence.
4. Bottles and containers will be closed by a lid or stopper, except when their contents are being used. Never remove a stopper forcefully. If the stopper cannot be removed easily, consult your instructor.
5. Bottles and containers of chemicals must be placed at least 10 cm away from the edge of the table. Make sure that they are positioned stably.
6. Before using any chemical, read the safety information on its label or box, and in the Material Safety Data Sheet, MSDS.
7. If there is any concern that a chemical or its container may be defective or contaminated, alert your instructor immediately.
8. Working with flammable liquids (alcohols, ether, acetone, etc.)



- a. You may only work with these liquids in fume hoods.
 - b. Never place a container of flammable liquids near open flame, heat source, or spark source. Keep acids and reactive substances away from flammable liquids.
 - c. For distillation, use only the equipment authorized by your instructor, and use it only inside the fume hood.
 - d. Remember that vapors of flammable liquids can spread and be ignited by different sources, such as a spark, heat source, or open flame, even from several meters away.
9. Working with acids and bases
 - a. Remember that dilution of acids and bases can be highly exothermic. Therefore, never pour water into an acid. Dilute them by pouring the concentrated acid or base solutions into water, while constantly stirring and cooling.
 - b. Protect your eyes with safety glasses and your skin with gloves and appropriate clothing (like an apron) when working with concentrated acid or base solutions. Follow the manufacturer and your instructors' guidelines.
 - c. Neutralize acidic and basic waste solutions before discarding, according to your instructors' guidelines.



Working with compressed gas cylinders

1. Before working with a system under inert gas atmosphere, be sure to receive detailed instructions from your lab instructor about how to open and close the valves and regulators of the gas cylinder. Use only equipment items that are designated for work with pressurized gas cylinders.
2. Before starting to work with a gas system, obtain your instructor's authorization and approval that the system is in working order, and make sure you are familiar with the proper usage of the particular gas system.
3. Flammable gas cylinder must be stored in fire-proof type cabinet. Gas cylinders must be anchored or to chained or used other suitable setup. Do not move gas cylinders, unless specifically instructed by your mentor.
4. When opening or closing the valves of a gas cylinder, stand at the opposite end of the tank, and wear appropriate safety gear for your eyes and face when relevant. When working with corrosive gases, such as HBr and HCl, you must wear gloves, protect your face with a mask and perform the procedure in a fume hood.
5. On completion of work with a gas, turn off the valve of the cylinder. Dismantling the connections will be done according to your instructors' guidelines. Do not attempt to dismantle the gas cylinder in any way.
6. In case of a malfunction, close the valve of the tank as far as you can and notify your instructor immediately.
7. When discharging gas into a liquid, a trap should be used to prevent liquid from getting back into the cylinder or regulator.



Working in the fume hood

1. All actions that involve the release of vapor, gas, or liquid spray must be performed in a fume hood.
2. All actions that involve a spread of powder particles must be done in a closed environment, such as a non-working (aspirator off) fume hood.
3. Before beginning to work in a fume hood:
 - a. Familiarize yourself with the location of the switches that control the fume hood (ventilation, electricity, gas, pressurized air, vacuum, etc.).
 - b. Turn on the ventilation and verify that the alarm system indicates proper airflow. Report immediately any malfunction to your instructor.
 - c. Keep all materials inside the hood at least 10 cm from the sash opening. When not working in the hood, close the sash.
 - d. Keep the sash window of the hood closed (down) as much as possible, especially when working with systems under pressure, vacuum systems, and/or extreme temperatures.



Miscellaneous

1. Do not use your mouth for suction of any chemical. Use only designated pumping equipment.
2. Check each glass or plastic container before you use it, to make sure it is not cracked, broken, dirty or otherwise defective. Never use a defective container.
3. When inserting a glass tube into a rubber tube, stopper, or similar item, protect your hands with an appropriate glove (thick) or cloth. If the insertion does not occur easily, ask your instructor for help. Do not use excessive force.
4. Before using a chemical, learn what happens to that chemical upon contact with water. Alkaline metals, for example, are not allowed to come into contact with water. The symbol on a bottle containing substances that react with water is **W**.
5. Wash all glass- and plastic-ware that you used during the experiment only after removing all remnants of the reaction solution, i.e., neutralization of acids and bases, removal of organic solvents to waste containers, according to your instructor's guidelines.
6. When using a vacuum pump, place the outlet tube outside the lab or in a working hood. When toxic gases are released during the experiment, use gas-trap as instructed by the instructor.

Emergency procedures

1. Any accident must be reported **immediately** to the instructor, lab manager and Emergency Response.
2. In any case of an emergency (spill, spray, ignition, etc.) remove people from the area and notify your instructor immediately. If the hazard spreads rapidly, evacuate the lab immediately.
3. In case of an emergency, notify the campus emergency team immediately. Make sure to report the type of emergency, its location, injuries if any and the name of the lab supervisor. Emergency contact details appear on the door at the entrance to the lab. Please make sure you take a snapshot picture of these details on the first day of the lab, and input the relevant phone numbers into your phone memory. If an emergency distress/alarm button are available in the lab, try to press them on the way out if possible, as they will speed up the delivery of the information to the relevant response team. This action, however, does not come instead of the normal reporting procedure but in addition to it.
4. In case of wounded people, after evacuation and providing immediate first aid, call immediately the campus security headquarters for handling the next steps, i.e., transfer to the hospital.
5. In case of contact with a chemical or injury, the type of first aid depends on the specific case:
 - a. **Foreign body or chemical in the eye**

Wash the eye thoroughly at the eyewash stand for at least 15 minutes. First aid will be administered on the spot by one of the instructors or by peers/friends.

 - (1) Acid in the eye - Wash immediately and thoroughly with copious amounts of water, using the designated cup or eyewash stand. Try to keep your eyes open. It is mandatory for the wounded person to see a doctor.
 - (2) Base in the eye - Same as with acid, but also wash with 1% boric acid solution. It is mandatory for the wounded person to see a doctor.
 - (3) Bromine in the eye - Wash immediately and thoroughly with copious amounts of water and then with 1% sodium bicarbonate solution. It is mandatory for the wounded person to see a doctor.

(4) Glass in the eye – remove the piece of glass gently with tweezers or by washing. Contact a doctor immediately.

b. Damage to the skin by chemical reagents

Remember, immediate treatment of the damaged tissue, with the appropriate washing solution, is critical and can prevent greater damage and future pain to the victim. In all cases, consider evacuation if damage is serious.

(1) Acid on the skin – wash immediately with copious amounts of tap water, then with saturated bicarbonate solution, and finally with water again.

(2) Base on the skin – wash with copious amounts of water, with 1% acetic acid solution, and finally with water again.

(3) Bromine on the skin – wash well with petroleum ether (80-100), then rub with glycerol. Make sure to rub the glycerol in well, so that it will penetrate the skin and react with the bromine. Wipe, dry, and apply burn ointment. An alternative treatment: pour saturated sodium thiosulfate solution on the wounded area and then wash with water.

(4) Phenol on the skin – wash immediately with copious amounts of ethanol.

(5) Other chemicals – wash immediately with soap and warm water.

c. Damage to the skin by chemical powders.

Remove the contaminated clothing immediately, brush the powder off with a soft brush. Wash the damaged area for at least 15 minutes.

d. Burns

(1) Minor burn – the skin is intact – immerse skin in ice-bath.

(2) Serious burn – the area of the burn is large or the skin is broken – remove clothing from the area by cutting off and evacuate the victim to the hospital.

6. Emergency procedure in case of fire

a. Using the extinguisher – allowed only to those who have been instructed on how to use the extinguisher. Using a water hose to put out a fire is forbidden unless instructed specifically by an authorized personnel.

b. Clothes on fire –

(1) Prevent the burning person from running around and aggravating the fire.

(2) Extinguish the fire by wrapping the person with a thick blanket or lab coat.

If possible, use an emergency shower or strong current of water.

(3) Do not extinguish the fire with an extinguisher.

c. Chemical fire

(1) Immediately extinguish all of the flames in the area, unplug all electrical devices from their sockets, and remove flammable substances and solvents.

(2) Small fire – smother the fire with a container such as a beaker, Erlenmeyer, or oil bath.

(3) Large fire – put the fire out using an extinguisher containing CO₂. Aim the extinguisher at the edges of the fire first, then move towards the center.

(4) Do not use water to extinguish a chemical fire. Water not only does not help; it often exacerbates the fire.

(5) In case of oil or organic solvent fire. Use sand to put out the fire.



7. Cuts

- a. If the cut is not deep, let it bleed for a few minutes, check to see that no more pieces of glass remain in the cut and disinfect with alcohol, then bandage with gauze or a Band-Aid.
- b. In case of a deep cut – evacuate the victim to the nearest hospital. On the way, check to see if the cuts are bleeding by pressing around the wound.
- c. Wounds resulting from contact with chemicals or bacteria – wash immediately with copious amounts of water to remove any remnants of the chemical or bacteria for preventing worse pain at a later stage.
- d. When the wound was caused by a contaminated item, check the victim’s Tetanus vaccination status.



Emergencies Contact 紧急联系方式:

Campus Fireman

Responsible Department 负责部门	Contact Number 联系电话
Firefighting Department 消防部门 	8807 7119 (24 Hours)

Campus Clinic & Frist Aid

Responsible Department 负责部门	Contact Number 联系电话
Frist Aid 医疗救助 	Campus Clinic 校医务室 8807 7120

Campus EHS Office 校园环境/健康/安全办公室 8807 7079

“Nothing we do is worth getting hurt for!”

实验室安全指引

简介

1. 指引目的

- a. 为学生提供实验室正确及安全的行为指引
- b. 为学生介绍与实验室相关的危害
- c. 为学生介绍实验室内的安全设施设备

简述如何应对危险情景和如何处理实验室受伤事故。

本指引不能包括所有潜在危害和危险情景，但此手册未能详尽的风险也需要引起学生们重视。

所有学生都须时刻谨记，在实验室里并不是单独活动，他们的任何行为均可能会对周围的人造成影响。

2. 本指引适用于实验室内所有学生，任何违反指引要求的行为都将可能导致该学生被广东以色列理工学院开除。

3. 学生必须仔细阅读安全指引，并签署所附的承诺书，否则学生将不被允许进入实验室。

实验室高级教员将确认学生在进入实验室前已经完成安全辅导，并完成安全承诺书的签署。

每位学生须保留本指引副本，已签署的承诺书将保存系管理办公室内。



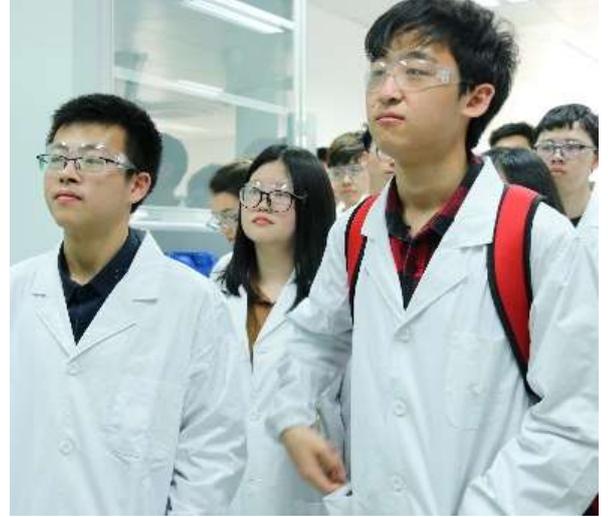
实验室一般指引：

1. 每位学生都必须熟悉实验室的安全设施和应急程序。这些包括：
 - a. 实验室和大楼所有紧急出口位置和逃生路线。
 - b. 所有切断实验室内电力和气体管道的紧急开关位置。
 - c. 实验室的供气主管线位置。
 - d. 紧急呼叫按钮的位置以及紧急情况下的相关应急联系电话号码。
 - e. 所有紧急冲淋和洗眼器位置及其操作方式
 - f. 消防设备位置及其操作方式。
 - g. 急救箱位置、应急物品、所有其他急救设备的位置及其操作方式。
 - h. 处理实验室废物；承装废弃溶剂和尖锐物体容器的位置。
 - i. 有害物质中和、吸收应急物品的位置及其操作方式。
2. 学生必须熟悉实验室安全操作规程和相关危险，以及教员在场情况下，才允许在实验室进行操作。
3. 为避免意外及受伤，如有疑问，请在开始工作前咨询教员或督导人员。
4. 在使用任何设备之前，确保你已经熟悉设备的操作和关停。
5. 禁止使用任何损坏或存在缺陷的机器、设备、装置或物品。如器材有损坏或故障，应立即通知教员。
6. 提前计划好你的工作，确保了解将要执行操作的所有流程和步骤。特别是在开始实验工作之前需进行适当的风险评估，以确定与所用实验的相关危害。如果有任何疑问，请咨询你的教员。
7. 未经实验教员允许，禁止进行任何实验。禁止进行未经实验教员明确授权的实验、测量或程序。
8. 禁止接触任何本次实验之外，且不属于自己实验的设备、实验系统或化学品。
9. 禁止将私人物品放置在实验台上，不属于实验的物品禁止出现在实验台上，保持工作区域干净整洁。
10. 确保所有临时溶液容器都使用无法擦除的标签标识正确标记。切勿将化学物质从临时容器放回原始容器，根据实验室教员说明将所有实验性残留物质按实验废弃物分类归类存放。
11. 除非得到实验室教员授权，否则禁止将实验废弃物或其他物质倒入水槽或排水系统。
12. 挥发性溶剂的操作必须在通风柜内进行。
13. 禁止将食物带入实验室，严禁在实验室内进食、饮水、嚼口香糖、吸烟。
14. 实验室内严禁佩戴隐形眼镜。
15. 在处理放射性材料时，请遵守学校相关指引和规定，操作前必须先得到实验室教员明确指示。
16. 禁止在实验室里奔跑。如发生事故，请保持镇定，不要惊慌。
17. 万一发生事故，切勿尝试抢救任何个人物品。谨记：生命无价！
18. 禁止在任何时候品尝、嗅或闻化学物品。
19. 无论是书面实验方案或是实验室教员口述（特别是处理实验室废物过程），如果没有明确且适当指引，禁止混合化学品。

个人防护用品：

学生在实验室内必须始终佩戴好个人防护用品，包括：

1. 安全眼镜或护目镜。
2. 长袖实验服，扣好纽扣。
3. 化学实验室内佩戴好防护手套(处理化学品及温度较高的材料时)
4. 包裹性较好的鞋子，最好是皮革或塑料(非织物)。实验室内严禁穿凉鞋、人字拖和高跟鞋。
5. 在某些特殊实验中，还需根据教导员指导，佩戴额外的安全装置(如防护面罩、围裙或耐热手套等)。
6. 在实验室工作时，长发必须束起(最好包裹起来)。
7. 注意手部清洁。



实验后：

1. 当你在实验室完成工作后，根据教员指引，关闭实验室内所有系统和设备，如用气、用水和用电等。
2. 一旦完成实验，将化学品和可移动设备归回原位。
3. 确认工作空间或地板上无遗留任何化学品。根据教员指引清洁所有实验器皿和实验台表面。
4. 根据教员指引，清洁工作空间及个人防护用品。
5. 完成工作后，用肥皂和水洗手。
6. 一旦发生化学品泄漏，在教员指导下使用专用工具进行处理。在使用任何中和剂或吸收材料前，必先确保自身已得到个人防护用品的充分保护。
7. 根据教员指引，针对泄漏物性质选择适当的中和剂进行处理，并将处理废物倒入指定的废物容器内。
8. 不需要实验员在场的连续工作系统，在使用本系统前，必须获得实验室教员的直接授权（最好是书面授权），并按照该实验室教员指引进行操作。



消防安全：

1. 实验室的工作增加了火灾危险，每个人都必须采取尽量降低火灾发生可能性的操作。
2. 使用明火前，必须得到实验室教员的授权。
严禁明火无人看管。
用完后，确保火源及时熄灭。
3. 随时准备灭火。谨记灭火设备和紧急呼叫按钮位置，熟知逃生路线。
4. 如使用灭火器灭火，请立即告知实验室教员，以确保灭火器随后完成及时填料或更换。
5. 禁止将灭火设备用于其他用途。



电气安全：

1. 在使用任何电气设备之前，请熟悉设备操作指引，并确保电源线完好无损。
2. 熟知紧急开关位置，并学会如何使用；
如遇触电或设备故障，应将电线视为“带电”状态处理。
3. 严禁修改或变更任何机电设备，或对实验室电气系统进行改动。
4. 如果设备、插头或系统的任何部分存在损坏或缺陷，请不要使用。
5. 禁止用湿手触摸电子仪器或设备、电线或插头。
如仪器或仪器周围有水，应立即向实验室教员汇报。
6. 如果易燃液体溢流至电气设备上或周围，此时液体存在着火危险。
应立即将设备附近人员疏散，并立即向实验室教员汇报。
在易燃液体或气体泄漏时，切勿开启或关闭任何电器开关。
7. 当完成实验活动后，根据实验室教员指引，断开所有的电子设备。



化学品安全：

1. 只有实验室教员方可将化学品带入或带离实验室。没有实验室教员和教员授权人的明确指示，禁止进入化学品储存间。
2. 所有化学品都必须用适当的容器进行运输。
瓶子和容器必须适当地控制(如双手握持)。
3. 携带化学物品进入实验室时，请避免突然移动，并大声提醒他人勿妨碍你的行径。
4. 瓶子和容器应用盖子或塞子密封，除非容器内东西正在使用。
避免用蛮力开启容器盖子；如果盖子不易拆卸，请咨询实验室教员。
5. 承装化学品的瓶子和容器必须放置在离桌子边缘至少 10 厘米的地方，并确保放置的位置平稳。
6. 在使用任何化学品之前，请阅读其标签或包装上的安全信息，以及材料安全数据表中的安全信息。
7. 如果担心化学品或其容器可能存在缺陷或污染，请立即向实验室教员汇报。
8. 使用易燃液体(乙醇、乙醚、丙酮等)



- a) 必须在通风柜内操作易燃液体。
- b) 切勿将承有易燃液体的容器置于明火、热源或电火花附近。确保远离酸和反应物质。
- c) 精馏操作仅限于实验室教员授权使用的设备，且必须在通风橱内进行。
- d) 易燃液体的蒸汽会扩散，可被多种点火源引燃，如火花、热源或明火，甚至可以从几米远的地方点燃。



9. 操作酸碱试剂

- a) 酸碱稀释时会高度放热。因此，禁止把水倒进酸里，应将浓缩的酸或碱溶液引流入水中稀释，同时不断搅拌和冷却。
- b) 在使用浓酸或浓碱溶液时，必须佩戴好安全眼镜保护眼睛，戴上手套和合适的衣服(如围裙)保护皮肤。请遵循产品生产商及实验室教员的指引。
- c) 在丢弃酸碱残液前，必须根据实验室教员指引，中和酸性及碱性废物溶液。



压缩气瓶：

1. 在使用惰性气体前，请确保熟知实验室教员提供的操作指引，熟悉气瓶阀门和调节器操作。
只使用指定用于实验的加压气瓶设备。
2. 在开始使用气体系统前，必须先获得实验室教员的授权和批准，同时确保系统处于正常工作状态，并熟悉气体系统的正确操作方式。
3. 易燃易爆气瓶必须存放在防火气瓶柜内，并用指定的链条固定在指定的气瓶架上。
除非实验室教员特别指示，否则禁止移动气瓶。
4. 开启或关闭气瓶的阀门时，应避免站在气瓶阀门处，并穿戴防护面屏。当使用腐蚀性气体，如溴化氢和氯化氢时，必须戴上防化手套、防护面屏，并在通风柜中进行操作。
5. 使用完气体后，关闭气瓶阀门。
必须根据实验室教员指引拆除设备连接件。
6. 如果发生设备故障，尽可能立即关闭气瓶阀门，并向实验室教员汇报。
7. 向液体中排放气体时，必须使用止回阀防止液体回流至气瓶或调节器中。



通风橱：

1. 所有涉及蒸汽、气体或液体飞溅的操作均必须在通风橱内进行。
2. 所有涉及粉末颗粒扩散的操作必须在密闭不形成烟尘的环境下，如不进行排风的通风橱内进行。
3. 使用通风橱前
 - a) 熟悉通风柜的控制开关(排风、电力、气体、压缩空气、真空等)的位置。
 - b) 打开排风系统，确认预警系统显示气流正常。如设备有任何异常，应立即向实验室教员汇报。
 - c) 所有材料保持在橱窗内至少 10 厘米距离。当不需在通风橱内进行工作，关闭橱窗。
 - d) 尽可能低的开启通风橱橱窗高度，特别是带压状态、真空状态和/或极端温度下工作时。



其他要求:

1. 禁止用嘴吸取化学物品，必须使用指定抽取设备。
2. 实验前，必须检查每一个玻璃或塑料容器，以确保不存在缺陷及污渍，禁止使用有缺陷的容器。
3. 使用玻璃管插入胶管、塞子或类似物品时，应配备合适的手套(厚的)或布来保护手部。如果不易操作，则请实验室教员协助，禁止蛮力操作。
4. 使用化学物质之前，应先了解这种化学物质与水接触后的变化。例如，碱性金属是禁止与水接触的。瓶子上会标注与水发生反应物质的符号 **W**。
5. 在清洗实验中使用的玻璃和塑料器皿前，必须先根据实验室教员指引，收集实验溶液的残留物至指定废弃物容器内。如中和酸碱溶液，将有机溶剂倾倒至指定废物容器。
6. 当使用真空泵时，将出口管道置于实验室外或运行的通风橱内。当实验过程会释放有毒气体时，应按照实验室教员指示使用吸风罩，将挥发性气体及时抽离。

应急要求:

1. 一旦发生任何事故，必须立即报告实验室教员，实验室负责人和学校应急小组成员。
2. 紧急情况下(溢漏、飞溅、着火等)，人员需撤离现场，并立即汇报实验室教员。
如果危害蔓延迅速，请立即撤离。
3. 如遇紧急情况，应立即通知校园应急小组。

报告事故类型、位置、伤情(如果有)、实验室负责人姓名。

具体的紧急联系方式会在实验室入口处的门上。请确保在首次进入实验室时，就拍照记录该紧急联系方式，并用手机记录相关联系方式。如果实验室有紧急报警按钮，如果可能在离开实验室时拉响警报，可加速信息送达至应急小组，但这些操作不能代替正常的汇报流程，只是对该流程的补充。

4. 如有伤者，在撤离后立即进行急救，并致电校园应急小组来进行后续处理，如将伤者立即送医院处理。
5. 如发生化学品伤害或受伤事故，急救需根据具体情况开展：

a. 异物或化学品飞溅入眼

使用洗眼器清洗眼睛至少 15 分钟。并由实验室教员及同伴提供应急处理。

(1) 眼内进入酸性物质：立即使用就近洗眼器大量清水缓缓清洗。尽量避免闭上眼睛，必须将伤者送医院处理。

(2) 眼内进入碱性物质：与酸处理一样，但需使用 1%硼酸溶液冲洗，必须将伤者送医院处理。。

(3) 含溴物质进入眼睛：立即使用大量清水缓缓清洗，然后用 1%碳酸氢钠溶液清洗，必须将伤者送医院处理。

(4) 玻璃进入眼睛：用镊子轻轻取出玻璃片（如玻璃粉末，则通过清水缓冲洗），必须将伤者送医院处理，并立即联系医生。

b. 接触化学物品致伤

应立即使用适当的清洗溶液处理受损皮肤组织，以防止伤害加剧。

如果受伤严重，应立即将伤者送医院处理。

(1) 皮肤沾染酸性物质：立即用大量清水缓缓清洗，然后用饱和碳酸氢盐溶液处理，最后再用清水清洗。

(2) 皮肤沾染碱性物质：立即用大量清水缓缓清洗，用 1% 的醋酸溶液，最后再用清水清洗。

(3) 皮肤沾染含溴物质：用石油醚(80-100)洗净，然后用甘油（丙三醇）擦拭。确保甘油和沾染面充分接触，并渗透到皮肤里和溴发生中和反应，然后擦干，涂上烧伤膏。

另一种可选治疗方法是：将饱和硫代硫酸钠溶液倒在受伤部位，然后用水清洗。

(4) 皮肤沾染苯酚：立即用大量乙醇清洗。

(5) 其他化学品：用肥皂和温水清洗。

e. 化学粉末对皮肤的伤害

立即脱去被污染衣物，用软毛刷把粉末清除。清洗受损区域至少 15 分钟。

f. 烧伤

(1) 轻微烧伤-皮肤完好情况下才用冰水浴。

(2) 严重烧伤-烧伤面积较大或皮肤破损-剪掉烧伤部位的衣物，将伤者立即送往医院。

6. 火灾时应急响应

a. 使用灭火器：只允许熟悉灭火器材使用方法人员操作；

除非得到授权，否则禁止使用水管灭火。

b. 衣物着火

(1) 着火人员不可奔跑加剧火势发展。

(2) 用防火毯或实验服将人包裹。

如果有可能，使用紧急冲淋或大流量水流。

(3) 禁用灭火器此类火灾。

c. 化学品火灾

(1) 立即扑灭本区域内所有火焰，拔掉电器插座上插头，清除易燃物品和溶剂。

(2) 小火：用容器将火源罩住，切断供氧灭火。

(3) 大火：使用含二氧化碳灭火器灭火。

首先将灭火器对准火源根部边缘，然后向火焰中心推进。

(4) 避免用水灭化学起火，水经常会助长火势。

(5) 遇油或有机溶剂着火，用沙子灭火。



7. 割伤

- a. 如果伤口不深，不必立即止血，主要是检查伤口内是否有玻璃碎片，然后用酒精消毒，再用纱布或创可贴包扎。
- b. 如果伤口很深，将伤者转移至最近的医院。在路上，通过按压伤口周围来检查伤口是否仍在流血。
- c. 因接触化学品而造成的伤口：应立即用大量清水清洗，以清除任何残余化学物质，避免残余物让伤势恶化。
- d. 当伤口是受污染物所致，需确保伤者接种破伤风疫苗。

Dangerous glass!



Emergencies Contact 紧急联系方式:

Campus Fireman

Responsible Department 负责部门	Contact Number 联系电话
Firefighting Department 消防部门 	8807 7119 (24 Hours)

Campus Clinic & Frist Aid

Responsible Department 负责部门	Contact Number 联系电话
Frist Aid 医疗救助 	Campus Clinic 校医务室 8807 7120

Campus EHS Office 校园环境/健康/安全办公室 8807 7079

"Nothing we do is worth getting hurt for!"

Affirmation and Agreement

I, _____, hereby confirm that I have read the Safety Guidelines for Students in Laboratories, which were handed to me at the beginning of the course, and certify that:

I have read and understood the guidelines and I have received instructions on the proper working practice in the laboratories.

I do not suffer from any medical condition, illness or disability that may affect my work with the chemicals or instruments in this laboratory or may be worsened by this work or affect others. In particular, I do not have a poor eye sight or coordination problems. If I have such a condition, I have informed the lab manager before signing this document. The lab manager has confirmed that it is safe for me to work in this lab, and that suitable provisions have been made.

I accept responsibility for acting in accordance with these guidelines and with any additional rules that I will receive from lab personnel in the future, either verbally or in print.

I am aware of the different hazards while working in a laboratory, which may be caused inadvertently by my actions, the actions of one of my peers or any lab employees, by exposure to bacteria or chemicals, or by a failure of a technical piece of equipment in the lab.

I am aware that I might be exposed to dangerous chemicals, i.e., explosives, toxins, flammable materials or carcinogens. (most chemical or bacteria compounds are dangerous to some extent). I affirm that I will obey all instructed guide lines and shall do everything possible to minimize the exposure of myself and others to hazardous substances.

I am aware that chemical substances that are considered safe today, may be found hazardous in the future as a result of ongoing research efforts.

I am aware that by working with different pieces of apparatus and equipment in the lab I am apt to be injured as a result of improper or unsafe operation of myself or of others, or by malfunctioning of the equipment.

(For persons wearing eyeglasses) I am adjusted to my eyeglasses and they fully cope with my eyesight problems.

I do not suffer from a medical condition that may be exacerbated or cause me harm during my work in the lab.

(If you suffer from any medical condition or are allergic to any substance, you must contact an occupational physician and bring a written authorization letter prior to entering the lab. Your signature on this document certifies that you obtained such a permission from an occupational physician).

I affirm that I will notify GTIIT in writing, of any change in my health condition or ability to adhere to this agreement, as soon as I become aware of it. In addition, I affirm that I will immediately notify GTIIT in writing, of any malfunction, defect or problem I may encounter, which may affect the well-being, health or safety of the people working in the lab or in the surrounding areas.

Surname: _____ First name: _____

ID #: _____ Department: _____

Date: _____ Student's signature: _____

Name of instructor: _____ Instructor's signature: _____

承诺书

我_____特此确认已阅读实验室学生安全指引，在课程开始时发给我，并确保：

我已阅读及理解此安全指引要求，且已收到有关实验室正确工作方法的指引。

我并没有患有任何可能影响本人在实验室中使用化学品或仪器的任何医疗问题、疾病或身体缺陷，或者可能因这项工作而恶化或影响他人。特别是，我没有视力不佳或协调问题。如果我身体存在这类情况，我已经在签署本文件之前告知实验室负责人，实验室负责人已经做出了适当的规定，并确认我可在本实验室安全工作。

本人接受按照本指引及未来由实验室教员口头或书面的任何附加规则执行的责任。

我完全了解在实验室工作中，会面对各种危害，这些可能是我个人行为无意中造成的，也可能是我的同学或任何实验室员工的行为导致，如：暴露在化学品中，遇到实验室设备故障等。

我完全了解我可能会暴露于各类实验室物品，如危险化学品和生物致病菌、爆炸品、有毒物质、易燃物或致癌物。(大多数物品在某种程度上是危险的)。我保证严格遵守所有实验室教员的指引，并将尽一切可能减少自己和他人暴露于危险物质的风险。

我知道，今天被认为是安全的物质在未来可能因研究的进步，而被发现是有害的。

我完全了解在实验室会使用不同的仪器及设备，且可能因本人或他人操作不当或设备故障而导致受伤。

(对于戴眼镜的人员)我已经适应了我的眼镜，它们完全可以解决我的视力影响问题。

我目前未患有任何可能会在实验室工作期间，导致自身病情加重或使自身受到伤害的疾病。

(如你有任何身体不适或对任何物质过敏，你必须在进入实验室前与专业医生沟通，并附上书面医疗授权书，你在此文件上的签署，确定你已获得专业医生的许可或证明)。

我确认，一旦我发现我的健康状况或遵守本协议的能力有任何变化，我将立即书面通知广东以色列理工学院。

此外，我保证会以书面形式将可能遇到的、涉及实验室或周围地区工作人员的健康或安全的设备故障、缺陷或任何问题，告知广东以色列理工学院。



CAUTION 注意

Lab Safety Supervisor 实验室安全负责人:

PPE REQUIREMENTS BEFORE ENTRY
进入前请按要求佩戴好个人防护用品
Emergency Contact
紧急情况请联系

Contact 联系人:

-  FLAMMABLE LIQUID HAZARD 可燃液体危害
-  CORROSIVE SUBSTANCE HAZARD 腐蚀品危害
-  HEALTH HAZARD 健康危害
-  ENVIRONMENTAL HAZARD 环境危害
-  SAFETY GLASSES 安全眼镜
-  GLOVES 手套
-  LAB COAT 实验服
-  WASH HANDS BEFORE LEAVING 离开实验室前应洗手
-  NO CONTACT LENSES 禁止佩戴隐形眼镜
-  NO FIBER CLOTHINGS 禁止穿戴化纤衣物进入
-  NO FOOD & DRINK 禁止饮食
-  NO ACCESS UNLESS AUTHORIZED 授权人员方可进入



注意通风
Caution Ventilation



当心有害气体
Beware of harmful gases



Chemical Spill Control Kit
化学品泄漏
处理工具

CLASS 1



CLASS 2



CLASS 3



CLASS 4



CLASS 5



CLASS 6



CLASS 7



CLASS 8



CLASS 9



SAFETY - OUR FIRST PRIORITY ...



Lab Safety
实验室安全

