

Annexure-I

Researchers of all category working in Chemistry laboratory are requested to read the (1) basic rules and fundamentals of laboratory safety procedures & protocols (**Annexure-IA**) and (2) the following terms and conditions and sign the ‘Researcher’s Safety Pledge’(**Annexure-IB**).

Terms and conditions for Ph.D., ROI / summer students, visiting personnel, collaborators, etc. working at the Chemistry laboratories of CeNS

- The personnel (researcher) are informed about the risk of potential for minor/serious injury while using the laboratory facilities and equipment of the Centre. They are personally responsible for their own acts and for any medical care that may be required during their stay in the laboratory.
- Researchers are not covered by any health and/or accident insurance while they work at CeNS for the assigned period. However, Centre will take proper action and provide the necessary first-aid treatment as per the requirement.
- In case of any personal injury or suffer any loss of or damage to personal property, the researchers are not entitled to claim coverage under any insurance policy.
- Centre has no commitment to make the office facilities available and researchers should leave and remove their personal belongings when asked to do so.
- Researchers have to review applicable laboratory safety procedures and protocols prior to participating in any laboratory activity and to follow all rules, and directions from supervisors / mentors regarding use of the laboratory facilities and equipment, as listed in Annexure-I.
- The Centre may recover the cost to replace / repair any equipment damaged while using the facilities by the visiting students.

I, the undersigned, have read carefully “Basic rules and fundamentals of laboratory safety procedures & protocols for personnel working in Chemistry laboratory” (Annexure-IA) and understand & agree to the terms and conditions of this release.

Name of the student:	
Address for Correspondence: (contact number & e-mail ID)	
Permanent Address: (provide contact number of parents/guardians/family members) (To be used in case of any need / emergency)	
Name of the supervisor / mentor / collaborator :	
Signature of the student: With date	
Signature of the supervisor With date	

Annexure-IA

Basic rules and fundamentals of laboratory safety procedures & protocols for students working in Chemistry laboratory

The personnel (researchers) are asked to read the following contents pertaining to basic rules to be followed that also describes the risks associated with chemistry laboratory work and safety measures to be taken while working.

Generally, chemistry laboratories, by nature, are hazardous if the rules are not followed stringently. In the laboratory, the students handle materials/chemicals (reagents and solvents) which are carcinogenic, poisonous, flammable, and explosive. Besides, some of these chemicals may also cause severe burns, cuts, or bruises if handled improperly or carelessly. Therefore, the researchers are strictly advised to work under the guidance of senior students/post-docs/well-trained project assistants/laboratory staff/supervisor etc. Vast majority of accidents that occur in the chemistry laboratory are a result of carelessness, impatience, improper or unauthorized experimentation, and disregard for safety rules or proper operating procedures. In order to minimize the chances of an accident in the laboratory certain rules and regulations must be obeyed at all times when one is working or observing in a chemical laboratory. Therefore, it is not advisable for anyone to work in a laboratory without proper knowledge of the dangers involved. Due to the inherent dangers present in a chemical laboratory exercise, it should be understood that the following rules must be obeyed to minimize the chance of an accident. The personnel is expected to exercise proper judgement and extreme caution at all times when working in the laboratory. Learn and observe the safety and laboratory rules.

1. Laboratory coat / apron and splash proof chemical goggles with side-eye-protection should be (compulsorily) worn while entering the laboratory as well as when working in the laboratory. Gloves should be worn when handling chemicals.
2. In case of chemical spill on body parts/eye, by chance, rinse immediately with large quantities of water using the water-shower /eye-wash stations.
3. DO NOT perform unauthorized experiments or work in a laboratory alone.
4. Appropriate clothing must be worn at all times while in the laboratory. Your legs must be completely covered below the knee by your choice of clothing.
5. Long hair and loose clothing must be confined while in a laboratory.

6. Closed shoes with socks must be worn at ALL times (open-toed shoes, backless shoes, sling backs, clogs, and sandals are not strictly permitted)
7. Know the location and proper use of fire extinguishers, fire blankets, safety showers, eye wash devices, and first aid kits.
8. Before obtaining any chemicals carefully read the label on the reagent bottles.
9. Use the fume hoods when carrying out reactions / handling toxic or irritating materials.
10. Clean up any spill immediately.
11. Eating, smoking, and drinking are not allowed in a chemistry laboratory.
12. Mouth suction of chemicals/ should strictly avoided used to fill a pipette.
13. Never direct the open end of test tube toward yourself or anyone else.
14. Never force glass tubing through cork or rubber stoppers without proper lubrication.
15. Never pour water into concentrated acid.
16. Never place chemicals directly on the balance pan. Always use a proper weighing container when using a balance to weigh a chemical. Never pour chemicals directly over the balance.
17. The work/reactions carried out on day-to-day basis should be entered in the laboratory note books provided by CeNS
18. These note books should be placed before the research supervisors for examination periodically.
19. The cylinders having compressed gases placed in the laboratories should be handled carefully. The cylinders should be labelled properly and checked periodically for leakage.
20. All chemicals placed in the laboraotory must be clearly labelled for the benefit of current users, emergency personnel, and future users. Given the fact that disposing of unknown chemicals is extremely difficult, the labels of the chemical containers should be periodically checked and replaced the damaged or missing labels.
21. Chemicals in glass containers should be handled with great care (use both hands to hold the glass container with gloves; never hold the container from its top).
22. All the hygroscopic materials should be stored in normal / vaccum desiccators.
23. Separate the corrosive acids / perchloric acids from bases / corrosive bases; store these chemicals near floor level having 2-inches of sand bed. (Do not store acids and bases on a wooden shelf).
24. Do not store incompatible chemicals in close proximity to each other because in case of accidental fire or spillage, they could mix and react violently and/or release poisonous gases.

25. Isolate highly toxic chemicals like cyanides and carcinogens from all other chemicals.
The storage place for these must have a warning label.
26. Never store peroxide-forming chemicals longer than 60 days.
27. Do not allow picric acid to dry out.
28. Water reactive substances should be placed in dry place.
29. Flammables/combustibles have to be stored in a refrigerator and should be handled carefully.
30. Each chemical has to be checked for its shelf-life and act/take proper action accordingly
31. A monthly review of chemical inventory should be made. The unwanted chemicals should be checked for its status and disposed following proper procedure.
32. Securely replace lids, caps, and stoppers after removing reagents from containers.
33. Always wipe spatulas clean before and after inserting into reagent bottles.
34. Liquid and solid waste containers must be properly used at all times.
35. Report any accident and/or injury, however minor, to your supervisor/lab-mates immediately.
36. Never place anything that is not directly required for the experiment on laboratory desks; other items may interfere with the experiment.
37. All personal belongings should be placed in the sitting as you enter the laboratory.
38. Thoroughly wash your hands after leaving the laboratory.
39. Before leaving the laboratory, make sure your work area is clean and dry. Ensure that all gas, water, vacuum, solvent distillation unit(s) and air valves are completely turned off.
40. Your instructor and lab-mates (colleagues) are generally available for any assistance you may require. Never hesitate to ask questions especially if there is any question concerning proper operating procedure. Be sure that you understand every instruction before proceeding.
41. The mixtures of solvents comprising, acetone, hexanes, ethyl acetate, rectified spirit, tetrahydrofuran (THF), dichloromethane (DCM) etc. categorized under the class of 'waste solvents', should be poured in a plastic container labelled as 'Waste solvents.
42. The aqueous solutions should not be poured in to the sink; they should be poured into a plastic container kept in the laboratory labelled as 'Aqueous solution wastes'
43. You need to work within the Centre's working hours: 9 am – 5-30 pm.
44. In case if you need to work beyond office hours, supervisors permission must be sought. It is strongly recommended that at least two people be within close proximity when after hours work is being performed.

45. Experiments carried out should be recorded the laboratory note book with all the sincerity and clarity. The compounds synthesized should be labelled properly (with lab code, identification tag, etc) and submitted periodically to the supervisor.
46. FTIR and UV-Vis spectra can be recorded for initial characterization under the supervision of any one among the labmates / R and D assistants who is familiar in operating the instrument.
47. ^1H / ^{13}C NMR and mass spectra should be recorded only when supervisor advices; this is also applicable while obtaining elemental microanalytical data.
48. Personnel are advised to focus on hygiene and health risk assessment (general safety & management awareness to avoid injuries, accidents)
49. Basic rules of the rules of the laboratory should be followed while (i) operating chemical fume hoods, chemistry-basic (major/minor) equipments and electrical switches; (ii) storing of chemicals; (iii) laboratory housekeeping.

Annexure-IB
RESERCHER'S SAFETY PLEDGE

This is to certify that I have read and that I understand this paper entitled “**Basic rules and fundamentals of laboratory safety procedures & protocols for researchers working in Chemistry laboratory**”. I also certify that I will obey each and every rule stated in the paper and will adhere to each of them while working in the chemistry laboratory. I have received a duplicate copy of this paper and will keep it available for review throughout period of my stay in the laboratory.

Name _____

Signature _____

Date _____

Place _____

Forwarded through research supervisor/mentor/collaborator: