

4 January 2022

**Standard Operating Procedure (SOP)  
for**

**Safe Handling of Chemicals & Laboratory Safety**

This SOP outlines the guidelines, procedures and rules followed by the Department of Chemistry, Miranda House to ensure safe handling of chemicals and a safe environment in the Chemistry laboratories for the various stakeholders – faculty members of the department, trained laboratory staff and undergraduate students who are studying Chemistry and performing experiments in the different laboratories of the Department of Chemistry.

In a Department Meeting held prior to the beginning of every Academic Session/Semester, the faculty members discuss the various experiments that have been listed in the syllabus of the University of Delhi for the courses being offered by the Department - BSc(Honours) Chemistry, BSc(Honours) Generic Elective Chemistry and BSc Life Science. The faculty members also make a concerted effort to plan the experiments mentioned in the syllabus such that the students do not handle hazardous chemicals, inflammable solvents and concentrated acids. This also ensures that the Department follows, as far as possible, environment-friendly and green practices.

A list is prepared of all the chemicals that may be required by the department. This list is given to the Chemistry Store-in-Charge - Chemicals with a request that he should check the availability of the same from the stocks available in the Chemistry Stores – Chemicals and/or from the list of authorized vendors if necessary. The Science Purchase Committee (SPC) calls for tenders from authorized suppliers and enlists those that are approved by the committee. This list of suppliers is updated annually - in the beginning of the financial year. Chemicals are purchased only from the authorised vendors. If a particular chemical is unavailable or in short supply, the same is procured from one of the approved vendors. Due process is followed in the procurement of chemicals – the Purchase Order is prepared by the Chemistry Store-in-Charge - Chemicals, this is counter-signed by the Teacher-in Charge, Department of Chemistry and the Principal. The Chemistry Store-in-Charge - Chemicals ensures that the Department does not stock an excess of any chemical; the stocks are replenished as and when required. The Chemistry Store-in-Charge - Chemicals also maintains the Stock Registers of the chemicals which are constantly updated and counter-signed by the Teacher-in Charge, Department of Chemistry.

The Chemistry Stores – Chemicals (Room 141), the Chemistry Stores – Apparatus (Room 153) and the four Chemistry Laboratories (three undergraduate laboratories Rooms 152, 156, 157 and one Instrumentation Laboratory Room 149) are located near each other in the ground floor of the building. The location of the Chemistry Stores - Chemicals has been specially chosen so that it is well ventilated and easily accessible to the suppliers and that the chemicals do not have to be carried a long distance when they are required in the laboratory. The Chemistry Store-in-Charge - Chemicals ensures that the chemicals are stored safely and in his absence,

the stores are always locked. Chemicals are issued from the Chemistry Stores - Chemicals only by the Store-in-Charge against the relevant Issue Slip which has the details of Class/Course, Date and Amount of the chemical to be issued and has been signed by the concerned class teacher/faculty member. Before receiving the chemical, the Laboratory Staff checks that the bottle/packet is sealed and that the label has been signed by one of the faculty members of the Department assigned to do this task.

Once issued from the Chemistry Stores - Chemicals, the chemical is kept under lock and key in the Preparation Room attached to each Laboratory. Two trained Laboratory Staff are assigned to each Preparation Room. The relevant chemicals are used once the instructions such as preparation of a solution, weighing a particular amount of a chemical to make packets etc are received by the Preparation Room Laboratory Staff, in writing in the Solution Register. Each practical course/class has its own Solution Register wherein detailed instructions of the chemicals required, amount of a particular dry chemical to be weighed to make packets, the dilutions of the acids/bases/solutions required etc are written by the concerned class teacher/faculty member a week before the scheduled class for which the experiment is planned. The chemicals, solutions, pre-weighed packets etc needed for a particular experiment are taken out of the Preparation Room and kept in the laboratory to be used by the students for the experiment assigned only when the teacher is present in the laboratory for the class.

The bench reagents, like dilute acids and bases, specific test reagents and spot test reagents are prepared by the trained Laboratory Staff attached to each Laboratory. The Laboratory Staff attend short courses to refresh and upgrade their knowledge.

The Laboratory Staff assigned to a particular laboratory ensure the following:

- The laboratory is opened before the class timing and is clean and ready for use every morning.
- The first-aid box kept in the laboratory has Burnol, Band-aids, Cotton wool, Dettol and a few OTC drugs like Crocin, Meftal -P.
- Students do not keep their personal bags near the work benches – these are to be placed on the sides in the designated area.
- All reagents are kept in bottles which have clear labels mentioning the name of the chemical.
- The bench reagents bottles are fitted with stoppers that have an in-built dropper so that only small and requisite amount of the chemical is transferred/used.
- All volatile chemicals are stored separately in containers that are tightly stoppered to avoid the escape of vapours.
- Refrigerators kept in the laboratory are ONLY for chemicals and NOT for any food items.
- Large containers or bottles are stored at ground level.
- The exhaust fans in the laboratory and the fume hood are in working condition.
- No chemicals are stored in the fume hood.
- The handheld water spray and the water shower to be used in the event of a minor accident are always in working condition.

- Chemicals are kept only on the counters along the walls of the Laboratory; no extra chemicals should be kept near the students' work bench.
- Different chemicals being used by students during an experiment are kept away from each other – this ensures that there is no mixing of chemicals, droppers, stoppers, spatula, measuring cylinders, test-tubes.
- Inflammable and hazardous chemicals are kept out of reach of the students; if required by the students only carefully measured amounts are disbursed to the students by the Laboratory Staff.
- All electrical equipment, electrical points and wiring is safely earthed.
- The fire extinguishers placed outside the Laboratory are always charged and ready for use – if not, the concerned agency is contacted to do the needful at the earliest.
- All broken bits of glass apparatus are separately collected and stored in clearly marked bins.
- All PNG burners and their on/off valves are in working conditions and that the PNG supply is switched off from the main line every day after the practical classes are over.
- The water supply is turned off once the classes are over at the end of the day.

Each student working in the Chemistry laboratories at Miranda House is mandated to attend, and successfully complete, a Bridge Course on Safety and Handling of Chemicals, Glassware and Equipment. At the beginning of the Academic Session, each student signs an Undertaking that she will abide by all the rules and ensure the safety of herself and her classmates while working in the laboratory.

No student is allowed to enter the laboratory in the absence of a class teacher. The class teachers give detailed instructions to the students at the beginning of the class on the procedure of the experiment and the safe-handling of the solutions, chemicals, glassware and instruments. The students are also made aware of the handling and use of chemicals as per MSDS. Posters regarding the rules to be followed in the laboratory are displayed prominently on the Notice Boards in each laboratory. Students not dressed suitably for the laboratory or not wearing safety glasses/goggles are asked to stay away from the practical class.

The solutions and reagents used by the students are dilute – this ensures that the washings do not corrode the sinks and pipelines and also do not harm the ground water. In the rare case that a chemical is hazardous, it is disposed by pouring it over sand which is kept readily available in containers in each laboratory. This sand is then transferred to a deep pit dug beyond and away from the main College building and out of reach of students.

Broken glassware is collected separately from the four laboratories and the Chemistry Stores – Chemicals and Glass Apparatus and sent at the end of the Semester/Academic Session to an agency which recycles and reuses old glass.



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