SH SACRED HEART COLLEGE Autonomous

MAINTENANCE POLICY

Keep your mind on the job. Your own safety as well as your fellow workers' depends on YOU!

Sacred Heart College

(Autonomous)

Thevara, Kochi, Ernakulam,

Kerala 682 013

Maintenance Policy

Physical, Academic and Support Systems

June 2020

Keep your mind on the job. Your own safety as well as your fellow workers' depends on YOU!

Table of Contents

Introduction

A well-established infrastructure policy, designed, developed and revised in accordance with the statutory requirements, technological developments, and infrastructure requirements is being implemented in the college under the guidance of the Governing Council. A systematic procedure is followed for maintaining and utilizing physical, academic and support facility for providing better teaching and learning environment. The College Bursar is responsible for providing and maintaining the infrastructure, jointly shared by the Vice Principal and HoDs of the institution under the overall leadership of the College Principal. The College Bursar is empowered to deal with all matters pertaining to the acquisition, up-keeping and disposal of campus infrastructure. The maintenance activities are overseen by a full time Supervisor under the Bursar and assisted by 10 support staff. The HoDs are required to seek the advice and consent of the Principal/Bursar on matters involving infrastructure. Complaints regarding infrastructure are recorded in a register maintained in the College office by the Senior Superintendent. Out-pass issued by the Bursar is essential for moving the physical assets out of the campus. He also looks after the day-to-day maintenance of the entire college campus. The staff under him performs classroom maintenance, campus cleaning, gardening, plumbing, repairs and maintenance of electrical appliances and hall upkeep. Periodical activities such as painting, carpentry, etc. are outsourced. The Heads of Departments upkeep the systems, instruments and equipment available in the various departments with the assistance of the supporting staff. They maintain a stock register for the equipment used in the Department and submit the same to the Bursar for scrutiny as and when asked for.

Officers on Accountability	Principal and Bursar
Office of Administrative Responsibility	Office of the Principal and Bursar (Operations and Maintenance)
Approver	Bursar (Facilities and Operations)
Scope	Applicable to all academic, co-curricular and other facilities.

Responsible Officers

1. Principal
2. Vice-Principal
3. Bursar
4. Heads of the Departments
5. Work Supervisor

Overview

Sacred Heart College owns and operates an extensive infrastructure to deliver its teaching, learning and research programmes. The management acts with due diligence in addressing institutional priorities pertaining to infrastructure and related services. The college management is responsible for maintenance activities required to be conducted on base building, such as architectural, structural, mechanical and electrical systems, and to ensure that the college abides by appropriate building rules and safety codes. As part of planning for on-going maintenance activities, and for problems that arise from the unplanned breakdowns with building systems and components, the management shall be responsible. This document provides a management framework and an outline on the allocation of responsibilities to ensure effective use and maintenance of existing infrastructure facilities. The College policy is to have effective mechanism for the upkeep of the

infrastructure and other facilities as to have optimum utilization of the facilities in order to have effective college functioning.

Maintenance

Maintenance is defined as a process in which working condition of plant or machinery is maintained at the optimum level as to give maximum output. *Maintenance is done through repair, partial replacement and total replacement. Following is the significance of the maintenance policy:*

- Maintenance policy ensures that equipment are always in ready and reliable condition. This ensures that the college is able to respond to any sudden change in demand.
- Maintenance policy ensures that equipment are always calibrated to provide good-quality products and competitive advantage. This ensures that there are no sudden and frequent breakdowns and reduce production of defective products.
- Maintenance policy ensures that there are no major breakdowns
- Maintenance policy ensures that costs are always controlled.
- Maintenance policy is particularly important in capital-investment.

If organizations are not able to implement an effective maintenance policy than it can result in the following results:

- Full capacity utilization may not be achieved.
- Increase in production cost as fixed labor cost cannot be reduced.
- Increase in maintenance cost as more spare parts are required.
- Reduction in product quality and increase in wastage.
- Safety of workers and operators in jeopardy.

Maintenance Management

Maintenance management is a process where available resources are regulated in a manner that all the equipment and the physical facilities can perform at specific levels. Maintenance management involves planning, scheduling and execution of maintenance-related activities. The main objectives of the maintenance management are as follows:

- Minimum level of academic loss and minimum incidence of interruption
- Minimum level of wastage.
- Optimum usage of maintenance equipment and personnel.
- Quality of teaching- learning is improved.

Planning and Scheduling

The maintenance department is responsible with planning and scheduling of maintenance in line with the requirement and expectation of the organization. Planning and scheduling needs to ensure that business as usual is not disturbed.

The following are key points to plan maintenance:

- Identify the equipment for maintenance and technique for maintenance.
- Categorize maintenance into routine, priority and emergency.
- Plan maintenance considering cost, time, space etc
- Material planning for maintenance requirements.
- Budget time and money requirements.

The need to schedule maintenance can be best described as follows:

- To optimize usage of available resources, space, machinery and tools.
- To optimize usage of manpower in maintenance.
- To ensure the smooth functioning of teaching, learning and research activities.

From the above it can safely be concluded that it is very critical for the college to have a robust and effective maintenance and repair policy.

OBJECTIVES

1. Direct and coordinate the operations and activities of the physical facilities maintenance, including but not limited to: facilities in administration, layout, design, and construction; equipment maintenance; utilities operations and maintenance; building and grounds maintenance; facilities protection and security; departmental safety; and environmental compliance.
2. Provide services, surveys, and recommendations to all Departments; to outside academic institutions performing services for the facility; and to Public utilities.
3. Ensure compliance with applicable state, and local laws, regulations, statutes, and codes; securing required permits; and coordinating with appropriate local authorities.
4. Contract with and oversee the activities of various stakeholders for the fulfilment of their academic aspirations.

FUNCTIONS

1. Management Responsibility

1.1 The management should set goals, plan, organize, and control the activities under his jurisdiction.

1.2 All goals should be specific, well defined, and quantifiable, with an estimated time of achievement given for each goal.

1.3 Each goal should be communicated freely and clearly to all those involved.

1.4 Goals should be reviewed regularly by the Management team responsible for maintenance.

2. Organization

2.1 Principal and Bursar shall share responsibility in a coordinated effort to optimize facility performance.

2.2 Principal and Bursar, have responsibility for safe, efficient, and technically sound execution of maintenance work.

2.3 Principal and Bursar shall give guidance, and support to operations and maintenance as part of the team effort.

3. Administration Administrative operations of the Maintenance Department include:

3.1 Program coordination for the Department and liaison with all other Departments for the procurement and maintenance of all real property, production equipment, utility services, and communication services.

3.2 The principal shall coordinate with Departments in the preparation of their maintenance budgets.

3.3 Maintenance of records of all academic and other activities

3.4 Installing, and maintaining all fire protection and security systems.

3.5 Assuring compliance with all applicable life safety and regulations.

3.6 Maintaining liaison with local community

Environmental Footprint of Maintenance

Maintenance activities have a direct effect on the environment that surrounds the facility where they are executed. There are three aspects in which maintenance strategies contribute to a facility footprint in the environment: resources needed: efficiency of the equipment, and waste introduced into the environment as part of maintenance activities. In order to be a sustainable maintenance department, resources and waste aspects must be reduced or closely controlled and efficiency should be optimized. Using the fundamentals of the Life Cycle Assessment the college can identify the following aspects where maintenance practices can impact the environment:

- **Resources needed to perform maintenance:** Water, energy (lights, power tools), combustible, paper from work orders, etc.
- **Asset efficiency:** More energy consumption by equipment that is not tuned up, also we can refer to critical equipment which functionality affects directly the environment by discharging contaminants to the water, ground or atmosphere.
- **Waste from Maintenance Activities:** Consumable parts, filters, oil, and grease, all these have their own ecological footprint that will be transfer or added to the maintenance footprint. Released by-products from maintenance activities, could also represent an environmental hazard.
- **Maintenance strategies**: Some strategies are more 'eco-friendly' than others but usually these practices require a bigger commitment, planning and even some times a bigger initial

investment, causing that some great initiatives get under looked and hard to 'sell' to top management.

- **Uncontrolled maintenance practices and frequencies**; When maintenance activities are unplanned, they could end with: more waste of resources, unnecessary maintenance interventions, failures or moreover they do not comply with norms and regulations for waste disposal.

One of the greatest outcomes of knowing that we have environmental issues is the creativity that had been generated in order to develop innovative solutions, from the design to the operations and maintenance of each asset. Ideally, we should consider all our maintenance activities as possible environmental risks or as opportunities to reduce our environmental impact.

Classroom Maintenance

1. General Purpose Classroom Maintenance

Classrooms scheduled by the Office of the University Registrar are considered as general purpose classrooms. Inventory provides limited resources to maintain these classrooms. Resources are limited to replacement of tablet arm chairs, tables, chairs, lecterns, and portable chalkboards. If additional chairs or tables are needed at the start of a semester, departments should contact Moving Services.

2. Departmental Classroom Maintenance

Those classrooms which are controlled and scheduled by departments are considered to be departmental classrooms. Inventory will provide as much support as possible to departmental classrooms based on

available resources. However, if items are not in stock, it may be necessary for the using department to purchase the items.

Maintenance for Smart and Semi-Smart Classroom Equipment

As the number of classrooms equipped with the latest equipment increases, it is important to know who is responsible for maintaining, repairing, and replacing this equipment and who is responsible for being sure that the equipment is fully functional. Equipment purchased by Multimedia Services is under that unit's authority for maintenance, repair, and replacement. Individual units are responsible for equipment purchased for their exclusive use or for instructional space which has been assigned to that unit for its sole use. This policy addresses equipment in a space that is potentially used by more than one college, with some priority-use designation.

The upkeep of e-learning equipment is best achieved by a collaboration that makes the best use of the resources available across campus. The college that has priority use of a classroom is ultimately responsible for maintaining the equipment in that classroom. In the case where priority scheduling is shared, the colleges involved must reach an agreement about who would do the following:

1. Systematically monitor the equipment.

- Check on a regular basis to see if equipment is working.
- Run virus checks on computers on a regular schedule.
- Maintain problem logs in each classroom.
- Maintain a bulb hours log on data projectors.
- Clean equipment routinely.

- Coordinate the addition or deletion of any specialized software on the machines and re-image the computers at the beginning of each semester.

2. Monitor security of classrooms.

- Insure that classrooms are locked at the end of the day as defined by the responsible college. The use of electronic room access that will automatically lock the doors when closed is recommended.
- Insure that equipment is turned off at the end of the day as defined by the responsible college.
- Maintain and monitor electronic keypads and room access. It might be preferable for the responsibility to fall upon the college that has its administrative offices in the same building as the classroom in question.

3. Execute work orders for repairs with Computing Services, Multimedia Services, and/or Facilities Management.

- Requests for repairs of computers, network problems, or problems related to viruses should be referred to Computing Services.

Requests for replacements of bulbs and batteries for data projectors and remotes should be referred to Multimedia Services.

- Requests for repairs of multimedia owned equipment should be referred to Multimedia Services.
- Requests for repairs of multimedia equipment can also be referred to Multimedia Services, who will respond if within their areas of expertise.

- Requests for repairs for other equipment should be initiated by the college responsible for that equipment and directed toward the vendor from whom that equipment was purchased, or other qualified repair technician.

Each college is responsible for the cost of replacement and repair of equipment it has purchased. The college with priority use of a classroom is responsible for the cost of replacement and repair of equipment in that classroom. Multimedia and Computing Services will cover the labour costs of requests for repairs but they will charge the college with priority use for replacement parts (including bulbs for data projectors and batteries for remotes). Colleges that share priority scheduling rights for that space must reach an agreement about cost-sharing for the equipment in shared classrooms.

Physical Education Facilities

Be-Fit Gym

The Fitness Center management has established a variety of policies and procedures to ensure the members have both a fun and safe experience while using the facilities. It is recommended that our members review the following policies

Fitness Centre attire

Proper athletic attire must be worn while using the fitness centres.

- Sneakers, socks, athletic pants/shorts, and t-shirts are considered appropriate attire.
- Shirts should cover full chest, back and lower torso area (no sport bras only).

- Jeans are not permitted. Jeans often have studs, rivets and zippers which may tear the fabric on the benches.
- Bare feet, socks only or sandals are NOT permitted (except during certain group exercise classes).
- During winter months and rainy days, ***please bring a dry pair of shoes***. The facility attendant on duty may deny access to Fitness Center if you do not have a dry pair of shoes.

Food and beverages

Other than water bottles, food and beverages are not allowed in the centres. It should also be noted that water fountains are located near each centre if you do not choose to bring water with you to the centres.

Health and safety

If you have the flu, a cold, or any other contagious illness, please do not train in the centres. Using the Fitness Centres with a contagious illness puts you and all other members at risk. Illness causes an individual's system to become weaker and the likelihood for injury increases significantly when training under these conditions. Furthermore, given the nature of physical training, the transmission of contagious diseases occurs quite readily. Bottles of disinfectant and paper towels are available in both fitness centres for cleaning perspiration from the pads and benches. Please be courteous of fellow Fitness Centre members and use the supplies

Injuries

Any member who incurs an injury or becomes dizzy/ill while using the centres should immediately contact a Fitness Centre staff person for assistance. A first aid kit is kept at the front desk for minor injuries. In

cases requiring more extensive first aid, fitness centre staff will contact the appropriate persons for assistance. It is important that fitness centre staff be notified of any cases of injury or illness so that proper procedures can be initiated. Athletic tape may only be used for minor injuries.

Membership revocations and suspensions

The Fitness Centre staff is responsible for enforcement of college policies and fitness centre guidelines. Courtesy for other members, staff and the equipment in the Fitness Centres is expected and required. Loud, boisterous or abusive behaviour will not be tolerated. Failure to comply with college policies and Fitness Centre guidelines may result in immediate eviction from the centres, revocation of membership with no refund, and disciplinary review through the campus judicial system.

Ground

The outside space at College is carefully designed and is an integral part of the College. Ground and garden shall be maintained with the help of support staff under the supervision of the Bursar and Supervisor. Our Ground is a used for various activities.

To manage and maintain grounds to:

- Ensure the health, safety and comfort of members
- Protect and extend the life of the grounds and landscape materials, and
- Enhance and increase its marketability.

Ground Staff responsibilities

- Ground Staff is responsible for the care and upkeep of the grounds and landscape materials in "private" areas attached to units as defined in grounds procedures.
- Ground Staff is responsible for lawn mowing, clean-up, weeding, etc.
- Ground Staff may be assigned responsibility for the care and upkeep of the grounds and landscape materials in common areas as defined in grounds procedures.
- Garden refuse and compost must be stored and disposed of as defined in grounds procedures.
- Ground Staff may not use landscape chemicals.

Maintenance of Laboratory Equipment

Equipment maintenance is one important aspect of quality assurance in the laboratory. Accuracy of a report depends partly on error free machines. Laboratory equipment are also costly items. Daily routine procedures in maintenance can help to increase the life span of the equipment thereby preventing unnecessary burdens on the state finances. Faulty equipment can also be unsafe for the users. Use of this guideline could help in overcoming most of the problems encountered in equipment maintenance in the Microbiology laboratories. It is intended to guide all laboratory personnel in laboratories are available. It is also intended to guide the administrators who have to decide on finance management in planning

Cleaning of Laboratories

All staff, whether laboratory-based workers or cleaners, have a responsibility to work safely and in a safe environment. Part One of this Section contains guidance for laboratory managers and supervisors, while Part Two contains guidance for cleaning staff. Part Three contains explicit rules for laboratory cleaners. These represent policy related to laboratory cleaning and health and safety support for cleaners. The range and complexity of potential hazards in most laboratory environments dictates special provision for the health and safety of cleaners. Changes of cleaning staff, including supervisors, may be fairly regular, and the need for induction safety information and instruction may be significant. The role of cleaning staff absolutely does not absolve staff of the responsibility to ensure that their own offices, workstations and laboratories are kept clean and tidy, and left in a safe state by unplugging unused electrical equipment etc.

The cleaning of floors and hand wash basins and emptying of waste paper bins are the basic tasks that it is reasonable to expect a cleaner to undertake without any specialised training. However, in order to work safely, the cleaner must be made aware of the need always to follow some basic precautions. Additional hazards arise when general laboratory sinks are also cleaned. If cleaners are expected to clean laboratory sinks, then more detailed information and instruction should be provided to avoid mishandling chemicals, accidents with glassware or potential contamination with biological materials. Specific arrangements should be made for cleaners working in biological containment laboratories and/or laboratories where radioactive material is handled.

Responsibilities of Laboratory Personnel

Laboratory workers have responsibilities to ensure they take account of cleaners gaining access to the facilities, and that the areas are safe for cleaners to carry out their work. It should be noted that much of the cleaning operation takes place after laboratory staff have left the building at the end of their normal working day. Laboratory workers must ensure that communication is adequate so that cleaners are not put in a position where they themselves have to make a decision as to whether the laboratory is safe to clean or not. Laboratory workers should check, each day, before they finish work, that no hazardous items have been left in areas where there is the potential for cleaners to disturb them and compromise the cleaners health and safety. In particular:

- Where cleaners are expected to clean laboratory sinks, both the draining board area and the sink itself should be free of glassware or other items of equipment
- Chemicals should never be stored on the floor but always stored in suitable chemical store cupboards, of construction appropriate to the hazard(s) that they present. Liquids should always be stored on drip trays. Flasks containing culture supernatant should be placed in some type of secondary containment to prevent them from being knocked and damaged during floor cleaning (and routine laboratory work)
- Sharps bins must not be overfilled.
- Small, working amounts (up to 500mls), of chemicals that may be within the open laboratory should be securely closed and labelled with the name of the chemical and, where appropriate, hazard warning pictogram(s). Such chemicals should be placed to the rear of the bench each evening. Corrosive chemicals should never be left on the open bench overnight.

- Where experiments are left running overnight, cleaners should be excluded from the laboratory by way of the laboratory being locked and signed to that effect. An exception to this may be, subject to risk assessment, if the experiment is wholly confined within a fume cupboard with the sash fully closed.
- All apparatus left running overnight must be clearly marked with the standard University notice, obtainable from the Works Division, informing of action to be taken and the person(s) to be contacted in the event of an accident involving the equipment.
- Cleaners should not be expected to clean laboratory benches. An exception to this may be where the benches have been completely cleared of all hazardous materials/items for periodical deep cleaning of the laboratory, but this would be subject to special arrangement with cleaning supervisors.
- Hazard warning signs should be used judiciously. For chemical hazards these should be affixed to bins, bottles, etc. that contain the relevant hazardous material, and directly to, or adjacent to any equipment that presents the particular hazard that the signage applies to. For these types of hazards, warning signs should, generally, not be affixed to the exterior of laboratory doors as this may confuse both cleaners and members of the emergency services. However, in the case of biological and radioactive hazards, there are requirements to display the appropriate hazard warning signs at the point of entry to the laboratory or area.
- The other exception to the above is where a hazard has the potential to immediately adversely affect the health or safety of a person entering the laboratory (e.g. strong electromagnetic field/person with pacemaker fitted), when again signage should be affixed to the point of entry. As individual cleaning staff may change without the prior knowledge of the laboratory manager it

is suggested that cleaning staff are excluded from such areas and that cleaning is either undertaken by laboratory staff, or by cleaning staff only under the express direction of the laboratory manager after he/she has discussed and assessed the particular risks with the individual concerned.

- All pressurised gas cylinders must be securely fastened, in an upright position, by the use of purpose made clamps, brackets and chains/belts

GUIDANCE FOR WORKING IN LABORATORIES

This guidance is designed to help the provision of safety instruction to cleaners whose job involves them entering and working in a laboratory. It is important that everybody who carries out such work is fully aware of and understands the information, by whatever means it is communicated. The following information can also be provided to the relevant staff as a support to the instruction.

General Hazards

As well as any normal workplace risk such as slips and trips, electricity etc., laboratories invariably use chemicals, and some might also use micro-organisms and radiation. By using basic hygiene precautions, allied to common sense, and following some simple rules, cleaners can be safe whilst carrying out their work in laboratories where chemicals, micro-organisms and radiation are used.

Chemicals

Not all chemicals are harmful, but many are, with vastly differing effects, such as simple irritation of the skin or lungs, to serious skin burns, or illnesses such as asthma.

RULES FOR CLEANERS IN LABORATORIES

DO

- Always wear the overall that has been provided and see that it is properly fastened. Keep your overall apart from your outdoor clothing and do not take your overalls home to wash. Do not wear your overall in the staff room or canteen; take it off when you go for your break.
- Wash your hands regularly, and always when you have finished work or stop for a break. Before you start work, always cover cuts and grazes (however small) with a waterproof dressing until they are fully healed.
- When cleaning sink areas, always wear gloves
- Immediately report any accidents or incidents (including if anything is leaking or knocked over) to the person in the laboratory or your supervisor.

DO NOT

- Do not attempt to clear up after an accident unless a member of the laboratory staff has told you it is safe to do so. Never pick up broken glass with your fingers; use a dustpan and brush. If there is no-one around to tell you whether or not it is safe to clear up a spillage, then you should put out some hazard warning signs and leave it for the laboratory staff to deal with
- Do not eat, drink, smoke, chew or apply cosmetics in the laboratory. Never put anything mouth whilst you in the laboratory. This includes pens, pencils, tools, cables, fingers etc. Do not take food, drink, cigarettes, overcoats, etc. into the laboratory. These must be left outside the laboratory

- Do not touch anything whilst in the laboratory unless required to do so to carry out your work and you have been told it is safe to do so by your supervisor. In particular, do not touch anything on the benches and only move things on the floor if you have been told it is safe for you to do so. Do not touch, empty or move things in the laboratory sinks unless you have been told exactly what you can or cannot do
- Never attempt to clean up a spillage of unknown material, no matter how harmless it may seem (e.g. many hazardous chemicals may look like water, but can damage your eyes, skin or lungs); always get advice from laboratory staff if there is a spill.

IF

- If you have an accident and injure yourself, especially if you break the skin or get something in your eye or mouth, you must report it to your supervisor at once and see that it is recorded in the Accident Book. If you become ill, you should tell your doctor where you work so, if necessary, they can talk to someone in the University about what you do
- If you accidentally spill a chemical on your skin, immediately place the affected area under running water for approximately 15 minutes, or until a colleague has obtained knowledgeable assistance. If you have to go to hospital, take the name of the substance, as shown on the label from the bottle/carton, with you
- If you have any doubts that it is safe to start or continue work, then you should you should not start or continue until the matter is sorted out. You should report any such problems to your supervisor.

Physics Laboratory Safety

The purpose of this document is to inform the physics student of the basics of laboratory safety and point out the most common types of safety hazards in the physics laboratory. This document is NOT a complete listing of the safety hazards in this laboratory or any laboratory but rather it plays the role of alerting the student to only some of the possible safety hazards.

Instructors Responsibilities

The laboratory instructor will inform the students of possible hazards in working in the laboratory environment as these hazards present themselves. Some of the experiments need extra concern as they include multiple safety hazards. The instructor will also maintain a watch on the different laboratory groups and point out safety issues and corrective action as the need arises. If you have a question about safety you should direct it immediately to the lab instructor.

Student Responsibilities

The students in the physics lab are expected to exercise common sense judgment when working with laboratory equipment. When personal experience does not help in the identifying and avoiding possible safety hazards, the student should exercise extra caution and ask the instructor for assistance. Safety is more important than pride and questions about safety will be answered promptly by the instructor. Note that it is better to NOT proceed if you suspect a safety issue than to learn the hard way! Students are expected to listen to and follow all instructions given by the laboratory instructor. This includes all safety precautions and guidelines.

Safety Rules for the Physics Lab

- Do not perform unauthorized experiments.
- Keep quiet and disciplined, and observe cleanliness in the lab.
- Wear lab coat, safety goggles, protective gloves and a surgical mask when needed.
- For your protection, jewellery should not be worn in the lab.
- Tie back long hair.
- Wear shoes which completely cover the feet. Sandals, open-toed shoes are not permitted.
- Do not wear contact lenses.
- Eating, smoking and drinking are not allowed in the lab.
- Be aware of the location of the exits, fire extinguishers, fire blankets, safety shower, eye wash, first aid box and emergency phone numbers.
- All aisles must be kept open all times.
- Please exercise caution when dealing with electrical devices.
- Don't touch any equipment or electrical supplies without specific authorization.
- Examine all apparatus for defects before performing any experiment. Don't use damaged, cracked defective glassware. If you break a thermometer or find a broken thermometer report it to your lab technician immediately.
- If the fire alarm sounds you must evacuate the building via the nearest exit.
- Before leaving the lab makes sure that your work area is clean and tidy. Ensure that all Bunsen burners and water taps and all electrical devices are completely turned off.

https://www.sigmaaldrich.com/technical-documents/articles/labware/cleaning-glassware.html

Maintaining Chemical Laboratory Equipment

Proper maintenance is critical for successful use of chemical laboratory equipment. Clean and properly stored equipment performs better, enhances safety, and protects against contamination. Unsurprisingly, diligence and contentiousness are important factors in lab maintenance. Here are three ways to maintain lab equipment used for chemical storage, testing, and mixing.

- **Thorough Cleaning With the Proper Materials**
- **Regular Calibration of Equipment**: Periodical calibration of equipment is critical for chemical applications. Calibrated equipment not only ensures accuracy of measurements and testing, it can improve safety in the lab when hazardous chemicals are involved.
- **Record Keeping and Testing of Processing Equipment**: In chemical labs that deal often with particularly volatile reactions (i.e. pressurized gas, electrical reactions, etc.) regular inspection of operational components is essential. In particular, pressure vessels should be labelled individually and excellent records should be maintained regarding everything from their maximum allowable temperature to burst diagrams.

There are, of course, dozens of maintenance steps specific to any particular lab. Even the chemicals used in a single experiment can dictate how machinery and glassware should be cleaned, handled, and inspected.

Cleaning Laboratory Glassware

Good laboratory technique demands clean glassware because the most carefully executed piece of work may give an erroneous result if dirty

glassware is used. In all instances, glassware must be physically and chemically clean and in many cases, it must be bacteriologically clean or sterile. All glassware must be absolutely grease-free. The safest criterion of cleanliness is uniform wetting of the surface by distilled water. This is especially important in glassware used for measuring the volume of liquids. Grease and other contaminating materials will prevent the glass from becoming uniformly wetted. This in turn will alter the volume of residue adhering to the walls of the glass container and thus affect the volume of liquid delivered. Furthermore, in pipets and burets, the meniscus will be distorted and the correct adjustments cannot be made. The presence of small amounts of impurities may also alter the meniscus.

- Wash labware as quickly as possible after use. If labware is not cleaned immediately, it may become impossible to remove any residue.
- If a thorough cleaning is not possible immediately, put glassware to soak in water.
- Most new glassware items are slightly alkaline in reaction. For precision chemical testing, new glassware should be soaked for several hours in acid water (a 1% solution of hydrochloric or nitric acid) before proceeding with a regular washing procedure.
- Brushes with wooden or plastic handles are recommended as they will not scratch or otherwise abrade the glassware's surface.

Safe Use of Chromic Acid

- If glassware becomes unduly clouded or dirty or contains coagulated organic matter, it must be cleansed with chromic acid cleaning solution.[1] The dichromate should be handled with extreme care because it is a powerful corrosive and carcinogen.

- When chromic acid solution is used the item may be rinsed with the cleaning solution or it may be filled and allowed to stand. The length of time it is allowed to stand depends on the amount of contamination on the glassware. Relatively clean glassware may require only a few minutes of exposure; if debris is present, such as blood clots, it may be necessary to let the glassware stand all night. Due to the intense corrosive action of the chromic acid solution, it is good practice to place the stock bottle, as well as the glassware being treated, in flat glass pans, pans made from lead or coated with lead, or plastic polymer pans determined to be compatible with the concentration of chromic acid you are using. Extra care must be taken to be sure chromic acid solution is disposed of properly.
- Special types of precipitates may require removal with nitric acid, aqua regia, or fuming sulfuric acid. These are very corrosive substances and should be used only when required.

Rinsing

It is imperative that all soap, detergents, and other cleaning fluids be removed from glassware before use. This is especially important with the detergents, slight traces of which will interfere with serologic and cultural reactions.

After cleaning, rinse the glassware with running tap water. When test tubes, graduates, flasks, and similar containers are rinsed with tap water, allow the water to run into and over them for a short time, then partly fill each piece with water, thoroughly shake and empty at least six times. Pipets and burets are best rinsed by attaching a piece of rubber tubing to the faucet and then attaching the delivery end of the pipets or burets to a hose, allowing the water to run through them. If the tap water is very hard, it is best to run it through a deionizer before using.

Rinse the glassware in a large bath of distilled water. Rinse with distilled water. To conserve distilled water, use a five gallon bottle as a reservoir. Store it on a shelf near your clean-up area. Attach a siphon to it and use it for replenishing the reservoir with used distilled water. For sensitive microbiologic assays, meticulous cleaning must be followed by rinsing 12 times in distilled water

Handling and Storing

- To prevent breakage when rinsing or washing pipets, cylinders, or burets, be careful not to let tips hit the sink or the water tap.
- Dry test tubes, culture tubes, flasks, and other lab ware by hanging them on wooden pegs, placing them in baskets with their mouths downward and allowing them to dry in the air, or placing them in baskets to dry in an oven. Drying temperatures should not exceed 140 °C. Line the drying basket with a clean cloth to keep the vessel mouths clean.
- Dry burets, pipets, and cylinders by standing them on a folded towel. Protect clean glassware from dust. This is done best by plugging with cotton, corking, taping a heavy piece of paper over the mouth, or placing the glassware in a dust-free cabinet.
- Store glassware in specially designed racks. Avoid breakage by keeping pieces separated.
- Do not store alkaline liquids in volumetric flasks or burets. Stoppers or stopcocks may stick.

PROCEDURES FOR LABORATORY CHEMICAL WASTE DISPOSAL

Segregate materials according to the categories. If possible, also segregate within categories. Unless the materials are used together

during the course of an experiment, segregate all waste. Do not mix chemicals together in one container for convenience sake. We cannot stress strongly enough that different chemicals have different disposal methods. If you are unsure of which category to use or if the materials can be safely mixed into one dump, call the Work Supervisor and instruct them by the faculty member in presence of HOD. Do not guess and do not assume. Label all containers with the group name from the chemical waste category and an itemized list of the contents. For example, do not label a container simply `Corrosive Liquids'. List each chemical in the container, including all solvents used and list by full name only. Abbreviations, initials or chemical formulas are not acceptable labels. Liquid dumps are intended for liquids only. Do not place glass or plastic items, such as tubes or pipettes, into solution dumps. If these items require disposal, package them separately. (Keep plastic and glass waste separate.) Any waste containing PCB's must not be placed in waste dumps. Special procedures are in place for disposal of PCB's and it is important to keep the volumes small.

It is very important that hazardous materials are segregated into the proper categories. Different hazardous waste have different disposal methods. These disposal methods are also reflective in the cost of disposal. For example, waste which has the potential for reuse or recycling, such as non-halogenated organic waste is less expensive to dispose of than waste which is destroyed in a chemical incinerator, such as halogenated organic waste. There is also a tremendous environmental advantage to reusing and recycling chemical waste. When categories are mixed, the disposal method is always for the "more hazardous" chemical. To use the above examples, when a few liters of a halogenated solvent is mixed with a drum of non-halogenated solvent, the entire volume must be considered halogenated waste. The contents of the drum, including the recyclable waste, will be destroyed in an incinerator.

Best Practices in Chemistry Lab

- It should always be the practice of those using chemicals in their laboratories to minimize risks from exposures while at the same time recognizing the benefits of proper educational use of chemicals.
- Chemistry education plans should be developed, reviewed periodically and approved on a regular basis ensuring that:

    - ❖ Chemicals utilized in experiments and demonstrations are appropriate to the plan and safe for student use.
    - ❖ Students are trained in the proper use of personal protective equipment (PPE).
    - ❖ Students are trained in the environmental impact of chemicals.
    - ❖ Chemicals classified as extremely or very hazardous by the GHS (Hazard Class 1 or HC1) or could be used as illegal drug precursors should not be stored, used by, nor available to high-school students. These chemicals include explosives, carcinogens, mutagens, teratogens, etc.
    - ❖ If needed to educate students, these chemicals should be handled or used only by science educators who are fully trained in their safe handling for demonstrations or in preparation of dilute solutions, such as the dilution of concentrated acids.

- **Maintain chemicals in appropriate storage areas (i.e., stockrooms, cabinets, lockers):**

    - ❖ Store minimum quantities of chemicals approved in the chemistry or science education plan.

- ❖ Restrict access to storage areas by students.
- ❖ Prohibit storage of HC1 chemicals, except as needed for demonstrations (demonstration quantities) by educators trained in their use.

- **Conduct demonstrations safely by:**

  - ❖ Utilizing appropriate safety precautions (e.g., PPE, ventilation).
  - ❖ Only using the minimum quantities of chemicals necessary for the demonstration.

Wastewater Treatment and the Role of Laboratory Professionals

An important part of wastewater processing is the accurate quantitative measurement of wastewater constituents during various stages of treatment. This is where laboratory professionals play a vital role. Wastewater flow rates and characteristics constantly fluctuate, and accurate analyses make it possible to track the effectiveness of the purification process. With the goal to improve water quality, modern wastewater treatment facilities take advantage of biological, chemical, and physical principles to accelerate natural processes under controlled conditions.

- Department of Chemistry prefer micro analysis for Organic experiments
- Segregating used solvents for disposal
- Licensed chemical are keeping strictly with the supervision of HOD, and using separate log books and the licence renewed every year.

- All Labs are equipped with advanced safety features such as safety showers and eye washes installed in all chemistry labs.
- Every year before starting the experiments all students must undergo a lab safety programme conducted by the Department.

Fire Extinguishers on Campus

All fires can be very dangerous and life-threatening. Your safety should always be your primary concern when attempting to fight a fire. The vast majority of extinguishers on campus are multipurpose, dry chemical units that are rated for use with Class A, B and C fires

The following information provides awareness about fire extinguishers types, how to use them, when to use them, the proper procedures to follow in the event of a fire as well as the care and maintenance of your extinguisher.

How to Use a Fire Extinguisher

Remember P A S S

- **P** - PULL the pin between the extinguishers handles
- **A** – AIM the nozzle at the base of the fire. You should stand 6-10 feet away from the fire
- **S** - Squeeze the handle of the fire extinguisher
- **S** - Sweep the nozzle from side to side across the base of the fire

Before Fighting a Fire is sure:

- You have followed R.A.C.E
- You have been trained to operate the extinguisher.

- You have an unobstructed escape route in case you can't put the fire out.
- You know what's burning and your extinguisher is right for the fire.
- The fire is small

Extinguisher Locations

Extinguishers are kept in the following locations on campus:

Fire Extinguisher Cabinets - smaller, less-conspicuous cabinets usually located in exit corridors and recessed into the walls. This is a common extinguisher location in newer buildings, library, etc.

Wall-mounted Brackets hold extinguishers that are not stored in cabinets. This method keeps extinguishers in plain view on the walls, and is most common in laboratory work areas, library, seminar halls, and office suites.

Dry Chemical - Class A, B and C fires

- Dry chemical powder (ABC - Ammonium phosphate, BC Sodium or potassium bicarbonate) stored under nitrogen pressure
- Discharge approximately 8 to 15 seconds, with a range of 6-15 feet
- Extinguishes fire by removing the oxygen through smothering
- Dry chemical fire extinguishers are suitable for labs, but can cause tremendous mess.
- Dry chemical powder can infiltrate sensitive electrical equipment and ruin optics, mirrors and other laboratory equipment.

Generator and Power Supply

Preventive maintenance for diesel engine generators plays a critical role in maximizing reliability, minimizing repairs and reducing long term costs. By following a diesel generator maintenance schedule and adhering to specific manufacturer recommendations, you can be sure that your standby power system will start and run when you need it most.

Because of the durability of diesel engines, most maintenance is preventive in nature. Preventive diesel engine maintenance consists of the following operations:

- General inspection
- Lubrication service
- Cooling system service
- Fuel system service
- Servicing and testing starting batteries
- Regular engine exercise

Monthly

- Inspect the battery and charging system
- Check hoses and belts for wear
- Remove water and sediment from fuel tank
- Run the generator and remedy any alerts

Every 6 Months

- Change fluids and filters: oil, coolant, air, fuel
- Check ignition and replace spark plugs
- Run the generator and remedy any alerts

Annually

- Recondition diesel fuel
- Service external components, including alternator and transfer switch
- Load test the generator and remedy any alerts

After any maintenance, clean the area around the generator, check the integrity of the generator enclosure and ensure the generator is set to "Auto" rather than "Off" so it can start automatically during a power outage.

Water supply system

Three wells are used for the water need of the college. Water supply system, infrastructure for the collection, transmission, treatment, storage, and distribution of water for departments, office, and irrigation, as well as for such other needs of the college are maintained in the college. Water supply systems must also meet requirements for all the supporting activities of the college. In all cases, the water must fulfil both quality and quantity requirements. In addition to quantity of supply, water quality is also of concern. Even the ancients had an appreciation for the importance of water purity. Sufficient drinking water shall be made available in the college. For this purpose, supply chain system shall be adopted and maintained.

Fr. Francis Sales Library

Sacred Heart College library is established simultaneously with the institution in 1944 by the CMI Congregation. It is named after Rev. Father Sales, a visionary and one among the former principals of the college. The Library is placed in the central place of the institution, all the

stakeholders can easily access. Centralized library clubs all subjects books and fiction in different languages. The library offering access to collection of electronic and hard forms books, journals, magazines, etc and is continuously updating with new and relevant reference materials. The library is fully computerized which makes the accessibility easier for the students. College library is equipped with more than 91000 books and which included 10000 plus reference books. Which subscribe many national and international peer reviewed journals and magazines for the stakeholders. The library subscribes 14 different newspapers. NLIST membership provides remote access to the digital e-resources like e-books and e-journals. The college library is so spacious and encompasses a large area of 12961.47 sq. feet with the facility to seat 320 people at a time. Separate section is setup for the researchers and faculty members for the serious reading. A multipurpose seminar hall and Audio Visual Centre setup in the library with seating capacity of 30. Advanced facilities like RFID entry and CCTV monitoring and OPAC guarantees the meticulous functioning of the library.Vision

Francis Sales Library is engaged in learning and discovery as essential participants in the educational community. We develop, organize, provide access to and preserve materials to meet the needs of present and future generations of students and scholars. We explore and implement innovative technologies and services to deliver information and scholarly resources conveniently to users anytime/anyplace. We also provide well-equipped and functional physical spaces where students can pursue independent learning and discovery outside the classroom

Mission

Francis Sales Library strengthens and enhances the teaching, learning, research and service of the College. The Library promote intellectual growth and creativity by developing collections,

facilitating access to information resources, teaching the effective use of information resources and critical evaluation skills and offering research assistance.

Objectives

1. To select, acquire and organize relevant and up-to-date information resources in all formats appropriate to the information needs of the stakeholders of the present and future.
2. Tocreateandmaintainqualityinformationenvironmen tthatsupportslearningand knowledge development at the College
3. To establish a computer infrastructure of all library operations and services by acquiring library computer software and hardware to make computerization functional;.
4. Provide inspiring, well-designed and conducive learning environment for use of library resources.
5. To support all educational and instructional programs of the college
6. To mold intelligent and enlightened students to play the role of a socially responsible citizen
7. To strengthen the library's bond to the library patrons by establishing "Friends of the Library" which would assist in the development of the library collection;

Library Timing

The library remains open on all days except Sundays and Govt. holidays. Though the expected working time of the library is from 9.30 am to 4.30 pm, for the convenience of the hostellers and the day scholars the library timing is extended as given below. The rescheduled timing is highly

beneficial to the students as they make the maximum use of the library in the morning and evening.

On Working Days	8.30 AM – 4.30 PM
Other Days	9.30 AM – 4.30 PM

Lending of Books

Members are eligible to borrow books as mentioned below. In addition to the numbers given below, students can borrow reference books for one day under the scheme 'Over Night Book Issue' scheme. Borrowers should return this book before 9.30 AM on next day.

Sl. No	Category	No of Books
I	UG Students	3
II	PG Students	5
III	Faculty Members	10
IV	Research Scholars	5
V	Support Staff	3

Library advisory Committee

As per GO MS No 169/94/ H. Edn. Dated 22/11/1994 a library advisory committee is constituted with Principal as president, Librarian as secretary, five HODs and one student representative from each department as the members.

Book Purchase Policy

Book purchase in the college library is a continuous process, on the basis of recommendations from the concerned Department and approval from library committee. Consolidated request will come to the librarian and after cross checking the existing collection based on the availability of the book, will place the order. Books are purchased according to priority and availability of the budget. The Library staff usually recommends general

reference books, general reading books and those materials not covered by departmental subject categories. Publishers and Vendors provide electronic lists of titles available for purchase, and printed catalogues. These are forwarded to the Department Heads. The list of books requested by the Faculty and student requests approved by the respective Department Heads are considered for purchase. Besides catalogues, textbook requirements by students are also considered for book purchase. Library also conducts book exhibitions to enable book selection_by Faculty and students.

Stock Verification Policy

The College Library is conducting stock verification to prevent loss and maintain accurate record, withdraw lost books and update catalogues. With stock verification we are able to arrange collection, restore it and provide good services to our user community. The Library is conducting stock verification every year during the month of April – May. We follow General Financial Rule (GFR 2017) guidelines for submitting the stock verification report.

Main features of the library

Open access

The Library follows full Open Access system with bay guides and other sign boards leading users to the concerned document. For the students and the faculty members, open access ensures more visibility and transparency in the usage of documents available in the library. The Institution also enjoys the same benefits in the aggregate form.

Automated Library

The library is fully automated using the Open Source Library Integrated System **Koha**. Automation tools include authority control, data enrichment, public access catalogues, circulation, etc.

Library collection

The library has a collection of 91631 books, 400 CD's and DVD's, 150 journals and popular magazines. 4000 back volumes of journals add to the richness of the reference section. Library has a very good collection of ready reference materials.

Wi-Fi connectivity

Library is fully covered with Wi-Fi access.

Internet Browsing

Students have been provided computer with Internet access. 22 computers are provided at this section. Service of this section is absolutely free. This service is on first come first serve basis.

Reprography services

A Reprographic Centre is attached to the Library with high performance photocopy machines. This service is open to all students and staff members of the college are charging nominal rates for copying.

Library Rules

1. All members of the staff and students are members of the college library.
2. The library will remain open from 8.00 am. to 8.00 pm. on all working days, with an interval of 45 minutes from 12 to 12.45 pm. On vacations and Saturdays, it opens from 9.30 to 4.30.
3. Strict silence should be observed within the library.
4. College ID card is essential for all the Library services, users should swipe their ID Cards at the entry and exit.
5. Personal belongings like text books, umbrella, bags etc. are not allowed into the library. Users can carry laptops, notebooks, etc. for their study purpose.

6. Books or any other records of the Reference Section will not be lent out. (a) The borrower of a book has to point out to the librarian or the circulation staff, at the time of the borrowing, any defect the book may already have. Otherwise it will be deemed that the book was intact when issued. The borrower will be responsible for any damage caused to a book while in his/her custody. (b) If a book or periodical is damaged or lost by a member, he/she will have to replace it or pay the replacement cost of the book including postage etc., within the time fixed by the librarian. (c) If one book of a set is damaged or lost by a member he/she must replace it with a copy of the same edition. If such a copy is not available he/she shall replace the same book with latest edition with bill within the time fixed by the librarian. In the case of multi volume set, if one volume is missing, the member should replace the whole set. (d) If a member happens to recover a lost volume after having replaced it or paid the value thereof he/she shall not be allowed to return it to the library and get back the new copy. (e) Payment is based on the Govt. rules.
7. Each UG student member will be given 3 books and PG student 5 books at a time for which he/she has to sign in an issuing register. The date on which the book is due will be noted on a label inside the book.
8. The period of loan is usually 14 days including the day of issue after which period a fine of Rs. 1/- per day per book will be levied. Users can renew the document for another 7 days, if that document does not have any reservation. Any book, which is temporarily in special demand, will be lent out only for a shorter period.
9. No member of staff is allowed to keep more than 10 books with him/her at a time.

10. Members are not allowed to sub-lend the books of the library.
11. Overnight issue of the reference books is available with the special permission of the Librarian.
12. E-book readers are available for loan, rules are same as books.
13. Consultation facility is available for the scholars of other institutions for a short period on request.
14. Students can reserve books by login their own account, in case they are already issued.
15. Books in demand/reservation may not be renewed.
16. Members are responsible for books issued against their names.
17. Library reserves the right to recall any issued document even before the due date.
18. The material such as rare books, theses, dissertations, loose issues of periodicals etc. marked for consultation shall not be issued
19. The library shall not be responsible for any loss or damage of the personal belongings of the users at the property counter.
20. The Principal of the college reserves the right to suspend the membership of any member found misbehaving with the library staff or with any other member.

Use of computers/laptops etc

1. Computers in the library should be used for academic purposes only.
2. Changing the settings and display of the computers kept in the Library is not permitted.
3. Use of laptops in the cubical systems where computers are already installed is not permitted.
4. Readers should not remove/unplug computer cables/connections, network cables and other peripherals/accessories in the library.
5. Personal keyboard, mouse, etc are not allowed inside the Library.

6. Users should enter the details before using the computers for browsing