Vivekanand Education Society's
Institute of Technology
Approved by AICTE & Affiliated to University of Mumbai

Lab Handling Manual

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1	Lab Conduction and Usage

1.1 Lab Schedule Management

1) Primarily the Lab Assistant manages the Lab schedule according to the Lab Courses mentioned in the Timetable. For all the Lab courses for the lab, lab resources (hardware/software/equipments/instruments/components) are installed / updated /made ready.

    i) Prepare a Timetable for each lab. And display inside the lab notice board and outside the lab notice board. Also prepare a consolidated lab timetable. Keep it updated.

    ii) Remove old notices from the notice board, and file them. Maintain a year wise notice file.

2) Software installed/reinstalled, handles crashes , recovery and formatting, reloading, upgrading the version etc. Equipment calibrated/recalibrated, components, wires instruments, tools made ready

    i) Many s/w applications and tools are required for the lab. Few tools are a 14 days trial, so need to be installed during the last few days of the semester.

        (1) Throughout the semester if any software is corrupted or uninstalled, needs to be reinstalled , equipment / instruments may require recalibrations and also before the MU practical exams.

        (2) Before examination all the PCs/instruments/components etc are checked and reinstalled , recalibrated , restarted , formatted if the need be.

    ii) Authorisation and Access management : admin and student accounts to be created for PC

3) Utilization of the lab : The lab and resource utilization is handled by the Time table number of hrs allocated and students attendance records.

    i) Attendance Monitoring : Students wear I- Cards at all times specially when in lab they need to submit their I -Cards against attendance, components, instruments or kits issued and after completing they keep/return back components and keep the instrument in proper position .

    ii) Monthly defaulters list needs to be notified.

4) Lab Experiments to be carried out / demonstrated /troubleshooting and debugging

5) Technical issues resolving that arise during the semester / Practical / exam / Training / Workshop etc.

    a) Resolving local Network issue :Checking LAN connectivity, in case a problem is unresolved, report to Network Admin/Maintenance dept. , follow up and get the work done, and follow up

    b) Ensure uptodate Antivirus setup :Check if Antivirus updated or not, scanning. When new PCs are received, install antivirus.

6) Lab. journals and document management : Label the bundles. Label the shelves accordingly. Keep sample journals separately labeled. Names given by the subject teacher as Best, Average & Poor.

7) Keeping record of the Project report of the students, books, magazine presents in the departmental library and updating the same.

1.2 Lab Utilization:

1) Primarily The lab and resource utilization is handled by the Time table number of hrs allocated and students attendance records.

But during free time slots of labs

2) Students can utilise free slots for their mini projects, extra projects for competition, different Societies (ISTE, CSI, ISA, SPICE, IEEE etc.) events

3) Online placement tests may be conducted with prior booking if slots are free following the proper procedure laid down. The T & P incharge will send a request to HODs to identify the labs and schedule the placement slots, keeping in view the regular slots and will be informed to the lab. assistants to make necessary arrangements

4) STTP, Workshops are conducted in predefined slots

5) If the classroom is not available and the lab is free, Extra lectures may be conducted in the lab.

6) Suppose, the teacher is absent, and any lab is free, students are allowed in the lab to complete their practicals, or practicals are conducted by other teachers.

7) Lab may also be used for Campus Placement tests, Data entry of marks, University exam online entry work, admission, Government Exams in the spare time.

2	Lab Records and Register

2.1 Stock Management, Bin card, Transfers

1) **Appending Central stock register on arrival of new resource, Staff stock register** and **Lab wise stock register,** bin card updation, indents of new requirement, Collection and filing of PO for new stock, GRN (write GRR no. on equipment) , transfer memos, equipment maintenance register, Update Lab Tool (software) etc. records. Also maintaining software license file, with the help of lab attendant and peon are major roles of lab Assistants.

2) Whenever part of any equipment/ PCs is/are replaced, the bin card of that equipment/ PC is/are updated.

3) Perform stock verification at the end of semester/ stock audit at the end of academic year, prepare a report and get it signed by Lab-Incharge and HOD.

2.2 Scrap Identification Process (within Department):

1) If equipment/instrument is not working or out of order then lab assistant is expected to prepare the list of equipment that are neither working nor repairable/outdated in consultation with Repair and Maintenance department

In case the equipment is faulty follow the Maintenance procedure as given in section 2.

2) The HOD verifies the list and Lab assistants are expected to send it to the Maintenance Department for central Scrape Process.

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3	Lab Handling (Dos/Don'ts)

3.1 General Instructions for All labs

1) If any problem with the printer, solve it, if h/w problem, send it to R & M Dept.
2) In case of problems with PCs, first try at lab level, then report to the Repair and maintenance dept and follow up. Sometimes, PCs need to be formatted.
3) 3) Get printer toner replaced.
4) Report complaints about AC, intercom, fans, lights, or main power, short circuit.
5) When painting or any civil work is going on, follow up for that also.
6) Workshop related maintenance : report and get the work done.
7) All labs have to be cleaned by housekeeping but overall cleanliness is expected to be maintained by Lab assistants.
8) Fire extinguishers are needed for places with a lot of electrical equipment , Chemistry , BEE, Workshop or server rooms.
9) Ensure that fan / light/ AC etc is switched off when not in use. The doors are locked when not in use.
10) For all electrical plugs earthing must be there.

3.2 Specific Lab handling Instructions

3.2.1 Physics Lab Instructions:

1) Handle crystal models carefully. Measurements should be taken accurately.
2) Isolate socket using the main switch before plugging and unplugging in equipment.
3) Planck's Constant experiment, Phototube should not be exposed to direct light as phototube is a light sensitive device.
4) Stopping potentials should be read carefully.
5) After finishing the experiment, switch off power and cover the drawtube with the lens cover.

3.2.2 Chemistry Lab Instructions:

1) Prepare solutions before commencement of practicals.
2) Dispose of waste and hazardous chemicals in the sink of the fuming hood and arrange all the equipment which will be required for that days practical.
3) Gas connection is checked by calling the gas connection person for its proper working.

3.2.3 Computer based Labs Instructions :
1) If any problem with the printer, solve it, if h/w problem, send it to the R & M Dept.

2) In case of problems with PCs, first try at lab level, then report to the Repair and maintenance dept and follow up. Sometimes, PCs need to be formatted.

3) Lab PC / Laptop antivirus, license updation.

4) Power ON all PCs, Laptops, if any PC/ Laptop is not working, troubleshoot at your level, try to resolve the problem in the lab itself, and make it in a working condition, else send it to R & M following the procedure. If required, format that PC.

5) Install server software as needed and configure client connectivity, create users, and allot roles. Install client software on other pcs as per requirement. If the server is already installed, check it's functioning and client connectivity, if ok then delete old users and create new users, check login with new users.

### 3.2.4 Instruments/Kits/Other Equipments based Lab Instructions(ETRX, EXTC, INST):

1) Fault Finding/calibration/Tuning/Troubleshooting to be done.

2) In case any Instrument/kits are not working in the lab first try to repair it yourself. If it is not repairable then give information to the Lab in charge and HOD. Then call the company engineer/Vendor and send them the list of instruments or kits signed by HOD and get the quotation for repair. And also ask them to send quotation copy to the Purchase Manager also.

3) If repair is possible in college they repair it here by an expert person, otherwise send it to the company following the procedure of college i.e. gate pass signed by the store in-charge with proper inventory and stamp. If the Kits and Other Instrument is not repairable then higher authority decides to scrap. Then include that item in the to be scrapped List and send it to the Repair & Maintenance dept. for further action.

3.2.5 PCB Lab Instructions

1) Replacement of the solution of Etching tank And LPR developer should be done over a period of time.

2) Maintenance of the drill machine is to be done through Mechanical Adjustments And other mechanical parts of the equipment are checked and greased regularly.

3) Ultraviolet Exposure checked and maintained over a period of time.

3.2.6 Instrumentation Lab Instructions:

1) Checking of the loops by running all the pumps and compressor

2) Servicing for eg. checking oil level in compressor, replacing oil in compressor, pump status whether working ok? if not then call for servicing it by an expert person.

3) For software like - DCS and PLC - checked with help of Lab In Charges, if any query then call to respective person
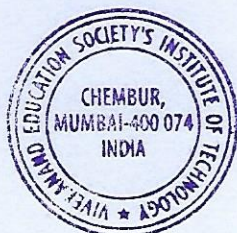
3.2.7 Workshop Instructions:

1) After receiving the raw materials for the practical, The pieces are cut into size as per the required dimensions and given to the students to perform the job.
2) Before the practical starts sharp and clean some of the tools and keep ready to use.
3) At the time of practical give instructions as well as demonstrations for making and completing the job assigned.
4) Ask all students to follow workshop rules during practical as well as explain about safety measures and precautions to be taken during the job and also help them physically to complete the job better.
5) At the end of practical clean all the given tools, machines and apply oil to them & keep ready for the next session/batch.

3.3 Safety Guidelines :

3.3.1 Hardware Labs :

1) Give safety instructions to students before performing practicals.
2) The First Aid Box should always have required medicine and other medical items.

3.3.2 Physics Lab (Dark Room) :

1) There should be complete darkness in the room where the experiments are performed to avoid stray light.
2) Level the spectrometer as well Grating before starting the experiment.
3) Readings should be taken with the help of a magnifying lens only.
4) Handle lenses, magnifiers and glass plates carefully. If an experiment is performed in LASER Light, Don't put your eyes or face in front of light.

3.3.3 Chemistry Lab :

1) No entry without ID & Lab coat.
2) Don't remove your shoes while entering the chemistry lab.
3) Handle the glassware & chemicals with proper care.

3.2.4 Workshop

Carpentry :
1) Never keep sharp tools in your pocket
2) Never allow anyone else to be near a machine when you are operating it.
3) Never touch a cutter tool while it is working.

4) Keep the electrical cord away from hot, rough or oily places.

Welding :

1) Protect your skin by wearing leather or flame resistant canvas coats or gloves.
2) Protect your head and eyes by wearing a welding helmet. Observers must wear suitable eye protection.
3) Remove or cover combustible material with metal or fire resistant guards.
4) Ensure proper ventilation to remove smoke and fumes
5) Oxygen combines with oil and grease to cause violent fires. Do not use oxygen to blow dust off clothing.
6) Gas cylinders must have Protective Caps in place for transporting and storing.
7) When arc welding always keeps work areas, work pieces, equipment and clothing dry to avoid electric shocks.

4	Maintenance

4.1 Local Lab Maintenance:

1) After the audit and with the discussion of higher authorities , the decision of repairing, scrapping of the equipment, raising the indent for new equipment is done. If indent is raised for the new equipment then the contacting of vendors , getting quotation of minimum three vendors and is forwarded to the purchase/procurement department.
2) Especially for the Hardware equipment we need to arrange the demo of the kits / machines prior to purchase. After the demo you need to get the approval from concerned faculties to finalize the vendor.
3) Hardware equipment is checked and maintained if any small issue occurs.
4) The small repair work is carried in some cases when it is not possible to repair locally then it is sent to Manufacturer's site (if under AMC) with due procedure (For Example Etching Tank And Electric drilling machine of PCB Lab)
5) Power cords of all equipment are checked and replaced if needed.
6) Soldering of damaged Patch Cords and CRO probes.

4.2 Repair and Maintenance Department Process

If some instruments are not working then the Laboratory Assistant tries to identify and fix the problems in faulty equipment, which is not in AMC.(Annual maintenance Contract)

1) If the problem could not be identified or fixed by the Laboratory Assistant, then a **service/repair request is registered** (marked as 1, as shown in the figure 1 below) with the Maintenance Department.
2) The service requisition form is prepared and sent to the Dean, Infrastructure (2) and the

Maintenance incharge.(5)

3) Further, verification of service/repair requests is done by Dean, Infrastructure and maintenance incharge.
4) An indent is raised to procure a faulty part for repair of equipment or it is raised for the repairing of the equipment from the outside agency.
5) After authorization from the Head of the Institute, Laboratory Assistant records the transfer of
   a) equipment and updates the Bin card (History card) of the equipment under service.
6) The equipment is handed over to the local maintenance team or vendor's repairing team to fix the problem.
7) After the equipment is repaired, it is given back to the requester.
8) Dean, Infrastructure authorizes the bill of work, and sends it to the Head of the Institute for further process and closes the case.

Established Process for Maintenance of Lab. Equipment.   III.
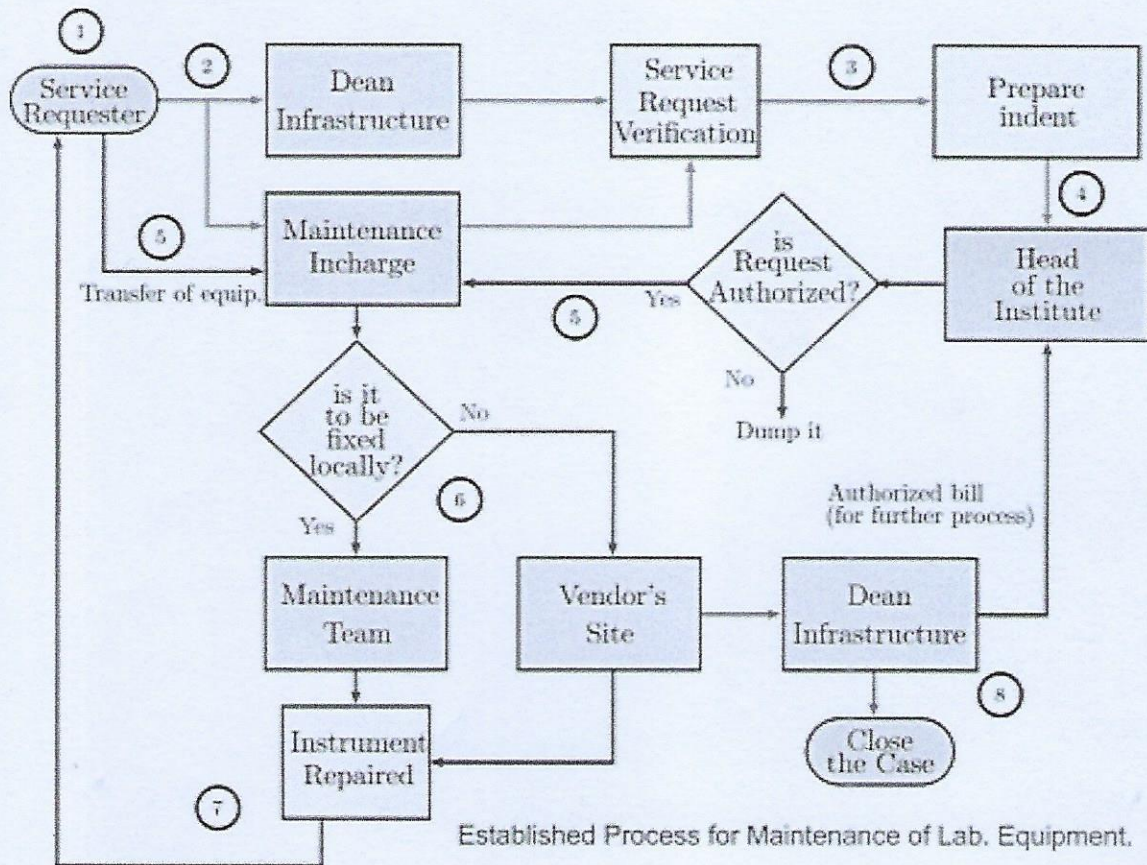
Figure 1 : Repair and Maintenance Process

4.3 Scrapping (Outdated/Obsolete/non working Equipment)

1) If some of the equipment/instruments are not working or out of order then the Laboratory Assistant prepares the list of equipment that are neither working nor repairable/outdated.
2) The Head of the Department verifies the list and it is sent to the Repairs and Maintenance Department.

3) The Maintenance Department verifies the unrepairable instruments/equipment with the Scrapping Committee.
4) Upon the confirmation from the scrapping committee, the Maintenance Department recalls unrepairable or outdated equipment and dumps them.
5) When the collective scrap of equipment from various laboratories is found to be adequate to sell,
   a) quotations from various scrap-merchants are invited.
6) Based on quoted price, Head of the Infrastructure and Head of the Institute selects the dealer who offers the highest price for the stated scrap.

5	Procurement/Purchase

5.1 Department's Indent Generation

1) The respective lab in-charges (Faculty) initiate the process of procurement by reviewing new requirements as per syllabus revision and industry requirements and as per the suggestions of the subject experts and lookin at the current stock in consultation with lab Assistants
2) The technical staff/lab Assistants then prepare the indent which is subsequently sent to the HOD and Vice Principal for approval.
3) The HOD/ Vice Principal then reviews the requirements based on the availability, product specifications and the quoted price for the same.
4) The consolidated proposals are sent to the overall procurement incharge of the Institute who further recommends the proposals for each department.

5.2 Centralized Procurement/Purchase Procedure : (As shown in Figure 2)

5) All such ratified procurement proposals are set before the Purchase Committee of the Institute for the finalization of technical specifications and quantity.
6) The vendors are finalized based on the comparative analysis with respect to the available (3 quotations) quotations. The purchase orders are then prepared and negotiated based on the product specifications, quantity, quoted price, quality specifications, place and date of delivery by purchase officer
7) On receipt of the equipment, the purchase committee and the lab in charge inspects the quality and functioning of the technical aspect of goods.

Vivekanand Education Society's
Institute of Technology

Requirement Gathering
Probably at the beginning of Academic Year
(From faculties, subject in-charges)

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Discussion with senior faculty for finalization of requirement (Need Analysis; if required)

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Discussion with HOD to finalize requirement along with purchase In-Charges

(Purchase Meeting in the Department)

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Forwarded to Department Purchase In- charges to prepare Departmental Budget | **B**

Budget Approval

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Identification of possible vendors By Lab In-charge and/or Purchase In-charge

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Indent for requirements through Purchase Software by Lab Assistants Digital Indent is Generated. (60% of sanctioned amount is utilized till First half of Financial year)

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Approval from Purchase I/C and Head of the Department

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Equipments Like PCs , Printers and any common entities are purchased by central Purchase Process and forwarded as per requirement to Departments.

Teaching aid such as data projectors or Lap-Top is procured at Institute Level.

Approval from Overall Purchase In-charge

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Approval from Head of Institute

↓

Indent will be forwarded to Purchase Officer

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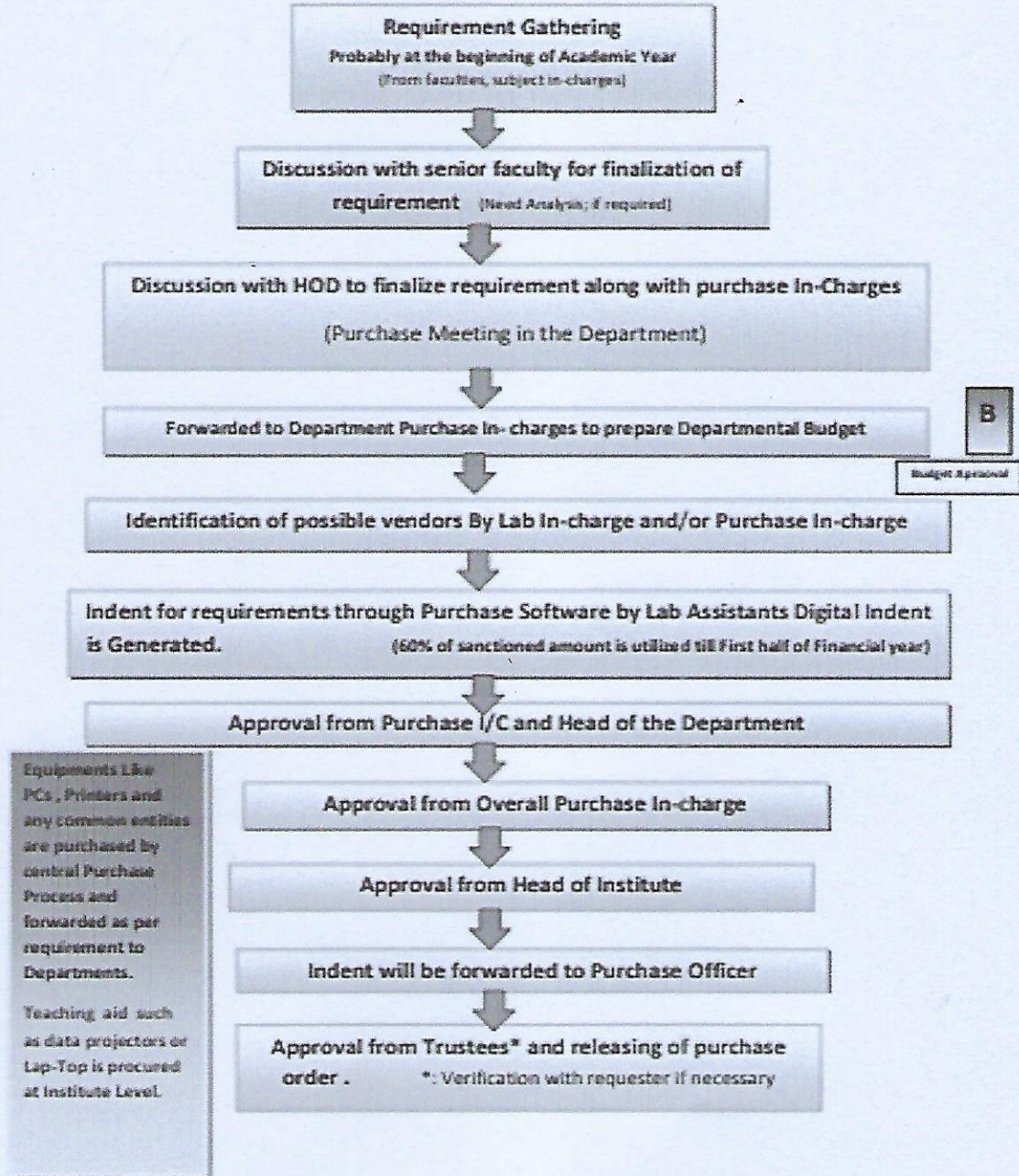**Approval from Trustees* and releasing of purchase order .** *: Verification with requester if necessary

Figure 2 : Purchase / Procurement Process

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