



Davao del Sur State College
Brgy. Matti, Digos City, Davao del Sur

CHEM 605L

PHYSICAL CHEMISTRY

LABORATORY



PREFACE

This laboratory manual is designed for college students enrolled in the Physical Chemistry course under the Bachelor of Science in Environmental Science program. The experiments included in this manual have been carefully selected and modified based on their simplicity, applicability, practicality, and the availability of the required chemicals, materials, and reagents. Each experiment is intended to address the learning needs of students as they develop a deeper understanding of the fundamental concepts and applications of Physical Chemistry.

The manual provides students with opportunities to engage in hands-on laboratory activities that reinforce the theories and principles discussed during classroom lectures. Through these experiential learning activities, students are encouraged to develop scientific inquiry, critical thinking, analytical skills, and proper laboratory techniques essential for the study and practice of chemistry.

The experiments are organized sequentially to align with the topics covered in the Physical Chemistry lecture course. Each laboratory exercise includes clearly defined objectives, a list of required materials and reagents, detailed experimental procedures, data recording sheets, guide questions for analysis, and spaces for interpretation of results. To promote a safe laboratory environment, essential safety precautions and proper laboratory practices are integrated into each experiment.

Furthermore, the laboratory exercises emphasize chemical principles that are relevant to environmental and health-related applications. By relating theoretical concepts to practical situations, the manual enables students to appreciate the significance of Physical Chemistry in addressing real-world environmental challenges and promoting sustainable scientific practices. It is hoped that this manual will serve as a valuable learning resource that enhances students' laboratory competence, scientific curiosity, and appreciation of chemistry as an indispensable discipline in environmental science.

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**POLICIES AND GUIDELINES ON THE
USE OF RESEARCH LABORATORY SERVICE CENTER**

1. Chemistry laboratory is open for equipment review and other preparatory work from 8 am to 5 pm Monday through Friday. Equipment may only be operated and chemicals will be dispensed during scheduled laboratory hours. Written approval of the faculty adviser, laboratory coordinator, and RLSC head are required for anyone (e.g. research students) to use the laboratory during Saturdays or to operate equipment on non-scheduled laboratory days.
2. For the use of equipment, computers, and chemicals, students and faculty members must sign in the log books for proper monitoring of the equipment.
3. No equipment is to be operated until the approval of the instructor and laboratory coordinator has been obtained at the check-in meeting. Only the equipment pertaining to the assigned experiment is to be operated. All members of a group are to be properly informed on the safety aspects of their assigned experiment and to be familiar with the safety aspects of surrounding experiments. Before any apparatus can be operated in the laboratory, the group must have a second on-site safety check-in.
4. Students are required to prepare handling and storage procedures of chemicals and materials to be used and waste disposal/treatment procedures approved by the faculty adviser and laboratory coordinator prior to any experiment.
5. Transfer or movement of equipment or devices from the laboratories will not be allowed without approval of advance notice (at least 2 days before the request schedule) from the laboratory coordinator.
6. In borrowing glassware and accessories of the equipment, equipment and in using laboratory facility, students must accomplish Borrower slip for the Use of Laboratory Facilities and Equipment with the signature of the professor.
7. In case of breakages, damages, or losses:
 - a. A student accomplishes three copies of the Accountability Form duly signed by all members of the group.
 - b. The student requests the signature of the instructor and returns the form to the laboratory personnel.
 - c. The laboratory personnel indicate the price of the damaged or lost item.
 - d. The students are given one week to replace the items with the same brand or specifications. If the students fail to replace the said item, the item is then forwarded to the Cashier's Office for payment.
 - e. After payment, the students return the forms to the laboratory personnel with the photocopy of the official receipt.
 - f. They must be advised to keep the original receipt for future reference.
8. Students should always wear their laboratory gowns or aprons when working in the

laboratory. Safety goggles and safety gloves must also be worn whenever applicable. Students must also observe proper attire specifically closed footwear to protect them from spilled chemicals or hot fluids. Neckties, dangling clothing or jewelry and other unsafe items are prohibited.

9. Sleeping is prohibited in the laboratory. Violation of this rule will result in dismissal from the laboratory for that day.
10. Horseplay of any sort is absolutely prohibited in the laboratory.
11. As a general rule, eating, drinking, chewing gum, and smoking are not allowed inside laboratories.
12. All safety precautions must be followed at all times.
13. No operating equipment will be left unattended. At least two members of the group must be present while the equipment is operating.
14. The laboratory floor must be kept dry, clean, and uncluttered at all times. Any spills should be cleaned up immediately.
15. All injuries, accident, hazardous situation, losses, leaks, malfunctions or breakages must be reported to the laboratory personnel or professor immediately.
16. All chemicals must be transported in a safety carrier. All mercury and alcohol thermometers and more than one item of glassware must be transported in a bucket or other suitable container.
17. The students are expected to be familiar with the safety aspects of all chemicals used in the laboratory.
18. Listening to radios, walkman, MP3's, MP4's, etc. is strictly prohibited in the laboratory.
19. Playing computer games; using and recharging of cellular phones; or viewing DVD's is prohibited in the laboratory.
20. Applying cosmetics are prohibited in the laboratory.
21. Precautions should be taken to prevent long hair from being entangled in moving parts of the equipment.
22. Read each activity carefully before starting work to become familiar with the experimental procedure and safety precautions.
23. Perform only the experiments approved by the instructors. Use only the recommended amounts of chemicals and no more.

24. Record all data and observations obtained in the experiments.
25. Do not wear contact lenses because there is always danger of volatile or corrosive material dissolving in the lenses or getting beneath them if needed must wear a safety goggles.
26. Keep the flammable liquids away from any source of ignition.
27. Plan your work carefully and thoroughly to prevent accidents in the laboratory. Report all cases of accidents to your instructor immediately.
28. Corrosive substances spilled on skin must be washed off promptly with plenty of water. Clothes spilled with chemicals must be removed immediately.
29. Perform experiments that use toxic and corrosive reagents as well as those that produce undesirable gases inside the fume hood.
30. Dispose liquid wastes in designated waste bottles. Never flush them down the sink.
31. Know the location of all emergency equipment (e.g. fire extinguishers, eye washes, safety showers, and fire blankets) in the laboratory and be sure that you know how to use it.
32. In case of emergency, the laboratory instructor must be the last person to leave the laboratory room.
33. Keep the chemicals and equipment inside the laboratory.
34. Eating, drinking, and smoking are strictly prohibited inside the laboratory
35. Always keep your working area clean and orderly. Keep materials away from the edge of the laboratory bench or worktable.
36. Turn off burners that are not in use.
37. Avoid unnecessary noise in the laboratory.
38. A violation notice will be issued by the Laboratory Coordinator or Laboratory Head or by the assigned Laboratory Professor to any student found violating any of these rules and regulations.
39. Any **SERIOUS VIOLATION** of any of these safety rules or laboratory policies may lead to immediate dismissal from the laboratory. A person who repeatedly disregards the safety rules or laboratory policies for at least 3 times will be called in for **disciplinary action** with the RLSC Head, and SODO Committee. A penalty that suits the violation may be imposed and, at the discretion of his/her laboratory professor, the student's grade may be severely affected.

Other policies may be given as situation arises and in consideration of our best interest. It is expected that these sets of policies serve as a guide for us to work safely and efficiently.

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