Safety Instructions

SAFETY FIRST WHILE IN THE LABORATORY

The basic purpose of laboratory safety is to protect students, researchers, technicians and teachers from the many hazards encountered during the use of various materials and equipments. Environmental Engineering laboratories provide experimental facilities in engineering and basic sciences like Chemistry and Biology. So, while in these laboratories, to satisfy your curiosity, always seek help of laboratory personnel instead of directly dealing with the situation. Precaution is the precondition to use a laboratory. A set of information is presented here to safeguard you while in the laboratory.

1. Laboratories are strictly smoke free zones.

2. no food and beverages are allowed inside.

3. Avoid long sleeved loose clothes and wear aprons while conducting experiments.

4. no running in the laboratory.

5. Wear protective shoes and avoid open-toed sandals.

6. Avoid risk of damage to your clothing or other belongings.

7. Know locations of first aid, eye station, safety shower, fire blanket, fire extinguishers and gas masks.

8. (a) Safety glasses should be worn at all times in the laboratory. (b) Normal eye glasses are not usually adequate for eye protection. (c) Do not wear contact lenses in the laboratory.

9. Various microbiological cultures, media and samples are handled in this laboratory. Avoid cross contamination.

10. (a) While transferring liquids, remember 'ACID TO WATER'.

    (b) Use gloves while pouring corrosive liquids.

    (c) Use funnel while filing bottle/flask. Prevent air block by raising funnel.

    (d) Avoid mouth contact with any laboratory equipments including pipettes. Use safety filler to fill pipettes.

11. (a) While handling glasswares, avoid direct heating on the flame.

(b) Never try to free 'frozen' stopper or ground joint by force.

(c) Broken or chipped glasswares should be discarded.

(d) Properly support glasswares using stand, clamps, etc.

(e) Use proper rings to place round bottom flasks.

12. Use only chemicals and reagents having proper labels.

13. (a) Avoid injury from spilled chemicals.

(b) Chemicals in eye: rapid treatment is vital. Run large amount of water over eye ball until medical help is available.

(c) Alkali materials in the eyes are most dangerous.

(d) Use sodium carbonate flowed by water for acid spills.

(e) For alkali spills on bench, wash with water followed by dilute acetic acid.

14. (a) Reduce fire hazard.

(b) Use safety shower for fire victims.

(c) While fire on clothing, do not run or fan flames.

(d) Smother flames by wrapping in fire blankets.

(e) Spills of flammable solvents can be a source of fire.

PROPER CONDUCT IN THE LABORATORY AVOIDS ACCIDENTS.

MAIN OBJECTIVES AND INSTRUCTIONS FOR PREPARING LABORATORY REPORTS

INTRODUCTION

The laboratory sessions are designed to support and supplement the theories introduced in the course and also to expose the students to some relevant applications. Students work in small groups on laboratory experiments; a total of 10 experiments must be completed during the semester. Each experiment and related material will be first introduced by the instructor. It is very important before conducting any experiment to make sure that you understand how does the equipment work and what measurements have to be taken. Following each experiment, a student is required to write a report and submit it in time. Final examinations on the laboratory experiments may be held at the end of the semester.

LABORATORY REPORT

Writing a technical report is very important in engineering practice. The experience gained from writing the laboratory reports will definitely help the student later during the preparation of his Co-op Report, Senior Project Report and in writing any Technical Report in his future career.

The laboratory report should be presented in a factual, concise and complete manner and should be free of any ambiguous or contradicting statements. All pertinent data and sources of error should be noted. The interpretation of data and subsequent conclusions must be supported by the experimental results.

The following is intended as a general aid in preparation of the laboratory report. The report consists of the following:

(1) Cover Page

The cover page should indicate the course name and number, the student's name and number, the experiment title and number and the instructor's name. Typical cover pages in the laboratory.

(2) A Descriptive Title of the Experiment

(3) Summary

This part of the report should include an abridged and abbreviated, but complete, resumé of the information which follows. A paragraph (about 10 lines in length)

is often sufficient, and never more than 20 lines (unless in certain circumstances such as a long thesis). The summary should give to the reader the sense of the report (i.e. the objectives, method and conclusions in a condensed form).

(4) Introduction, Apparatus, and Procedure

In most cases, reference need only be made to the experiment instruction sheets. However, when certain procedures were employed or were modified in such a way that they were not covered in the instruction sheets, it should then be recorded.

(5) Discussion of Results

This part represents the core of the report. All experiment findings must be discussed here in some detail. The student should refer to all tables, charts and graphs in his discussion. Although some numbers may be mentioned to support the discussion, a full table of measured data or calculated results should not be presented in this section.

(6) Conclusions and Comments

In some cases, certain questions are asked in the instruction sheets and these should be answered. However, in general, students are required to make brief pertinent conclusions of their own. Give reasons for any discrepancies which may have been noted between the obtained results and the expected theoretical results or trends. Well thought-out conclusions in the report are identification of the accomplishment (or not) of the objective of the experiment. The summary together with the conclusions form an important source of information for the busy reader.

(7) Observed Data, Sample of Calculations and Computed Results

A composite table of observations should be prepared from the experiment readings, with the proper units noted for each set of data. A sample of conclusions is usually necessary to show how the results, graphs and conclusions are derived. All calculated data that is used for graphs and charts should be presented in a tabular form. All tables should be properly titled and clearly identified (such as Table 1, Table 2, …. etc.).

(8) Graphs

All graphs should also be properly titles and clearly labeled (such as Fig. 1, Fig. 2, …. etc.). Ordinate and abscissa scales of graphs should be carefully chosen to make the curves meaningful (i.e. scattering of points should be “compressed” as much as possible). ON the other hand, a sufficiently large scale should be chosen

so as to clearly define the trend of curves. Average curves should be drawn through plotted points. Graphs in pencil are permissible.

Finally, it is important to note that the key word for writing a good report is brevity. There is absolutely no reason for the report to be too long. Such report is not required, and will result in no additional marks over a well-organized, concise and brief report. Two or three pages, with graphs, should be all that is required.