Department of Electronic Engineering

A Guide to Laboratory Work

INTRODUCTION

The purpose of the experimental work which you are required to carry out in the electronic engineering laboratories is four-fold. Namely :

(i) to develop your experimental technique by providing you with an opportunity to use electronic equipment, instruments and tools to observe, measure and investigate certain aspects of electronic engineering,

(ii) to reinforce certain key principles relating to your lecture modules,

(iii) to develop your ability to write concise laboratory records as the experiment proceeds.

(iv) to provide an opportunity for you to develop your skills in the preparation of formal, or technical, reports.

EXPERIMENTAL WORK IN THE LABORATORY

(i) Before the Experiment Session

At the time of doing an experiment, you may or may not have been taught about the topic concerned. Since many experiments are intended to verify the theory, prior to the practical session, you *must*, prior to the practical session, study the experiment guide sheet to find out what is involved and carry out a preliminary study of the background material. References listed in the guide sheet can be sourced from the Library or from the laboratory.

(ii) At the beginning of the Experiment Session

You should already have a clear idea of the objectives, procedure and expected results of the experiment before you come to the laboratory. Do not start the experiment immediately. Instead, spend 10-15 minutes with your group members to plan your work schedule for the entire session, normally three hours.

Objectives :

The overall objective of the experiment is normally given in the guide sheet. However, you should attempt to set your own objective to cover the entire session. This exercise will help you to really think about your work and to develop your skill in time estimation and management.

Procedure :

If you are in a senior class, you may notice that the guide sheet does not include detailed instructions on circuit or meter connections. Typically a functional schematic diagram is provided. In other cases you may be asked to measure a parameter without being given detailed procedures. These features are designed into the experiment-guide to help you gradually build up your confidence to work independently.

Expected result :

It helps tremendously if you know what results are expected. You can then check immediately if significant deviation from theoretical behaviour is noted during the experiment. For this reason try to get some idea of the expected results before the laboratory session. Whenever possible, conduct a preliminary experiment at the start of each part of an experiment if time is allowed. There is no need to take detailed readings at this stage. In fact, visual observation alone is often adequate. The pilot test will highlight possible difficulties; help to decide on choice and range of equipment required; identify the soundness of the method used; give a good indication of the time required for the actual experiment; determine appropriate intervals between readings and highlight those aspects of the experiment that give rise to the largest errors.

(iii) During Experiment

The worst thing to do in conducting experimental work is to **See** but not **Observe**; and that makes the difference between a good engineer/technician and a bad one. Skimping on observations 'to save time' might in the end cost you more time if the results are unreliable and unrepeatable. It pays to do whatever calculations are necessary *while* you are doing the experiment. *Don't* leave the calculations until afterwards. Remember: Do not disconnect your test circuit until you are quite happy with your results. Disconnecting it destroys the evidence which may indicate to you the causes of any errors which may occur.

(iv) End of Experiment

An experiment does not necessarily have an "end" point. Many of the experiments will, except when carried out by an experienced experimenter, take more than three hours to "complete". Some are designed to cover several laboratory sessions, and may be relatively open ended. It is vital that you *do not rush* the work at the expense of understanding.