NUST School of Electrical Engineering and Computer Science

Department of Electrical Engineering

EE-332/SC-325: Linear Control Systems Lab

Introduction to the Lab

1. Safety Guidelines

i. Our most important concern is your safety followed by the safety of the equipment. Try to avoid all situations that can compromise your, any other person's, or the equipment's safety.
ii. For your own and equipment's safety try to keep clear of any moving parts.
iii. Try to use the equipment with extreme care. Damage of any equipment will make it difficult to properly conduct the labs.
iv. Do not use the equipment if you are not confident. Contact the lab staff for support.
v. The complete list of guidelines is displayed in the lab and attached at the end of this handout. Please take out time to read it.

2. Motivation

The main purpose of the control systems lab is to give you some hands on experience with control equipment and familiarize you with some of the software tools used by control engineers.

The lab instructor/lecturer will give you a brief presentation on why control is important and what kind of equipment do we have in the lab. Ask the instructor if you do not receive any presentation.

3. Logbook

Throughout all of the labs, we will ask you to maintain a logbook. The purpose of the logbook is that you keep record of everything you are doing. It will be handwritten and you should include everything in the logbook which you feel is important and not part of this handout.

Maintaining a logbook or a similar record is a good practice for professionals whether engineers or not. It helps you to remember things when you are trying to recall them later or when you are preparing a typed report.

Some of the things you can include in the logbook are:

i. Any observations that you may have
ii. Derivations
iii. Solution of exercises
iv. Responses observed on the oscilloscope, with proper labeling. (For responses observed on the computer you can save an image.)
v. Any thing that you do not understand and want to ask a faculty member.

Some guidelines for a good logbook:

i. Use a proper copy. Loose pages can get lost easily.
ii. Clearly mention your name, group number, and registration number on your logbook.
iii. Whenever starting a new experiment, always write the date in your logbook.
iv. Give proper and clearly visible headings.

If done properly, you will feel that the logbook is for your benefit and is a nice practice to follow in any professional work.

4. Maintaining Files

We encourage you to save and organize anything you do on computers. Most of the activities that you will do in the initial labs will be used in the later labs. If you lose your work from the initial weeks, you will find it very difficult for you to perform all the lab activities

Some suggestion on how to maintain your files:

i. Make a folder called “Control systems lab”. Make a subfolder for each lab you do e.g. “Lab1”. Save anything that you do on a computer in the appropriate folder.
ii. Be sure to save all the MATLAB, Simulink or LabView file you create.
iii. Save any important graphs/plots that you generate.

5. Lab Groups

We will divide you into groups of four. Each group of four will have two subgroups of two people each. We will distribute you a sheet on which you can write your preferences to be in a group with your friends. If you don’t have any preferences, we will assign you to a group randomly.

We will assign you the lab group numbers by the end of the first week. Due to limited equipment, for most of the weeks different groups will work on different experiments. We will give you your schedule in week 2, which will have to be followed. If you miss a session or if you are lagging behind, we will have two sessions in the semester where you can catch up.

6. Evaluation

The lab has 25 marks from the whole course. The distribution of these 25 marks is given in the table below:

Evaluation	Marks
Mid semester exam/viva	5
End of semester exam/viva	5
Lab report	5
Lab activity completion	5
Logbook	5

Description of the evaluation activities

Exams/Vivas: There will be two written exams/vivas that will take place sometime in the mid and the end of the semester.

Logbooks: Logbooks will be marked at the end of each lab.

Lab activity completion: During each lab, students will have to report to the lab staff that they have completed the experiment. They can also be asked a couple of questions to test their understanding.

Lab report: A lab report will have to be submitted for each lab. You will have one week to complete the lab report. A Lab report is a typed document which should contain everything that you wrote in your logbook, all the exercises and any interesting results/observations/comments.

NOTE: If you are absent, you will not get any marks for logbook, lab activity completion and the lab report. However, if you have a genuine reason for being absent, then you will be allowed to the lab in your spare time.

7. Complete Guidelines

The following guidelines are also displayed in the lab.

i. If you see any hazard which can cause an accident or injury you must report the respective person in the lab.
ii. For your safety, maintain proper distance from moving/rotating equipment.
iii. Do not use the equipment if you are not confident; Contact the lab staff for supporting.
iv. All Students must be punctual as late comers will not be allowed to perform the lab. No Student will be allowed to enter the lab after 10mins of the scheduled lab time.
v. Students must not make unnecessary noise and should not mess with unconcerned lab equipment. Anyone found guilty will be sent out from the lab and will be marked **ZERO.**
vi. Eating/Drinking will not be allowed in the lab. If anyone found guilty will be fined **HEAVILY**.
vii. No Student will leave the lab during lab timing without permission.
viii. Before leaving the lab student must ensure that he/she has put the chair in an organized manner.
ix. Lab will remain closed from 1:00 to 2:00 for Lunch/Prayer break.
x. Late submission of the Lab report will lead to **ZERO** marks.
xi. **COPIED** lab reports will not be tolerated and **ZERO** will be given to both the host and the copier.

8. Acknowledgments to lab testers

We would like to thank our students Mr. Muhammad Kamran Bodla (BEE 2008), Mr. Mohsin Shehzad (BEE 2008), Mr. Yasir Altaf (BEE 2008), and Mr. Usama Abdullah (BEE 2009) for test running the labs handouts. Their efforts have made sure that the handouts you get have less mistakes and easy to read.