**LABORATORY INSTRUCTIONS FOR ECE401**

**General:**

The purpose of theECE401 exploratory sessions is to acquaint the student with:

1. Proper experimental procedures and techniques as they apply specifically to electrical engineering laboratory practice.
2. Interpretation of data collected from various measurement devices.
3. The design process and how to think creatively.
4. Methods of good record keeping.

**Important Points:**

1. Students are to come to Lab fully prepared and be ON-TIME!
2. Students must not eat or drink in the laboratory. However, water in closed containers is permitted.
3. Students will work independently or in teams as indicated by the laboratory instructor or TA. Students must follow all verbal and written instructions carefully. If they student is unsure of the procedure, they must ask the lab assistant for help before proceeding.
4. All required equipment will be available on the laboratory benches. Students will receive training related to the operating procedures for applicable laboratory equipment. The student is responsible for the proper use and care of this equipment. If the students are unsure about the usage of equipment, confer with the TA before touching anything.
5. There is a strict deadline for pre-lab and lab record submission. Extensions are not typically given. In very special cases, such as when there is a failure of the laboratory equipment or a student is absent for legitimate medical reasons, arrangements can be made with the instructor and TA to complete the work during a designated make-up period.
6. Each student has the responsibility for coming to the laboratory fully prepared. This preparatory work is to be documented in the form of a Preliminary Report (Prelab). The Prelab is prepared before any laboratory is performed. It is reviewed by the TA prior to students performing the lab. Satisfactory preparation is required in order to be allowed to perform the experiment. A well-prepared student will be able to proceed with the laboratory work without delay. Students with Prelab deemed inadequate will be required to correct the deficiencies of the Prelab prior to being allowed to perform the laboratory.
7. The Laboratory Record of each student, whether completed or not, must be handed to the laboratory instructor at the end of the final laboratory period for that particular lab.

**Preliminary Report (PRE-LAB):**

Each student is required to write a brief preparatory report on each experiment and bring it with them to the laboratory period. The Prelab must be thorough enough to allow another student or the instructor to perform the complete experiment using only the report and lab instruction sheet. All Prelabs must be word processed and not handwritten. Diagrams can be hand drawn; however, the student is encouraged to use the ECE computer cluster and make electronic drawings for their Prelabs.

The Preliminary Report should contain the following information:

1. Cover Page
   1. The date the Prelab is to be handed in
   2. Identification of the experiment by letter and title
   3. Your name followed by the names of each team member if any
   4. Lab section
2. Objective
   1. A brief yet informative statement defining the objective of the experiment.
3. Equipment List
   1. Include a picture and description of the equipment (how to use it, what it is used for, etc.)
4. Preliminary Procedure
   1. Explanations of what is to be done during the lab. Should be a step by step procedure.
5. Calculations/Circuit Diagrams
   1. May include circuit diagrams and sketches of proposed setups to obtain the desired measurements for the laboratory. Explanations of those diagrams as required making it clear what is to be done in lab.
   2. Preliminary calculations and pertinent information that may be necessary for completion of the experiment.
6. Predicted Results
   1. Any measurement or observation that will be done during the lab must have a predicted result before any experimental work is actually performed.
7. Discussion
   1. Answer here any lab handout questions that ask for your predictions regarding the outcome of the lab. Include the question being asked before answering it.

A well-prepared Preliminary Report will allow the student to proceed with the laboratory work without delay.

Label all diagrams and tables; otherwise they will not be easily referenced in the lab report.

Again, the purpose of the Preliminary Report is to supply enough information so that another student or instructor could perform the entire experiment.

The ultimate test for a properly prepared Prelab is that if you gave it to a fellow student in the class, they would be able to proceed and perform the laboratory without additional guidance or materials.

**Laboratory Record:**

Each student is required to make a written record with a ball-point pen (not felt-tip or gel) of his/her work during the laboratory period. The laboratory record must be shown to the laboratory instructor or TA before the student leaves the lab. Students MUST use a “Mead Composition” or equivalent, size 9¾” x 7½” commercial notebook with bound pages (DO NOT buy a spiral notebook!). Such notebooks may be purchased at the bookstore. For each lab the student will be asked to staple their trimmed or folded Prelab into the notebook before beginning the experiment. Notes should be made in the record whenever they are needed to clarify or emphasize what was done and why. The Laboratory Record should contain the following information:

1. Cover Page
   1. The date the Prelab is to be handed in
   2. Identification of the experiment by letter and title
   3. Your name followed by the names of each team member if any
   4. Lab section
2. Introduction
3. Equipment List
   1. Include any additional equipment used.
   2. Only need a table of equipment, pictures and descriptions are not needed
4. Procedure
   1. Include all steps taken while performing the lab.
   2. Changes in procedure from the Prelab
5. Diagrams
   1. Circuit diagrams(s) showing the detail of the actual connections used (polarities to be shown where appropriate). Each piece of equipment or important component should be uniquely identified. Important variables and constants should be indicated. Each major part of the experiment should be identified.
6. Results
   1. Original data, consisting of tabulated values, waveform sketches, recordings, etc. The variables should be identified, and notes should be made on special conditions or constraints.
   2. Calculations. When is it necessary to write down numbers, formulae, etc., as an aid to obtaining calculated results, this should be done in the Laboratory Record. Any formulae should be given the variables related to the data used. The source of formulae used should also be given. Calculated results should be tabulated.
   3. Curves plotted from data or calculated results where these will be of use in analyzing or continuing the experimental work. It is good practice to plot data as it is taken. Reference to these curves may be made in later parts of the Laboratory Record.
7. Discussion
   1. Notes on changes in procedure, difficulties encountered, and the method used to overcome these difficulties should be included. In fact, notes should be made in the record wherever they are needed to clarify or emphasize what was done and why.
   2. Results should be explained and referenced.
   3. Include answers to any questions found within the lab handout, include the question asked as reference.
8. Conclusion
   1. Include conclusions you have made by performing the lab and final summary of the lab.

The purpose of the Laboratory Record again is to supply sufficient information in order that a student’s experimental work may be exactly duplicated so that all observations and data can be verified.