Laboratory Information

Laboratories 1 to 4 are experiment labs that will be online in the "Labs" page on the course website. Labs 5 and 6 are design projects that will be posted to the website during the latter half of the semester. The laboratory exercises aim to reinforce the material covered in lecture and in problem sets. Laboratory sessions of 12 to 14 students will meet weekly. Students will typically work in pairs. The topics covered in the labs are coordinated with the lectures, but will lag somewhat.

Laboratory assignments will typically consist of three sections:

- **Preliminary Discussions and Problems:** intended to familiarize you with the laboratory topic, and in some cases, perform some design tasks
- **Laboratory Procedure:** usually a series of measurements to illustrate specific circuit topologies and characteristics
- **General Questions:** intended to encourage you to generalize and apply your laboratory experiences

It is vital that you read the entire laboratory and, where appropriate, do the preliminary problems, prior to your laboratory sessions! Failure to do so will make it difficult to complete the assignment in the time available. Pre-lab problems are due at the beginning of the corresponding lab session.

Each laboratory has Result Sheets to simplify the grading process. In most cases, the remainder of the material, should be included in a laboratory report, attached to the Result Sheets. There is no specific format required for the report, however they should contain the following information:

- Demonstration of all work.
- Derivations for all work.
- Properly labelled graphs.
    - Give every graph a title and number, and refer to these numbers in the report.
    - Label every axis, and specify (on the axis label) the relevant units (volts, Amperes, sec/div, etc. ...)
    - For Bode plots, always plot frequency in Hz (not radians/sec) on a log (base 10) axis.

Although you will be performing the laboratory procedures in pairs, each student must turn in his/her own report. Laboratory reports will be due in the subsequent laboratory session. Your lab TA will provide you with more information.

One of the main purposes of the course is to convey some of the trade-offs involved in analog and digital circuit design (e.g., gain vs. bandwidth, speed vs. power). For this reason, the last two laboratory assignments will take the form of open-ended design problems. In general, these labs will provide a set of specifications. You will be required to select a circuit topology, do a paper design "by hand" to determine the validity of the topology and any relevant parameters (operating points, component values, etc.), perform computer simulations to validate the paper design, and physically implement the design to demonstrate that it meets the specifications. Note that these design problems require a considerable amount of time to complete and take the place of two or more regular assignments. They also receive a grading weight roughly in proportion to the time allotted for completion. You are strongly encouraged to start on these labs as soon as they become available.

The grading policy for the laboratory assignments are as follows:

- Technical Content: 90%

- Document Quality: 10%

The “document quality” category aims to encourage you to prepare your reports in a manner that makes them readable and easy to evaluate.

For the first four labs (not the design projects), the “technical content” is broken down as follows:

- Prelab: 30%
- Report: 60%

The overall point totals assigned to the laboratories for grading purposes are as follows:

Assignment	Points
Lab 1: Laboratory Introduction — Review of Passive Networks	15%
Lab 2: Characterization of the 741 Op-Amp	15%
Lab 3: Configurable Amplifiers Using Small-Signal MOS Resistors	15%
Lab 4: Biasing of MOS Transistors	15%
Lab 5: Design Problem 1 — Common Source Amplifier	20%
Lab 6: Design Problem 2 — Multi-Stage Amplifier	20%
TOTAL	100%