**Tips for writing Lab Reports:**

* Read pages 4 through 7 of the Syllabus for details on how to write the lab report.
* Follow the lab report outline as explained in class.
* Include diagrams of the circuits. *(It’s ok to copy and paste the figures from the lab manual, or to neatly draw the figures by hand.)*
* Tabulate data whenever it’s appropriate to do so. *For example:*

|  |  |  |
| --- | --- | --- |
| Vin (volts) | Vout (volts) | Voltage Gain |
| 2 | 80 | 40 |
| 2.5 | 100 | 40 |

* Number and type a title for all figures and tables. *For example:* Figure 1. Microphone circuit
* Type a title for all graphs, and give labels and units for X-axis and Y-axis.
* Use font size 11 or 12.
* It’s ok to single space within paragraphs and double space between paragraphs and sections.
* Remember to answer all the questions.
* It’s ok to get help with your English writing skills (such as grammar, syntax, spelling, etc.). The NEU Writing Center <http://www.northeastern.edu/english/writing-center/> offers help for all members of the NEU community.

**In this course, lab reports must follow this basic format:**

1. **Cover Page**
2. **Introduction**
3. **Concept 1**

a. Results

* Experimental Methods (including circuit diagrams)
* Tabulated Results
* Calculations

b. Analysis

* Answers to questions posed in the lab manual (questions are usually in **BOLD** type)
* Appropriate analysis of your results and their validity

1. **Concept 2**

a. Results

* Experimental Methods (including circuit diagrams)
* Tabulated Results
* Calculations

b. Analysis

* Answers to questions posed in the lab manual (questions are usually in **BOLD** type)
* Appropriate analysis of your results and their validity

1. **Conclusions**

**Lab report grade (all 100 pts. total).**

* + Cover page (an example is attached on page 7 of Syllabus) **→ 2 pts.**
  + Introduction (a brief description of the purpose and goals of the lab) **→ 10 pts.**
  + Results **→ 39 pts.**
    - Experimental Methods (including circuit diagrams) *→ (9 pts.)*
    - Tabulated Results *→ (15 pts.)*
    - Calculations*→ (15 pts.)*
  + Analysis**→ 39 pts.**
    - Answers to questions posed in the lab manual *→ (each question: 30 pts./number of questions. Questions are usually in* ***BOLD*** *type)*
    - Appropriate analysis of your results and their validity *→ (9 pts.)*
  + Conclusions **→ 10 pts.**

**Here is a checklist that will help you in writing Lab Report 1.**

**Cover Page (2 pts).** The following information must be on the cover page:

* Lab 1: Operational Amplifiers (Op Amps)
* EECE 2413, Lab for Electronics I
* Name of your EECE 2412 professor (Prof. Grabel or Prof. DiMarzio)
* Names of the lab TAs: Yuexi Zhang and Leili Hayati
* Your name and your lab partner’s name
* Your team number
* Date of your lab (for example, Tuesday, September 22, 2015)

1. **Introduction (10 pts).** Typically 3 to 4 well-written sentences describing the goals and purpose of the lab. It’s introducing the reader to the devices, equipment and concepts that you studied as you performed the experiments.
2. **Phase Shift (22 pts)**

a. Results

* Description of experimental procedure. Include the model number of test equipment that you used (for example, “Agilent 33220A Function Generator”).
* Figure of the test circuit, labeled with a number and title.
* Measurement of Vin
* Measurement of Vout
* Calculation of Voltage Gain
* Measurement of time lag
* Calculation of phase shift.

1. **Clipping (25 pts)**

a. Results

* Description of experimental procedure
* Measurement of maximum (most positive) possible output voltage
* Measurement of minimum (most negative) possible output voltage

b. Analysis For Lab 1, the BOLD questions in the Clipping section are briefly summarized here:

* How do these voltages compare with the power supply voltages?
* What is the typical “difference” between the typical output voltage swing and the +/- 15 V DC supply?
* Is your op-amp within the typical “difference” spec for +/- 10 V DC supplies?
* Look at the LM741 schematic and explain why the output voltage is always less that the power supply.

1. **Slew Rate (31 pts)**

a. Results

* Description of experimental procedure
* Output that is observed after setting the signal to a square wave
* Procedure in obtaining the plot. Include the 5 lines of MATLab code.
* Attached plot with a figure number, a title, names of team members, team number, and both axis labeled with titles and units.
* Slew rate calculated from the plot.

b. Analysis The BOLD questions in the Slew Rate section are briefly summarized here:

* Explain what happens when the input signal was set to a square wave.
* What is the slew rate in volts/microsecond?
* Does the slew rate meet the LM741 specs?

1. **Conclusions (10 pts). Here you explain to the reader what you learned and what conclusions you have drawn based on the results of your experiments. You should have at least one conclusion for each concept (phase shift, clipping, slew rate).**