

ECE 1192/2192 Introduction to VLSI Design
Laboratory Work and Report Guide
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The laboratory exercises are a very important component of our course. By doing the laboratory exercises, you will gain a deeper understanding of both the basic operations of CMOS circuits and the design process for CMOS VLSI systems. Also, you will develop a better understanding of some specific digital circuits like pass-gates, dynamic-gates, flip-flops and registers. In these exercises, we hope you will:

1. Learn new information, skills, and tools;
2. Use those skills to create, test, and experiment on new designs;
3. Analyze and understand the results of the experiments;
4. Draw some conclusions from your analysis;
5. Write up a report with your results, analysis, and conclusions.

Lab Report Requirements

Writing lab reports is one of the most important methods for people to review their understanding of experiments, record their work, and communicate their results. The ability to write a good laboratory report is a valuable communication skill, because it also can be the basis for technical papers on original scientific research. In this class, the laboratory reports are a very important tool we use to evaluate your performance. You should follow the outline below for your reports:

1. Start with a basic and **brief introduction** that gives the background for the lab content and summarizes what you have accomplished in the lab exercise. You can also add a brief review about related course content.
2. There will be several assignments in each lab exercise. Please arrange the main body of your lab report as **several sections, one for each lab assignment**.
3. Each section should be **written as a narrative of the work completed** in the lab, not a reproduction of the procedures listed in the lab material. For example, you could present the basic mechanisms of some circuits, and explain the schematic you designed.
4. **Record your lab results**. Materials like screen shots of circuits, waveforms, layouts and test reports (such as LVS and DVS) should be included in the report to document your laboratory work.
5. **Analyze the laboratory experiment results**. For example, you can present descriptions of the methods used and details of your calculated results as well as necessary equations and calculations.
6. Finally, **present a discussion and draw some conclusions** about what you did and what you learned. (You can write this part separately in each assignment section.)

Lab Report Evaluation

Generally, each lab report will be marked out of 30 points. The total of all the laboratory reports will share the same weight with the total of the three examination scores. Your final grade will be based mainly on your lab reports (including final project), two midterm exams, and the final exam.

According to the lab assignments in each handout, if any part of the report is not completed (like an assignment missing or done incorrectly, not enough work recorded, or lack of a conclusion or discussion of results) then points will be deducted.

Typically, a lab will last a week and the final project may last two weeks. Please ask questions about the assignment during the lab class period and ask the TA for help. Since the lab meets on Friday, you do not want to wait three days to get your questions answered.

The lab report submission deadline is 12:00 pm, Friday (that is, before Lab class starts). Late reports will be marked down. It is not fair to the students who do turn their work in on time otherwise. **Collaboration in learning the new materials and mastering the tools is encouraged. But, copying or sharing of data, figures, or analysis is not acceptable. You must do your own work on the design and testing of each of the assignments.** The reports should detail each individual's work in the laboratory. So, even if you collaborate to learn a new tool or procedure, start your independent work as soon as you have finished the tutorial or mastered the tool.

Note:

Our course website is:

<http://www.engr2.pitt.edu/electrical/faculty-staff/levitan/1192/index.html>.

Please add this website into your web browser's bookmarks under your Linux account or your own computer. On this website, there are several versions of lecture materials, please use the newest. You can use them for reviewing the lectures and print them to use when taking class notes. **The exams will be open book/open notes but closed computers.** You can look at the older notes for more background and examples.

Since there is a lot of material in the course, the online lecture materials will be very helpful. Also you can find lab materials (lab handouts) there. This year, we will revise and post them one by one and possibly change some content. What's more important are the Tutorials. They provide a walk through of the tools and help you develop the skills you will need to design and analyze circuits, draw the mask layouts, and perform circuit synthesis. Tutorials 1-4 are primarily for the Fall semester and the rest are for the Spring semester. These labs use state-of-the-art CAD tools and the skills you develop will benefit you as long as you are doing VLSI or digital system design, so please read, learn, and use them.