Capstone Design Report Requirements

# For Computer Engineering & Electrical Engineering Degrees

Updated: January 6, 2012

# Introduction:

A requirement for completing your Computer Engineering or Electrical Engineering Degree is that you take a design course from the list of approved design courses and submit a report to the department detailing your design (for team-based projects, one report per team is required). This report should document your design in a similar manner to the final design reports written for the Freshman EDC course. The minimal requirements for this report are described in the following sections; additional requirements may be specified by the instructors of the design courses.

# Structure and Content of Final Report

The report should have the following elements:

1. Title page
2. Front matter
3. Executive Summary
4. Body
5. References
6. Appendices

# Title page

The title page should include your name, the date, the course used for the design option, and the name of the instructor for the design course.

# Front matter

Front matter in your report should include a Table of Contents, List of Figures and List of Tables. These should be formatted similar to the guidelines given in EDC.

# Executive Summary

This is a high-level summary of your design report it should include a brief statement of the design problem, a brief statement of your design approach and a summary of the benefits of your design as well as any important limitations.

# Body

The body of your report presents the design problem you worked on and your solution to this problem. It should have the following sections:

1. **Introduction:** In the introduction, state the goal of your design project and give a brief overview of your approach. Compare your design approach to any prior art and provide adequate references.
2. **Broader considerations:** In this section, you should discuss the broader impacts of your design project. For example, what is the commercial feasibility? How and where can this be used in industry? If your design became widely used, what impact could it have on society or the broader technical community? Comment on any ethical or legal issues surrounding your design, if appropriate.
3. **Design constraints and requirements:** Comment on the key requirements and constraints you had to deal with in your design (e.g. power, costs, and component availability). Also discuss any engineering standards that are relevant to your design with appropriate references.
4. **Design description:** This section is where you describe your design in detail. Begin with an overview of your design and follow this with sections describing particular sub-systems and features. Show block-level diagrams of your design, and demonstrate how data flows between functional units or modules.
5. **Design Optimizations:** Present any optimizations or enhancements you have used to improve your design and their impact on performance, for example loop unrolling, pipelining, hardware/software partitioning, operation scheduling, register re-use, etc. You should include adequate details so that someone could reproduce your design if needed (some details may be put into the appendices). Did you have to refine your design or optimize it because it did not meet requirements, or fit on the board?
6. **Testing / Simulation:** In this section discuss how you tested your design and assessed its performance. How and where did you acquire input and output to test and verify your results are bit-true accurate. Provide simulation waveforms describing how simulation results were verified. Point out any weaknesses or limitations to your design, if any, and if there were any particular modules that were not tested, could not be tested, or had limited testing in simulation.
7. **Implementation / Synthesis:** In this section discuss how you implemented your design on the board. What modules or IP were integrated? What were the inputs and outputs to your design. What was the target frequency, and did it meet timing and design constraints? Did you need to refine your design because it did not complete the synthesis process? Provide details on resulting resource utilization from synthesis and mapping, including logic blocks, memory, block RAMs, etc. Finally, how did you test your final design to make sure it worked properly?
8. **Conclusions:** Summarize your design and how well it met the requirements. Did it work to your original design specifications? Suggest potential future improvements and new features to be added.

# References

Your report should include a complete list of references for all books, articles, websites, manuals, and other sources you used in performing your design and preparing the report.

# Appendices

Use appendices for including extra details that some readers may want to examine in detail, but would distract from the flow of the report if included in the body.