

PROFESSIONAL SELF ASSESSMENT REPORT

FOR:

**SCOTT A PALADINO
A33083744**

ECE 480 - DESIGN TEAM 10

The purpose of this report is to document and evaluate my learning in ECE 480: Senior Capstone Design Project.

How have I satisfied the learning objectives in this course and contributed to team and course outcomes? Cite each learning objective and refer to examples throughout the term. The course learning objectives were listed on the course syllabus distributed the first week of class (see the course web site).

The first course objective is to be able to describe the reasons and forms of technical communication. Technical communication is a key part of the design process. It is used to disseminate information to members of the design team, as well as to provide a method of learning and application of principles. Forms of technical communication include: Design Proposals, Engineering Notebooks, Technical Lectures, Design Issues Papers, Progress Reports, and Application Notes

In this class, I have had a large part in the creation of the above listed forms of technical communication. I felt that I was the strongest writer on our team.

The second objective was to write technical reports. These include the Design Issues Paper, Progress Reports, and an Application Note. I wrote an Application Note on using an LCD module with a Cypress Semiconductor PSoC microcontroller. The Design Issues paper and both progress reports were rewritten and edited by myself and Matthew Christy for accuracy and completeness.

Next, we were to write a team proposal for a major design project and obtain approval. I, along with Matthew Christy, were the main editors of our Design Proposal and Pre-Proposal. We took the ideas given to us by the team, and rewrote them for clarity and grammatical accuracy. We visited the Writing Center multiple times to get feedback on our work. I personally edited and made valid the final working version of the Gantt chart that we used in the Proposal.

The next course outcome is the ability to comprehend the content and style of oral

presentations. We had two formal presentations to present this semester, our Oral Proposal Presentation and our Technical Lecture. I helped to develop the content of both presentations, and I also presented during both sessions. The feedback from my classmates and Dr Goodman was positive. I also critically evaluated the presentations of some of my peers.

This class was supposed to help us understand the importance of career planning and management. I personally do not see where that objective was satisfied. There were several presentations by outside lecturers on topics such as patent law, and liability that would be of use in a job. However, there was no formal guidance on career planning. Some management skills were developed, as I tried to be a leader and go-to person for my team.

We devoted a portion of the class to comprehending the importance of engineering ethics. The ethics portion of the class, taught by Dr. Strangas, was helpful in introducing me to Engineering Ethics. In this part of the course, I had to write seven short essays and one long essay on various topics in ethics. It helped me to think about the bigger picture and the potential ramifications of my engineering decisions.

We were to access relevant standards and interpret their meaning and application. As an example, one of the key portions of our project was to use the ASHRAE 55-2004 heating and cooling standard. I had to familiarize myself with the basic concepts of the standard to understand the role it was to play in our design.

Another objective was to delineate the principal design criteria and constraints for an electrical or computer engineering design project. This is in regards to criteria such as cost, size, power, environmental factors, reliability, safety, maintainability, and reusability. For this topic, I would say we began by getting the relevant information from our customer, and then researched the options that were within our budget. Safety was a primary concern, as our product is intended to be installed into homes. I personally tested the power supply. I ran it under very high load for hours, to make sure that components would not fail or overheat. Maintainability was a key concern. I helped to develop the system which allows the user to flash update the code of both the thermostat and the interface plate. This allows for usability well into the future. Size was important; I helped to choose components that would fit within our designated space. Reusability was also a prime criterion of this project. The system allows for the user to upgrade his or her thermostat easily, quickly, and safely.

Another objective was the ability to describe and understand the overall engineering design process. Project justification, identification of constraints, establishment of design criteria, establishment of timetables, the partitioning of work, project monitoring, and project evaluation were the factors here. I helped to thoroughly research the background on our topic, and it was found to be a

worthwhile project based on the potential energy savings. My role in this process is described below under the next question heading.

The next course objective deals with being able to describe and understand contemporary industry practices and trends with respect to electrical and computer engineering. In this respect, I worked with some very current devices: Cypress PSoC, PIC 18F series MCU, opto-isolated relays, switching power supplies, and LCD displays. Knowing these devices, and other standard electrical engineering parts, will help me in my career path.

Can I describe, understand, and apply key tools used in the overall electrical and computer engineering design process? I believe I can. This would include oscilloscopes, multimeters, data sheets, function generators, PCs, and programming equipment. I have used all of these to a great extent in completing my parts of the project.

The next section deals with understanding the benefits and potential problems of teaming, being able to describe qualities and processes of effective teams, and describing the role of teamwork in system design.

After completing this course, I am definitely able to see the potential problems of teaming. With a large group, it seems inevitable that some members will do less work than other members, leaving the harder working members to "pick up the slack." Also, some persons will be more technically competent than others, placing a burden on the teammates who either have to take on more work, or slow down to bring a less adept team member up to speed. Teammates can have conflicting personalities, especially if more than a few outspoken members are placed together. I have found that it can be very difficult to express frustration with the performance of fellow team members without become hostile, angry, or bitter.

With that being said, I have also experienced some of the benefits of having a team approach to design. First, I was able to build camaraderie among members that I respected and liked. This made the process much less dull and much more enjoyable. Secondly, I have seen the benefit of having different people see a problem from a different perspective, and offer suggestions that I would not have thought of on my own. Finally, having a team allows you to have someone who is able to double-check your work for accuracy, or help troubleshoot flaws. It is helpful when a technically-able person can look at your work and point out potential problems or make suggestions for improvement.

All in all, I feel that an effective team is one where all parties are working toward a common goal, and are willing to put in equal amounts of hard work and dedication. My experiences in this class, and other classes with teams, has shown me that having the right combination of people at your side makes a huge difference in project outcome and personal happiness. Teammates who respect each

others time and knowledge are often able to create better final products.

The course outcomes require that I can acquire and understand information contained in contemporary technical literature. During this course, I have read and analyzed many data sheets for the devices used in our project. I have had to read technical reference manuals and application notes to get ideas and help, as attested by my binder full of technical reference information.

Finally, we need to be able to browse the web to acquire information about electrical and computer engineering, software, design tools, third-party suppliers. This was done on a near-daily basis, as much of my information and learning came from websites, web forums, papers on the web, and supplier websites.

What have I learned about the design process from my work on the design project? Restate your portion of the overall project as define in your team's design proposal, which was developed and completed in week 6 of the semester. Describe your work during the semester on your TECHNICAL portion of the design project. In your write-up discuss your work in terms of the overall engineering design process – e.g., project justification, identification of constraints, establishment of design criteria, establishment of timetables, the partitioning of work, project monitoring, and project evaluation. Also discuss your work in terms of design iterations that occurred during the semester.

In the proposal, my role in the project was to develop the LCD code and drivers for our project, and to create the menu system for it. As I have taken on that role, I have also been a leader in many other technical and managerial tasks for this project.

In regards to LCD development, there were many facets to the successful development of that part of the project. It was determined early on that we needed some type of output display module for our design. First, I had to educate myself on the different technologies and options available for our display. There were graphical LCDs, touchscreens, simple number LCDs, character LCDs, and more. I had never used an LCD module before this class, so I had no idea what to buy or look for. I substantially researched the topic, and found that graphical LCDs would have been expensive and complicated, touchscreens were much too expensive, and simple LCDs did not offer enough capability. After much research, I finally decided on the method that we are currently using: an alphanumeric character display.

We initially chose to go with the PSoC microcontroller to help speed development. Its capabilities suggested that it would make designing our system much easier. Though the system was

powerful, in the end it was too much for everyone to learn in this timeframe. I was able to get the LCD running on the PSoC, but soon after the choice was made to go with a PIC microprocessor instead. This was for the benefit of the team. It was tougher for me to get the LCD to work with the PIC, but after some struggling, I finally got the LCD to work properly.

As I was working on the LCD issue, I was also helping with other parts of the system. In particular, the power supply and relay system was not being designed in an efficient, reliable manner. It became clear to me that for the power supply system to become a reality that I would have to take a role in its development. I researched the different options, asked questions of my peers, and in the end decided to look into a DC-to-DC converter using a switching regulator. After a few failed attempts, I found a chip combination that worked well and provided the clean, efficient power we needed. After this, I created the relay driver circuits that we need in our interface plate.

I also worked with another teammate in designing our USB bootloader device. This took quite a bit of research and time, but in the end, we were successful; our PIC microprocessors can now be reprogrammed in-circuit using a USB connected to a PC.

Monitoring the project progress has been important to me, and I have jumped in and taken a role in developing parts of the project that were behind schedule. I have been a part of the evaluation of the finished subsystems has by thoroughly testing each system, and looking for flaws.

What technical communications have I done this semester? List the reports and presentations you have help prepare. Also indicate those presentations for which you were a speaker.

As previously noted, I have had a major role in creating the team-based Proposal, Pre-Proposal, Progress Reports, Design Issues Paper, Proposal Presentation, and Technical Lecture. I had a speaking role in the Proposal Presentation and Technical Lecture. Individually, I have written an Application Note and am writing in my Engineering Notebook, something which I did not do well the first half of the course.

What is the impact of this course on my career objectives and professional goals?

After taking this course, I am now more aware of career aspects that may be appealing to me in the future. I found that I was able to learn quite well how to program for an embedded system, and I now have a very solid foundation for microcontroller coding and development. This was a very interesting topic to me, and I may keep an eye out for embedded system development jobs.

This course helped me to see the value of hard work and dedication in gaining the respect of fellow teammates. As the course progressed, it seemed to me that my team saw me as the de facto leader. I was the contact person for our sponsor, and handled all communications with them. I helped to arrange team meetings and tried to lead them in a productive manner. I wanted to make sure that my team knew that I was dedicated to the success of this project, and would always help out in any way I could. Working with every member at some point leads me to believe that this goal was accomplished. I put many long hours and nights into both the paperwork and hardware sides of the project. I also had a working knowledge of the entire system, which could not be said for all members. These attributes make me feel that I may have what it takes to look into a management position sometime in the future.

The knowledge of team-based design will be invaluable also. I now have an idea of potential problems to expect when being placed in a design team, and I will be much more confident about trying to make sure that problems are addressed early on. I will know more about the different types of personalities that I may encounter when placed into a team.

What are my primary strengths and weaknesses?

This course has helped me to see the areas in which I am strong, and also the areas in which I need improvement.

One strength that I have observed is my ability to design and troubleshoot. After working with people of varying skill levels, I can see that my skills in a laboratory environment are above average. I was able to brainstorm, design, build, and test many areas of our project.

I am also very willing to help others learn if I have knowledge that is useful. I enjoy explaining things that I understand to people that do not, as it helps me to learn the topic better myself.

Also, as noted before, I am a strong team player and will put in as much as required to make sure the team is successful. It is important to me to gain the respect of my fellow teammates.

My main weakness might be not being able to "see the forest for the trees," that is, getting hung up on the details of the project and not seeing the overall picture. As the semester ticked down, it became obvious to me that I would have to make concessions, even if that was painfully difficult. Without these concessions, the project might not get completed on time.

I also can be short on patience with people whom I feel are not contributing the appropriate level of commitment to the team. It is very difficult for me to stay focused when I feel that someone is riding on the coattails of others. I need to learn better strategies for staying calm, cool, and collected.

when dealing with frustrating teammates.

Where would I like to be professionally five years after graduation?

At this point, I really cannot say where I would like to be in five years. I have not had much experience in industry, and I do not know what may be a realistic scenario five years from now. I do know that I hope to be in a steady, enjoyable position, but I cannot say if that will be as a engineer, or part of management, or something completely unrelated. This course has emphasized to me to the benefits and drawbacks of being in a management position versus being just part of the design team.

What lifelong-learning steps must I plan to undertake in order to achieve this five-year professional goal?

If management becomes my goal, then I will have to focus on honing my “people skills” while learning more about the business aspect of engineering. If I decide that management is not for me, then I will work on building up my “toolbox” of skills by staying current on topics related to electrical engineering, and mastering whatever tasks I am given. Learning a particular skill would be valuable, such as a difficult piece of software or hardware. I need to make myself valuable to my employer, through my knowledge, input, and dedication to the company and project. In this way, I can be more assured that I will be compensated well by my current employer, or that I have the necessary skills and confidence to find a job with another company if I feel that the time is right for that.