

Professional Self-Assessment Report

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Purpose

To document and evaluate my learning in this course and begin to prepare myself for the next stage in my professional growth.

1. How have I satisfied the learning objectives in this course and contributed to team and course outcomes?

1.1 Describe various forms of technical communication and the reasons for using them

Technical communication is an essential part of being an engineer. I learned various forms of technical communication have been used throughout the course. The technical communication for the course was presented in the form of technical papers, proposals, and presentations. The technical papers were a more detailed presentation of ideas that could be implemented by a reader if needed. The proposals were a high-level overview of the the project meant to convey technical information on the team's initial design and understanding of the project. The presentations were a condensed form of the technical information or proposal meant to convey the needed information while keeping the interest of the audience. These forms of communication are an integral part of working as an engineer.

1.2 Write well-organized technical reports

Technical reports are an important way for the engineer to communicate detailed information to others. I learned the process of writing a technical report. This process starts with a definition of the information to be conveyed, which serves as an introduction. Next is the statement of the tools the reader must be aware of in order to fully understand the technical aspects of the project. From there comes the technical body of the document, with the data and procedure used, split into logical sections the reader can follow in order to reproduce the information contained. That is then followed by a conclusion to recap the technical information and to state the conclusion to the information that has been conveyed within the document.

1.3 Write a team proposal for a major design project and obtain approval

Team proposals are important within industry. I learned that proposals can be used to propose a solution to a problem a company is looking at outside help to solve, or they can provide management within a company the information needed to make decisions. Proposals present a team's solution to the problem, with a detailed breakdown of how the team will tackle the problem. They show the resources and the time the team will need in order to solve the problem. Proposals often start with a declaration of the problem to be solved. Next is a method by which the problem will be solved. From there the final proposed design is stated. Next would be the timeline for the project, split into predicted milestones the team will need to achieve, and the time frame they should be completed in. The cost of materials of the design as well as the

proposed budget is next. The proposal is concluded with a restatement of the material covered as well as time for the team to answer questions.

1.5 Write a team proposal for a major design project and obtain approval

I learned that oral presentations are a very good way to taking technical content and presentable materials such as proposals and condensing the material so that an audience can get an overview. The presentation can be anything from convincing someone to review further documentation for a proposal to teaching an audience about a topic to showing the progress of a project. Often presentations are given a time allotment that the presenter must reach but stay within. Much like written documents, the presenter must grab the attention of the audience, so the audience stays interested in the material until the end of the presentation. I participated in designing the layout of both the technical lecture and the proposal presentation as well as creating my own slides to present. I learned to give the presentation the appropriate amount of content and detail to both convey the information and fill the time allotted.

1.8 Access relevant standards and interpret their meaning and application

I learned that standards are an important part of an engineering career. Standards allow the engineer to use stay within a certain set of boundaries when designing the solution to a problem. They also allow other engineers a way to look through the design of a project without the need to teach every aspect, the engineer reviewing the document for use can already be familiar with the standards used. Computer languages are a good example of a standard. By using a common language, another engineer reading the code with knowledge of the language will be able to interpret the structure and the solution to the problem being solved much quicker than one unfamiliar with the language. Another standard would be symbols used in circuit schematics. By using defined symbols, the electrical engineer is able to look at the design of the schematic and understand what the circuit is attempting to achieve quickly. The ability to use these standards and the ability to research any standard not known quickly is an important tool.

1.9 Delineate the principal design criteria and constraints for an electrical or computer engineering design project—e.g., cost, size, power, environmental factors, reliability, safety, maintainability, and reusability;

The senior design project has many constraints. The sponsor has constraints on the design; what is required and what is expected. This generally requires the project to be as low cost as possible. The requirements limit the overall design, but assist in making the design process easier. The expectations serve as a constant goal for the team to achieve even after the requirements are met. For our project, the design requirements limited the supply for the power and limited the materials that could be used. Fortunately, the basis for the design uses a very reliable, safe, maintainable and reusable design. However the circuit to be designed required our team to find components that were easily obtained in multiple countries, easy to manufacture, easy to

maintain while still being safe to use. The design also has a cost limit that must be managed at all times during the prototyping phase. The prototyping phase can cost many times more than the initial design but the cost constraints for the final design needed to be kept in mind at all times.

1.10 Describe and understand the overall engineering design process—e.g., project justification, identification of constraints, establishment of design criteria, establishment of timetables, identification/scheduling of critical path, the partitioning of work, project monitoring, and project evaluation

The engineering design process is a set of steps that must be traversed to produce a working design. I learned that if the goal for the project comes from outside the team, as it often does in industry, the initial justification, constraints and design criteria can be quickly found from the persons requesting the design. Any questions about these topics can be answered during subsequent meetings, until the team is satisfied that enough information is available to continue with the design. After this, the team can start to produce ideas on how the design will be achieved, research parts needed, produce an expected timetable for the design that falls within the overall time constraint. A lot of work will need to be done over the cost of the project, and each stage of the process may overlap, except the critical path. This path is part of the design that must be followed step by step, which each successive step requiring the previous step be done. The whole team may be involved in the critical path, but the team members will be given additional tasks that can be done in parallel with the critical path. The team will need to report on progress regularly, and evaluate the current progress at stages to guarantee help the project to be completed.

1.11 Describe and understand contemporary industry practices and trends with respect to electrical and computer engineering

Electrical and computer engineering are two industries that are frequently changing. The base of the work still stems from reliable practices to produce results, document progress, work within teams. However, these industries are migrating to newer forms of technology. Engineers now have many more tools to produce results. Where an electrical circuit may have, and may still be designed on generic circuit boards, the reduction in cost to create a custom circuit board moves boards from just being used in production to being used for prototyping as well. Circuits that may have been designed entirely through electrical components are often now hybrids between computer chips and the electrical components. Documentation of progress on a project may use engineering notebooks, but engineers are moving towards digitally logging progress. Team meetings have gone from an always in person meeting to video or audio chat as well. This hybrid between the old and the new causes the engineer to now learn both styles. I have learned both the older industry practices as well as the newer, emerging practices as well.

1.12 Describe, understand, and apply key tools used in the overall electrical and computer

engineering design process

Many tools are available that are tailored to each type of engineering discipline and the work the engineer is to perform. These tools allow the engineer to do things like model designs, create designs that will be used in production, write computer software, do mathematical calculations, etc. Use of these tools may come with training or the engineer may be asked to learn the tools on the job as the work is being performed. Choosing which tools to use will sometimes be easy and at other times will require the engineer to weigh the strengths of each tools against weaknesses to find a tool that meets requirements.

1.13 Understand the benefits and potential problems of teaming, describe qualities and processes of effective teams, and describe the role of teamwork in system design

Teaming is an integral part of being an engineer. I learned valuable lessons during my time with my team. Teaming can be a good way to bring together the ideas of multiple individuals to produce the best solution for a project. With this benefit comes potential problems. The group has the potential to pass up new and interesting ideas to stay with the status quo. Interpersonal communication is an important part of teaming and if team members struggle with communicating ideas, the result is a team with an unproductive member. There is always the potential for a team to have a member that does not produce as much work as the others, which can lead to resentment within the team. For a good team to thrive, there must be an open and comfortable forum for new ideas, to voice concerns, to report on progress. The team members must also be comfortable discussing problems with other team members as the project progresses so that no team member falls behind. This leads to a fluid and continuous design flow that will in both the early and later stages of system design. Communication is the most important part of of a good team.

1.14 Acquire and understand information contained in contemporary technical literature—e.g., trade journals, magazines, books, conference proceedings, and supplier literature—about hardware components, software, design tools, third-party suppliers, etc.; Nearly every product used by engineers has documentation. This documentation comes in the form of paper documents, websites and videos. I learned how to look through documentation to find information that was crucial in determining the components that we would need for our design. Technical documents are very dense with a great deal of information. Reading and understanding these documents is an important part of being an engineer. I found that setting goals for the information I needed first made the process much easier as I could skip what I did not need and go straight to what I did. After the information needed was extracted from the document, reading through the rest allowed a more complete understanding of the component.

1.15 Browse the web to acquire information about electrical and computer engineering, software, design tools, third-party suppliers, etc.

During this course, I was able to strengthen my ability to search the web for the documentation I needed. Searching for technical documents is not as easy as it initially seems it would be. I found that many manufacturers have either a great deal of documentation about an item or no direct documentation at all. When too much was found, it is beneficial to quickly look through each of the documents to find that content needed. If no documentation was found, the supplier for the part has the documentation needed, a search of the supplier's website produced the needed documentation.

2. What have I learned about the design process from my work on the design project?

My defined part of the product was to serve as one of two Software Specialists. The software specialists were responsible for implementing the motor control algorithm which effectively interfaced with the AMS sensor, throttle sensor, and the power MOSFET switching circuits. I used computer language standards, electrical standards, schematic standards and many more over the course to communicate with the team. When I produced material for the design, other team members were able to understand the solution, when others produced designs I was able to understand their work as well. I was involved in creating a list of specifications the microcontroller needed to satisfy as well as researching and choosing a microcontroller to be used for the project. I researched and helped choose the magnetic rotary sensor used in the project based on a list of requirements we created. I helped create a list of requirements that would need to be satisfied for the PCB board that would need to be created. I was involved in the building and testing of the alternator initial design. I recognized potential issues that would need to be addressed in the final design. I was involved in the initial framework of the software design as well as the research into the documentation of the microcontroller to enable the needed features. I was then involved in the process of building the software. I was involved in a great deal of the testing of each design iteration, from software to hardware. I was involved in the building of the final circuit.

3. What technical communications I have done over the course of the semester?

I was involved in the preparation and content in most of the deliverables as well as a speaker in both presentations. I wrote a Lab Report and an Application Note during this course. The lab report was a lengthy document that used technical writing skills to recap the laboratory procedure performed. The application note consisted of a concise explanation of an implementation of pulse width modulation so that the reader could reproduce the computer code. I participated in writing the pre-proposal and the final proposal by filling needed sections, and editing content for a consistent flow. I started the initial layout of the presentations to get the team started. I created my own slides and worked with the team to maintain a consistent flow.

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

This course introduced me to a variety of issues that I may need to be prepared for when I join the workforce. The course was very time intensive which simulated a project with technical aspects, presentations and deliverables under a tight time schedule. I have been introduced to various forms of technical communication my previous course work had not introduced me to. With these tools I will be more prepared in the future if I am presented with any of the work required by this course. I also learned to find a solid place within a good team. I learned team communication and how to find a voice within team meetings.

5. What are my primary strengths and weaknesses?

I have learned that I have some strengths and some weaknesses and how to identify and overcome them. A strength I have is to keep on task to produce consistent work. I am able to assert myself and my opinions when in meetings. I become comfortable with a team quickly. I stay current with the team lead, suggesting ways to better improve workflow. A weakness I have is to not follow through with understanding every aspect of a project. I allow others to take sections that they are assigned but I do not always follow up with them and the solutions they produce. I also find myself focusing on one particular topic when an overall view must also be kept in mind. I allow others to discredit me too quickly when solving problems. I have worked on overcoming these weaknesses over the course of the semester.

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

Ideally I would like to be a part of a company that I am passionate about working for. This company will need to provide me with the culture and comfortability that will allow me to work to the best of my abilities. I would like to have five solid years of work experience that will form a solid foundation for years to come. It is important for me to stay in the area and I hope that the company I work for will meet all of my requirements.

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

I would like to continue to broaden my understanding of the computer engineering field. I would like to try and strengthen my understanding of both computer science and electrical engineering. This will require me to review past work to keep old ideas fresh, either on my own or through auditing courses. I will need to keep up with the news feeds from standards organizations so that I am current with ideas and technologies that may make me more effective. I would like to learn to balance my family with my work so that neither are at odds. I will have to learn new techniques to keep my work separate from my home life.

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Objective: Software Development in an exceptional company with a diverse and positive culture

Skills

Highly Motivated,
Independent, Innovative,
Analytical, Team Player

Education

Electrical Engineering,
Computer Science, C
Language, C++ Language,
Assembly

Academic Software

Visual Studio, AutoCAD,
Microsoft Office, Linux,
Netbeans, Eclipse, Xilinx,
Cadence, SPICE, Git,
MATLAB

Education

Michigan State University: East Lansing, MI

Bachelors of Science - Computer Engineering 3.2GPA

December 2015

Lansing Community College: Lansing, MI

Associates Degree In Science - Computer Science 3.5GPA

May 2013

Work History

The Facility for Rare Isotope Beams / National Superconducting Cyclotron Laboratory:

Michigan State University Campus, East Lansing, MI

Student Info Tech Assistant

December 2014 - Current

Independent Projects for the Global Controls Group

Open Source software project in C++ for a custom circuit board

Scripting for an internal Continuous Integration Server

Migration of programs to a newer version of Linux

Comcast: Lansing, MI

Communications Technician Level 4

March 2006 - August

2011

Service and Installation of Residential, Commercial Products

Customer facing Sales and Support, use of technical tools and documents in fieldwork

Cintas: Lansing, MI Lead Loader

April 2005 - March 2006

Loading and unloading of products for sales, organization of products for efficient use

Achievements

Comcast – Bow-Tie Award Nominee (for superior customer service)

Comcast – Circle of Success Nominee (for superior customer service)