SENIOR DESIGN PROJECT REPORT

<Fall 20xx or Spring 20xx>

<Date>

TITLE

<The title must be fully descriptive, so that an outsider could readily understand what the project is about.

If you use acronyms, spell out their meaning >

|  |  |  |
| --- | --- | --- |
| Student name | Student Major | Grade  Received |
| Please complete | <CE> |  |
| Please complete | <EE> |  |
| Please complete | <ME> |  |

|  |  |
| --- | --- |
| Advisor’s name | Advisor’s affiliation |
| Please complete | SUNY New Paltz |
| Please complete | SUNY New Paltz |
| Please complete | <Company name> |

**ABSTRACT**

< It serves two main purposes:

1. It gives a quick, encapsulated look at what you have done and why you did it. It gives the reader a mind-set on what to expect in your report. Only those topics covered in the report should be mentioned in the abstract.
2. It lets the reader decide if your report gives information he or she is looking for. People searching for specific types of information often look no further than the abstract.

An abstract should be able to stand alone. The abstract is often used to introduce a prospective reader to the document without actually showing the entire document.

A good abstract answers the following questions

* What did we do?
* Why did we do it?
* What did we find out?
* Why does this information matter?>

Remember, as a standalone document an abstract should not be used as the sole source of an acronym, abbreviation or definition and should not cite sources that are listed in the main documents bibliography.

TABLE OF CONTENTS

|  |  |
| --- | --- |
| **Topic** | **Page** |
|  |  |
| 1. About this Project……………………………………………………………………… | 1 |
| 2. Functional description of the design…………………………………………………… |  |
| 3. Preliminary design and results.………………………………………………………… |  |
| 4. Final design and results………………………………………………………………… |  |
| 5. Recommendations for future work…………………………………………………….  6. Conclusions…………………………………………………………………………….  7. Bibliography…………………………………………………………………………… |  |
| 8. Different Disciplines used in this project…………………..…………………………… |  |
| 9. Design constraints that drove this project………………………………………………. |  |
| 10. Engineering standards used in this project…………………………………………….  11. New skills acquired during the project………………………………………………… |  |
| 12. Appendix ……………………………………………………………………………… |  |

1. **ABOUT THIS PROJECT**

< Introductory statement to tie the subsections together.

* 1. Motivation

Describe the motivation for undertaking this project. What you examined and why. Give some history of what led you to the topic. Talk about what work has been done by others in the past and how you built on that work

* 1. Design Objective

Define the design objective. The goal of your project is to resolve an unanswered question. Give an exact definition and description of that question. Talk about the sequence of events that led to the question and how it can be recognized.

* 1. Need for Project

Explain the need for your project. Based in the question you described, show that a strong need exists for the resolution provided by your project. Talk about the audience affected by the question and how your project improves things for them.

* 1. Project Scope

Define the scope of your project, that is, what you cover in this report. Do not give detailed information here- that is what the body of the report is for. Just give a brief statement of what the reader can expect to be told. >

1. **FUNCTIONAL DESCRIPTION OF DESIGN**

< Draw a functional block diagram of the project system/circuit or/and a flowchart of project computer program. In an introductory statement, describe the function performed by each block of the block diagram or/and explain the flowchart functionality. >

1. **PRELIMINARY DESIGNS AND RESULTS**

< Add as many Subsections as needed (3.1, 3.2, etc.) Be sure to include an introductory statement to tie the subtopics together. These subsections could include the following topics:

* Explain criteria used to select your project components.
* Describe preliminary design strategies.
* Explain experiments that you designed to test individual components of your design product.
* Explain the experiments that you designed to test your current product performance.
* Explain what failed and what was improved by subsequent designs. >

1. **FINAL DESIGN AND RESULTS**

< Add as many Subsections as needed (4.1, 4.2, etc.) Be sure to include an introductory statement to tie the subtopics together. These subsections could include the following topics:

* Explain reasons for final selection of your project components.
* Describe final design strategies.
* Explain experiments that you designed to test newly incorporated components of your final design product.
* Explain the experiments that you designed to test your final product performance.
* Explain how/why your final design shows improvement over preliminary designs.
* Explain how your final product meets the design objectives/scope defined in the Introduction.
* Provide conclusions summarizing the results of your work. >

1. **RECOMMENDATIONS FOR FUTURE WORK**

< Explain limitations of your final product and how they could be overcome. Suggest routes for expanding your project beyond the design scope explained at the Introduction. Make Section 5 appealing to a future group of senior design students who may consider expanding your work.>

1. **CONCLUSIONS**

< This is where you reiterate your main points and tell your reader what you expect him or her to conclude from your work. Readers often interpret what they read in different ways. Do not leave it to chance that your reader will understand those points. Be explicit!>

1. **BIBLIOGRAPHY**

< As SUNY New Paltz students you are required to use the IEEE method of citing as shown in the “IEEE Editorial Style Manual found at the following website:

http:/www.ieee.org/documents/ieeecitationref.pdf

In your report, citations should look like this:

“In early English history, various officials started wearing a badge as a symbol of authority and identification. [1]”

Your bibliography entry for this citation would look like this:

[1] John Brown and Arnold Jones, Authority Symbols in Early England, Surry, England: Britannia House Publishers, 1927, pp. 33-34.

**Some Examples of Methods of Citation**

You will gain most of the information used in your project in one of the following ways:

Books, Periodicals, Electronic and Word-of-mouth

Books:

[1] B. Klaus and P. Horn, *Robot Vision*. Cambridge, MA: MIT Press, 1986

[2] Westinghouse Electric Corporation (Staff of Aerospace Div.), Integrated Electronic Systems. Englewood Cliffs, NJ: Prentice Hall, 1970

Periodicals:

[3] R. U. Aslip, “Surface and leaky wave antennas,” IEEE Trans. Circuits and Syst.1, vol. 30, pp.545-546, Jan. 2000.

Electronic:

[4] L. Brigham, (1997, Feb.). The never-ending story. *WebMaster Mag*. [Online]. Available: <http://www.cio.com/cgbin.html>

Word-of-Mouth

[5] J. D. Brain, (Conversations on Oct.23, 1996). Professor of Electrical Engineering, SUNY New Paltz.

Note: All sources listed in the bibliography must be cited at least once in the text of the document.

1. **DIFFERENT DISCIPLINES USED IN THIS PROJECT**

The first column of Tables 8.1, 8.2 and 8.3 show that different disciplines used in this project. More specifically, the second column shows the course(s) within the disciplines whose learning outcomes were used in the project:

Table 8.1: Electrical Engineering (EE) Disciplines and Courses within discipline in the EE program

|  |  |  |
| --- | --- | --- |
| **Discipline** | **Course in the discipline** | **Check if used** |
| D1) Computers | EGC251 C/C++ Programming |  |
| EGE331 Computer Simulation (MATLAB) |  |
| EGC331/EGC332 Microprocessors + Lab |  |
| D2) Analog Electronics | EGE200/EGE201 Circuit Analysis + Lab |  |
| EGE320/EGE322 Electronics I + Lab |  |
| EGE321/EGE323 Electronics II + Lab |  |
| D3) Signals/ Systems | EGE311 Signals and Systems |  |
| EGE416 Control Systems |  |
| EGE417 Digital Control Systems |  |
| EGE412 Communication Systems Theory |  |
| EGE493 Applied Digital Signal Processing |  |
| D4) Electromagnetism | EGE340 Applied Electromagnetics |  |
| EGE445 Antenna Systems |  |
| EGE493 Intro to MEMS |  |
|  |  |
|  |  |
| D5) Energy Systems | EGE350/EGE351 Electric Energy Systems + Lab |  |
| EGE452 Electric Power Systems |  |
|  |  |
|  |  |

Table 8.2: Computer Engineering (CE) Disciplines and Courses within Discipline in the CE program

|  |  |  |
| --- | --- | --- |
| **Discipline**  **D1) Computers** | **Course in the discipline** | **Check if used** |
| D1.a) Software | EGC251 C/C++ Programming |  |
| CPS210 Computer Science I |  |
| CPS310 Computer Science II (Data Structures) |  |
| CPS353 Software Engineering |  |
| D1.b) Computer Systems | EGC331 Microprocessors +  EGC332 Microprocessors Lab |  |
| EGC433 Embedded Systems |  |
| EGC442 Computer Architecture |  |
| EGC451 Real-Time Systems |  |
|  |  |
|  |  |
| D1.c) Digital Systems | EGC220 Digital Logic Fundamentals +  EGC221 Digital Logic Lab |  |
| EGC320 Digital System Design |  |
| EGC441 System On Chip |  |
| EGC445 VLSI Design +  EGC446 VLSI Lab |  |
| EGC447 Functional Verification |  |
|  |  |
|  |  |

Table 8.3: Mechanical Engineering (ME) Discipline and Courses within Discipline in the ME program

|  |  |  |
| --- | --- | --- |
| **Discipline** | **Course in the discipline** | **Check if used** |
| D1) Computers | EGE331 Computer Simulations |  |
| EGM302 Finite Element Analysis |  |
| EGM393 Advanced Computer Aided Design |  |
|  |  |
|  |  |
| D6) Mechanics & Machines | EGM211 Statics |  |
| EGM212 Dynamics |  |
| EGM311 Kinematics of Machines |  |
| EGM312 System Dynamics |  |
| EGM393 Biomechanics |  |
|  |  |
|  |  |
| D7) Thermodynamics/  Fluid Dynamics | EGM331 Thermodynamics |  |
| EGM332 Fluid Mechanics +  EGM333 Fluid Mechanics Lab |  |
| EGM334 Heat Transfer |  |
| EGM335 Thermosystems Design |  |
|  |  |
|  |  |
| D8) Materials | EGM221 Engineering Materials |  |
| EGM322 Mechanics of Materials +  EGM323 Materials Lab |  |
| EGM393 Composite Materials |  |
| EGM393 Design of Machine Elements |  |
|  |  |
|  |  |

< Describe how the learning outcomes of the course(s) checked in the above tables were used in your project >

1. **DESIGN CONSTRAINTS THAT DROVE THIS PROJECT**

Table 9.1 shows the design constraints that drove this project (this can be used as an introductory statement):

Table 9.1: Design constraints that drove this project

|  |  |
| --- | --- |
| **Design Constraint** | **Check if applied to this project** |
| Economic |  |
| Manufacturability |  |
| Social and Political |  |
| Environmental |  |
| Ethical |  |
| Sustainability |  |
| Health and Safety |  |
| Other (explain) |  |

< Explain how the engineering constraints checked in the above table drove your project

What are engineering constraints?

Engineering constraints are bounds that drive your project.

These bounds can be a) imposed on you, or b) set up by yourself. Here are some examples:

* Economic constraint:

1. The total cost of your project should not surpass $200 because there is no more money available.
2. Since similar products cost $400, you set as a goal to develop a product of similar quality, but whose cost is only half.

* Health and Safety constraint:

1. We need to design a board whose 400 V domain is not accessible, so that it does not harm the user.
2. We want to design a product that will help people with a heart condition.

What is really important about engineering constraints?

* They have to be considered PRIOR to doing the project, so that they will shape/ define the outcome of the project. If they are considered after the fact, they do not actually drive your project.
* They need to be realistic. Do not keep adding constraints just because you think your project should have at least four (the majority of seven). It is better to have one constraint that actually drove your project, than four unrealistic constraints that did not actually affect the outcome of your project. >

1. **ENGINEERING STANDARDS USED IN THIS PROJECT**

Table 10.1 shows the engineering standards used in this project (this can be used as an introductory statement):

:

Table 10.1: Engineering standards used in this project

|  |  |
| --- | --- |
| **Engineering Standard** | **Where it was used** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

< List all engineering standards used in your project and explain where you used them. These may be standards from any number of organizations, such as but not limited to:

IEEE (Institute of Electrical and Electronics Engineers)

SES (Standards Engineering Society)

SAE (School of Audio Engineering)

TIA (Telecommunications Industry Association)

ISO (International Standards Organization)

ASME (American Society of Mechanical Engineering)

ANSI (American National Standards Institute)

The link to a great website to find engineering standards is provided below:

<http://www.engineeringtoolbox.com/pipes-codes-standards-t_17.html>

NOTE: Citing a general set of standards, such as IEEE, is not enough. Additional work is needed, for example, going into the IEEE section of the website and finding the specific IEEE standards that were used in your project.

1. **New Skills Acquired During the Project**

< List new knowledge acquired during the project and the learning strategy used to acquire it, i.e. how did you find the information and how did you learn it.>

1. **APPENDIX**

< Here is where you place specific information that might be very useful for a reader trying to duplicate/expand your work but not for a reader that is just trying to understand what you have done. Examples of such specific information are:

* Data sheets of components used in your project
* Computer code generated in your project

>