**Project Deliverable: Final Design Report**

Each team must submit a final design report for the design project. **The report is due on the date and time specified on Canvas (DO NOT TURN IT IN LATE).**  This is a TEAM deliverable, and each team (one person per team) should submit an electronic copy in pdf or doc(x) format of the document to Canvas. The report is a **technical document** and should be **typed** in paragraph form, with appropriately formatted section headings (use bold and/or underline, and/or larger font size). You could use the report template posted on Canvas or follow your own format. You should use consistent font, style and spacing throughout the report, as well as correct grammar and spelling. Since this is a formal technical document, it should follow all technical writing guidelines discussed in class including **no use of first person** (I, we, etc.), appropriate labels for figures and graphs, correct formatting for tables and equations, and appropriately formatted citations for all references used. Any figures, tables, equations, or data included in the report should be described in the text of the report. Most of the report should be written in **past tense**, since you have completed the project.

The report should include each of the sections listed below. The expected content for each section is also described below.

**Cover Page**

* Course title
* Lab day/time
* Title of the report
* Team number/name and team member names who participated
* Date the report was submitted

**Contributions**

* Description of individual contributions including tasks performed by each team member and how much percentage each individual contributes to the project

**Executive Summary**

* Brief summary of design problem, solution, results, conclusions and recommendations

**Introduction**

* Description of the design problem
  + Share the story of your character experiencing the pain point (need)
  + Define your point-of-view and your project objective
  + Include a list of design requirements
* Brief description of the structure/content of this document (i.e. what will be discussed in the document, and in what order (structure))

**Background**

* Description of the current solutions and state of technology for solving the problem. This could also include other research that you did that helped you make your design decisions. Cite sources appropriately.
* Description of your potential customers (age, gender, income, etc.). How big is your market (how many people out there might buy your solution)? What is the potential for market growth?

**Design and Implementation**

* Describe your final design in **detail** (in text)
  + Describe all important aspects of your final design (form and function)
  + Describe your solution’s important/unique design features. How is your design different from the others in the market?
  + Describe how your design adds value in an economic, environmental, or societal sense such as reducing costs, increasing speed, expanding reach, eliminating inefficiency, increasing effectiveness, or whatever value you can think of. Use quantitative data to support your claims when appropriate. **Describe how your design is related to the “theme”.**
  + Describe the design trade-offs that you made during the design process
  + Include any evidence/rationale for design decisions (why did you make the trade-offs that you did?) If applicable, calculations relating design factors to system performance can be included as a part of Appendix 2. Be sure to direct reader to appendix in text.
  + Describe how customer feedback has influenced your design.
  + Include detailed engineering drawing attached in an Appendix (should include 3 views (top, front, side) with dimensions, units, etc.) of your final design. Make sure to refer to (mention) drawing in this section of your report and tell reader where to find it (i.e. see Appendix A for Engineering Drawing of final design). If you used a CAD software, you can generate the 3-view drawing from the 3D model directly.
* Include picture(s) (photos) of your final prototype.
* Include all materials used and final cost (should be included as tables, separate materials from prototyping and final design, see table below for examples), also **include final total cost for the project (sum of Table1 and 2)**, which is sum of all money spent.

Table 1: Final Design Materials and Cost

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item Description | Vendor | Unit Price | Quantity | Cost |
| Mabushi RF-370 CA-15370 12V DC Motor | Sparkyville | $1.95 | 1 | $1.95 |
| 0.5W, 6V Solar Panel | Radioshack  http://www.radioshack.com/product/index.jsp?productId=12609999 | $9.99 | 2 | $19.98 |

Total: $21.93

Table 2: Prototyping and Testing Materials and Cost (Not Used in Final Design)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item Description | Vendor | Unit Price | Quantity | Cost |
| 50-tooth Gear | Sparkyville | $0.70 | 1 | $0.70 |
| 650uF Capacitor | Radioshack  http://www.radioshack.com/product/index.jsp?productId=12464109 | $1.86 | 1 | $1.86 |

Total: $2.56

**Results and Discussion**

* Describe the testing procedures you used (when preparing for the final demonstration) to ensure your design’s success. Include the testing results from these tests.
* Describe the final demo outcome, i.e., if your design performed as expected **from final in-lab demonstration.**
* Describe whether or not you solved the design problem.

**Conclusions and Recommendations**

* Summarize the work done in the project and final outcomes
* Described what you learned while completing this project
* Describe what you would do differently if you had more time or could do it over again, i.e. potential design improvements, testing, etc.
* Based on your prototype, what recommendations would you give to someone trying to commercialize your design, i.e., mass produce your product? What different materials would be used? What other changes would need to be made?

**References**

* Include all references used (also should be cited in the text of the report)
* Peer reviewed sources such as books and journal articles are preferred
* Use an appropriate citation format (i.e. Chicago Manual of Style, IEEE, etc. – see <http://libguides.asu.edu/> for helpful information under ‘engineering-basic’ or your specific discipline)

Below are three examples, pay attention to cite web resources appropriately:

ASME: <http://libraryguides.missouri.edu/mae/asmecitation>

IEEE: <http://www.ijssst.info/info/IEEE-Citation-StyleGuide.pdf>

AIChe: <https://www.elsevier.com/journals/chemical-engineering-journal/1385-8947/guide-for-authors#68000>

**Appendices**

* Appendix A: **Detailed** Engineering Drawing (should include 3 views (top, front, side) with dimensions, units, etc.)
* Appendix B: Detailed Calculations and all Software Code (if relevant)

Note: Each Appendix should have a clear label and title at the top of the page (i.e. ‘Appendix A: Detailed Engineering Drawing of Final Design’)

|  |  |  |
| --- | --- | --- |
| **Topic** | **Max Pts** | **Score** |
| Professional quality document (cohesiveness, flow, correct & consistent formatting, typed, labels for figures and tables, mostly third person, passive voice, etc.)  **NO** spelling or grammatical errors | 5 |  |
| **Cover Page** (Title, Lab Day/Time, Team #/Name, Team Member Names, Report Submission Date) | Required |  |
| **Description of Individual Contribution** (including tasks performed by each team member and how much percentage each individual contributes to the project) | Required |  |
| **Executive Summary** (design problem, solution, results, conclusions and recommendations) | 5 |  |
| **Introduction** (introduction to project, problem statement including need, objective and requirements, structure/content of document) | 5 |  |
| **Background** |  |  |
| * Description of current solutions, state of technology and your potential customers | 5 |  |
| **Design and Implementation** |  |  |
| * Detailed description of all aspects of your design (form & function) | 5 |  |
| * Description of your solution’s important/unique design features. How is your design different from the others in the market? | 5 |  |
| * Description of how your design adds value | 5 |  |
| * Description of design trade-offs made and evidence/rationale supporting your design decisions | 5 |  |
| * Description of how customer feedback has influenced your design | 5 |  |
| * Pictures of final design | 5 |  |
| * Materials and cost tables, total cost | 5 |  |
| **Results and Discussion** |  |  |
| * Description of testing procedures and results | 5 |  |
| * Description of final demo outcome and whether or not you solved the design problem | 5 |  |
| **Conclusions and Recommendations** |  |  |
| * Summary, lessons learned (what would you do differently next time), and recommendations for commercialization | 5 |  |
| **References** (cited in text, appropriate formatting, appropriate sources, etc.) | 5 |  |
| **Appendices** | 5 |  |
| * Appendix A: Detailed engineering drawing |  |  |
| * Appendix B: Detailed calculations and all software code (if relevant) |  |  |
| **Total** | 80 |  |

**Final Report Grading Rubric**