MET 352 Engineering Design
Department of Materials and Metallurgical Engineering
South Dakota School of Mines and Technology

Assignment 6: Design Proposal – Initial Draft

Submit digitally before 11:00 pm Tuesday 3-19-19

Submit the first draft of a Design Proposal containing the elements of the design process presented in class and required in the assignments in addition to any other information needed to describe the project. The topics in the final design report Requirements that have not yet been presented by the due date may be left blank but create the heading for all such items.

Final Design Report Requirements

Report Format

- 12 pt font, Times New Roman, single spaced. Figures and Tables may have smaller font but students should ensure that information provided is legible.
- All figures and tables should include descriptive captions (captions should be "self-contained" providing necessary details to interpret image/table without reading text first) and should be included within the body of the report. Avoid white space before and after figures/tables.
- Page limit = 15 pages, excluding appendices. Page margins = 1inch
- Page numbers should be provided at the bottom of all pages.
- Main sections (sections i – 10) should begin at the top of a new page.
- Subsection – students should use subsections when appropriate to organize their report.

Report Contents

i. Title Page
    - On a separate page, including the title of your project, date, name of team members, and an image relevant to the project.

ii. Executive Summary
    - Concise summary of design project
    - Presents motivation for design, main objectives, and how objectives were accomplished
    - Presents important conclusions and relevant implications.
    - The author should assume that the reader has some knowledge of the subject, but has not read the report. For that reason, the summary should provide enough background that it stands on its own.

iii. Table of Contents
    - Includes page numbers of main headings. Format is consistent and professional.

1. Introduction
    - Presents the motivation of the design project, a definition of the problem being solved, and the overall objective for the design project.
    - Outlines customer/stakeholders
2. Background
    - This section provides a thorough review of literature relevant to your design project. Students should strive to avoid "generic" information that is only tangentially relevant to the project. Rather, students should include information that is necessary for a general audience to understand the contents of the design project/design report.
3. Design (or Design Methodology)
    - Problem statement (this should be a separate subsection): A concise section which provides the design problem statement (i.e. objective or problem statement). [this may be somewhat redundant with information provided in introduction]
    - Includes a description of the design methodology comprising (1) customers/stakeholders, design requirements, design constraints, design approach, major design tasks, and the design schedule (includes a discussion of current progress against schedule).
    - The Metallurgical/Materials theories and scientific basis for design should also be integrated into this section. It will likely be included in the design approach or design tasks sections. It is also acceptable to include this information in the background or results sections when appropriate.
    - This section should also include subsection entitled "Safety". The subsection should comment on any safety risks associated with the proposed design and highlight the mitigation plans and associated activities which have been implemented to address these risks.
4. Results, Discussion, and Recommendations
    - This section presents the results-to-date from the design tasks outlined above. A well-organized report will often have section headings which directly correspond to those in Section 4.
    - This section should include (1) relevant products (e.g. selected materials or processes) from your design process, inclusive of trade studies/ design matrices, pilot studies, preliminary testing, theoretical calculations or simulations; (2) Testing/characterization results; (3) correlation between measured results and design objectives/requirements; and (4) description of problems encountered and how problems were overcome.
    - This section should also include a discussion of how well the design met the objectives/requirements while also commenting on how the design can be modified to address these issues.

5. Global, economic, environmental, and societal contexts
    - Discussion of the impact of the design in a global (across cultures and societies), economic, environmental, and societal (issues associated with specific groups of people and their beliefs, practices and needs) context.
6. Future Work
    - This section is not needed on final reports but can be provided if deemed necessary.
    - Provides a discussion of the project schedule, including an explanation of areas where schedule needs revised and also outlines work to be completed in the spring semester.
7. Conclusion
    - Brief synapse of design project should be included.
    - Salient conclusions of design project should be provided.
    - Need to comment on how well the design met the objectives.
8. References
    - References should be cited in the document where appropriate
    - List of references should be included here.
    - Citation format should be consistent & following a published format (journal or other)
    - See http://www.writing.engr.psu.edu/workbooks/format.html#references for reference format.
9. Acknowledgements
    - Acknowledge any sponsors and other important contributions not otherwise covered.
10. Appendices

    Appendices often are included in a design report. One type of appendix presents information too detailed to be in the report's text. Another type of appendix presents tangential information that does not directly concern the design's objectives but is important such as environmental regulations, a Material Safety Data Sheets (MSDSs), etc.