

Design Report

Due: 2022-12-06 at 2200 **Weight:** 20% **Submitter:** Team

Assignment Overview

The Design Report represents your design work in its entirety to a reader unfamiliar with your opportunity framing and design work. So, the Design Report documents both the design concept you are recommending, and the key parts of the process to arrive at that concept. The Design Report answers the question of whether the current design is a verifiable and verified solution to the opportunity presented in the Design Brief. More specifically, the Report aims to answer three key questions:

1. What your recommended design concept, and why is it best current design concept? The word “best” implies comparison, so you should be able to justify the current concept relative to other concepts (and reference designs).
2. What key decisions have determined the design? As you make specific decisions, you need to be sure you understand why you made those decisions and establish the research, testing, or conceptual logic to justify your work.
3. Has the current design concept met sufficient testing to be justifiable as a solution? This question requires you to be able to document your requirements, how they were met, and the kinds of testing you have done.

To accomplish this teams should document their opportunity as re-framed, key alternatives from their diverging process, the evaluation of the alternatives using appropriate research and testing, and the recommended design they converged on.

The Design Report does not assume the existence of an associated Design Brief and should include equivalent content.

Assignment Stakeholders

- Your team, who must report on not only your recommended design concept, but also justify it using the process by which that concept was developed and tested.
- You, individually, as an aspiring engineering designer who must develop both individual and team engineering design skills.
- Your assessor, **who is unfamiliar with your design work to date**, including the Design Brief, and Alpha, and who is responsible both for assessing and evaluating the engineering design work that your team has completed.
- The stakeholders from your Design Brief, who by definition have an interest in both the recommended design concept and the process of its development.
- Stakeholders **who may iterate on or implement your recommendation** (e.g. other engineering designers, technicians, contractors, etc.) who want to understand your recommended design concept, its key features, how it was verified, and the results of that verification.

Requirements

Requirements language in this and following sections are to be interpreted as described in RFC 2119.

Objectives

1. Represent and communicate a design opportunity using an engineering framing, including requirements, such that the credibility of candidate design concepts can be assessed.
2. Represent and communicate design concepts and their key features.
3. Demonstrate the verification of design concepts by key requirements, using appropriate engineering prototypes.
4. Demonstrate the use of formal engineering tools to support design work.
5. Demonstrate effective teamwork through a document that reflects a coherent vision of the team's work and a unified voice.¹
6. Communicate clearly using integrated, structured visual and written representations.

Submission Constraints

The Design Report:

1. **Must** be submitted as one single PDF file per team through Quercus.
2. **Must** use a recognized reference format (IEEE, APA, CBE, Chicago, but not MLA).
3. **Should** be typeset in 11pt serif font with 1.25 line spacing and 1.0 inch margins on standard letter sized paper.
4. **Must** not exceed 2500 words, excluding captions, headings, references, and appendices; and **must** include a word count at the top of the first page.
5. **Must** include relevant extracts from any used references in an Appendix titled "Source Extracts."
6. **Must** include the original Design Brief that provided the initial framing for the opportunity in an Appendix (Note: there is no need to revise this document. The entire point is simply to see the starting point for the design work).

Content Constraints

The Design Report:

1. **Must** be a standalone document, including appendices, that includes all of the information necessary for assessment and evaluation without the reader needing to locate other documents.
2. **Must** include a complete set of requirements in the body of the report.
3. **Must** recommend one (1) credible design concept that addresses an opportunity framed from a Design Brief.
4. **Must** document comparisons of the performance of the recommended design concept against at least three (≥ 3) other credible candidate design concepts (which may include reference designs).
5. **Must** integrate a Pugh Chart (or similar representation that includes all of the content present in a Pugh Chart).
6. **Must** justify three (3) key design decisions in the recommended design, using a combination of verification (testing), prototypes, research, and or calculation.
7. **Must** document using at least one (≥ 1) prototype in verification activities.

¹ As with all Praxis team assignments, the teaching team assumes that team members share work equitably. In situations where this is not the case, students or instructors should refer to Section 7 of the Syllabus.

Characteristics of Evaluation

These characteristics describe the attributes that will be evaluated. For the full metrics consult the Design Report Independent Assessment Tool. That Tool places these characteristics alongside descriptions of levels of achievement that you can use to independently assess your work. For all characteristics, the criteria are “more”, “higher”, or “greater”.

Note: These characteristics may not be weighted equally.

1. Quality and credibility of engineering argument, with emphasis on justifying claims through credible use of engineering-appropriate sources (including, but not limited to, research or testing)
2. Quality of the engineering requirements developed in response to the Design Brief.
3. Quality of the application of engineering tools (e.g. for: exploring (diverging); assessing (converging); representing (e.g. prototyping); and, verifying).
4. Quality of the recommended concept, as demonstrated through verification against the requirements.
5. Quality of the verification process of the recommended design concept – as represented by appropriate prototypes that were used in testing.
6. Quality of the document as a Design Report.
7. The coherence and clarity of your written and visual communication
8. Coherence of the vision the team’s work represented in the writing style of the document.

Revisions from Rev.1.1

Added Content Constraint 2 — this constraint was implied in Constraint 1, but for clarity this constraint has been expressed independently

Added Characteristic 7 — this characteristic is consistent with the Design Brief assignment.

Added here to reinforce the continued development of written and visual elements together