

Design Proposal: Outline

This outline should be used as a checklist to help each member of the team make sure that every section of the document meets the requirements for a design proposal.

Writing Style

The final proposal should follow the basic guidelines for proposal writing:

- Write for your readers; convey all information with your readers' interests, concerns, and perspectives in mind.
- Use active rather than passive voice.
- Bullet-point and use boldfaced text to break up long paragraphs.
- Avoid “telling the story” of your research—this may be a story of great interest to you, but it’s rarely valuable to your readers.

The proposal should also seek to persuade its readers of the design’s merits. To do so, your proposal should:

- Translate design features into benefits.
- Back up benefits with evidence (research, testing, & users), authority (client & experts), and/or reasoning.
- Anticipate and answer questions and objections.

Visual Style

Your final proposal should use sketches, photos, graphs, charts, etc. to illustrate its claims. All of these illustrations should be of high quality and reflect the professional nature of the document. Remember to:

- Number and title your figures, tables, etc.
- Provide a key for your graphs and charts.
- Cite sources for your data and illustrations. If a member of your team took photos, he or she should be given a photo credit.
- Provide dimensions for your graphics.
- Refer to all figures in the text of your proposal.

General Formatting Rules

Use single spacing, business-style paragraphing conventions, standard 1.25 inch margins, 12-point font for text in the body of the proposal, and a conventional font (Times New Roman is a good typeface). Headings and sub-headings should stand out visually and dense text areas should be broken up with tables and figures, if possible. Pagination rules are as follows:

- Page numbers are centered in the footer.
- Title page, table of contents, list of figures, and list of tables.
 - Use lowercase Roman numerals, *i*, *ii*, *iii*, *iv*, etc. for page numbers.
 - No page number on the title page.
- Rest of the proposal starting with executive summary.
 - Use Arabic numbers, 1, 2, 3, etc. for page numbers.
 - This sequence of page numbers should be continued for appendices.

Full Breakdown of Proposal Components

- Title page
- Table of Contents / Lists of Figures and Tables
- Executive summary
- Introduction
- Requirements
- Research methods
- Project Scheduling (RAM Chart and Gantt Chart)
- Design (with subheadings)
- Recommended next steps
- Conclusion
- References
- Appendices

NOTE: Important figures should go in the main body of the proposal. Non-essential details can be placed in appendices.

Title Page

The title page should begin with a full title, i.e. final design proposal with project name. Following that should be “Submitted by”—then list:

- Full names of individual team members
- Team Name
- Departments
- City and state
- Date of submission

Following that should be “Prepared for”—then list:

- Professor _____
- Mechanical Engineering Department
- School of Mechanical Engineering
- Istanbul Technical University
- Gümüşsuyu, 34437 İstanbul

Optionally, the title page can include a colored picture, drawing or sketch of the design prototype.

Table of Contents

- Include each heading and subheading with page number.
- List the letter, title, and page number of each appendix.
- List the Arabic number, title, and page number of each figure under “List of Figures.”
- List the Arabic number, title, and page number of each table under “List of Tables.”
- Use leaders (series of periods) and put the page number at right margin, right justified.

Executive Summary

The executive summary should be no longer than one page and should concentrate on the design's **key** features and benefits. It stands alone and does not refer to the main body of the proposal or to any appendices.

A rough outline for the executive summary looks something like this:

- Context of the project along with your client name, team name/number, as well as the scope and duration of the engagement.
- Brief summary of your research (2-3 sentences)
- Description of how your design meets the project goals, with some discussion of the scope and limitations of the design
- Brief account of your team's conclusions and recommendations for implementation and/or recommendations for future research, testing and development.

Remember to use sub-headings and bullet-points to designate different kinds of information, break up long paragraphs, and keep the summary as concise as possible.

Introduction

The introduction to the body of the proposal will recapitulate information that appears in the first part of the executive summary, but it should NOT mention your solution. A rough outline for the introduction looks something like this:

A good introduction does the following four things:

- Orients your reader to the larger context of the design problem: How is your client affected? To what extent?
- Focuses on the specific issue that your team tackled. Says what portion of the larger issue your team is addressing and how it fits into the big picture.
- Justifies your specific focus, saying how it makes sense in the larger context of issues faced by your client. What is at stake in finding a solution?
- Provides a road map to the rest of the report, giving the reader a preview of what's to come.

Major Users and Requirements

This section need not be exhaustive, but should focus on the major issues your team kept in mind as you researched and developed your solution to the design problem. Thus it should outline for the reader how your team translated user needs and the shortcomings of current solutions (if any exist) into the requirements that framed your work.

- Explains who users are and how their needs are not being met. This may include a discussion of the current design (if one exists) and its shortcomings and/or possible improvements to be made to that design.
- Discusses the major requirements. (Refer your reader to Appendix A: Project Definition for more detailed requirements.)

Research Methodology

Your summary of research methodology should list only that research that had a significant impact on your final design. The section itself should be kept short and refer readers to appropriate appendices for more detailed information.

- Clients
- Internet research
- Retailers and manufacturers
- Competitive and model products
- Building/testing of mockups
- User interviews, testing, and observations
- Performance testing
- Expert interviews
- Brainstorming

The Design and Its Benefits (do NOT use this generic heading!)

When you write this section, you may find it helpful to **revisit the design problem as your client originally presented it**. Has your design met all the requirements outlined in the previous section?

This section should also include a number of figures to illustrate your proposal's claims. Figures (photos, drawings, etc.) should be embedded in the text in a logical fashion and should use arrows and labeling to point to details or illustrate the design's use. A rough outline for the design concept looks something like this:

- Overview of the design (major features, how it works, how it meets key requirements and user needs). Keep it short—save the detail for later.
- Design subsystem and features
- Explanation of how design features meet project requirements and user needs. This may include a user scenario.
- Description of the benefits of the design.
- Discussion of significant design shortcomings or safety warnings, if necessary.

Conclusion and Next Steps

This section should begin with a brief summary of how your design addressed the problem effectively in ways that are especially tailored to the client(s) AND the stakeholders' (present and future) major concerns. In short, say where you succeeded.

But clearly most serious design problems take more than ten weeks to solve. Your prototype may need additional testing. You may have met some of the design requirements but not others. Or your client may want to think about how he or she could produce the design on a large scale. Whatever the case may be, this section tells your client how he or she should proceed.

You should also consider the nature of your client in framing your recommendations. Consider the resources that your client has at his or her disposal. This will help you tailor your recommendations and put them in a frame of reference that is specific to your client.

Doing a thorough job on this section has the added benefit of being excellent preparation for the Q & A session following your team's presentation. Typical recommendations for next steps might reference the following:

- Further user and /or performance testing
- Further prototype development
- Consideration of new features, materials, etc.
- Alternative designs (details would be included in appendices)
- Implementation plans (details could be included in appendices)
- Procedure for construction of additional prototypes
- Development of instructions for operation
- Additional research on the cost of product, with regard to small scale and/or large scale production
- Maintenance issues
- Safety and fault analysis considerations

References

The list of references should be placed at end of the main body—it is NOT an appendix. References may include the following:

- Client contacts: meetings, phone calls, e-mail, etc.
- User interactions: observations, interviews, testing mockups, etc.
- Sources of competitive and model products information, such as retail stores and manufacturers
- Expert contacts: meetings, phone calls, e-mails, e.g. with Steve Jacobson
- Other teams' ideas or input used in your design
- Sources of information on materials used in prototype
- Books, journals, newspapers, etc. read and Internet sites visited. (If possible, it's a good idea to annotate your reference with an assessment of the worth of the source and information conveyed.)
- Brainstorming meeting(s)

Appendices

Appendices should be listed as A, B, C, etc., start on separate pages and have descriptive titles and a brief introductory paragraph describing the kind of information the appendix contains, how it was derived, etc. The project definition should ALWAYS be Appendix A. Each appendix should contain only one kind of information and have a brief introduction, explaining the contents and its source. Each appendix should be directly referenced and briefly discussed in the main body of the proposal.