

GPGN438 Geophysics Project (Senior) Design
Guidelines for Reports
November 25, 2013

The format and content of major reports in GPGN438 Geophysics Project Design will vary somewhat depending on (a) whether it is the mid-project report or the final project report; and (b) whether the project has more of an engineering focus or science focus. However, either report follows the same basic format, as described below. The difference is this: if this is the report mid-way through the project, it contains a full proposal, a description of what has been done to date, and the plan for what is going to be done in future; if it is the final project report, it describes what was originally planned and gives a full accounting of what was ultimately accomplished.

1. Title page

This page should include the title, the date, the names of the team members, the name of the supervising professor(s), and the name(s) and affiliations of the clients (if any).

2. Table of contents

3. List of figures

4. List of tables

5. Executive summary (or Abstract)

This section of the report/proposal is generally written last. It is a succinct, very high-level summary of the "who, what when, where, how, and why" described in the body of the document. From this section alone one should be able to get the gist of the entire project.

6. Problem statement (or Research Question)

What is a clear, concise statement of the engineering problem or research question on which this design project focuses?

7. Introduction & background

Why has this engineering problem or research question been selected by the team? Why is it important? What has been done already by others on this topic? Who is the client and/or who will benefit from the solution? What is the anticipated impact of solving this problem? What does a "home run" look like; i.e., what would be the ultimate success one could imagine from this work (a Nobel prize, a publication, a conference presentation, ...)?

8. Deliverables

This is a specific list of the tangible deliverables envisaged as an outcome of doing the project. This list would be agreed in advance with a client (if there is one) or, with a supervising professor if there is no client. There should be a brief description of each deliverable, as appropriate.

9. Design objectives

The heart of this course is design. One is either designing an approach to solving an engineering problem or designing a strategy for researching and solving a scientific question. At this stage, there are generally several approaches or strategies that could be adopted. Until the pro's and con's of each are analyzed, it is not clear which alternative should be taken.

10. **Decision-making & assessment of alternative approaches**

This section contains an analysis and discussion of the various approaches or strategies listed in the previous section and the decision criteria for choosing among them. It is likely that things will be discovered in the process of doing the project that will determine the choice between one or another solution approach; i.e., decisions will be made as the project progresses. This section anticipates these decision points and what issues/criteria are likely to be the basis for the choices made.

11. **Design solution (or research methodology)**

Tools that may be important in solving the engineering problem or research question are (a) **theoretical analysis**, and (b) **modeling / simulation** – either physical or computational, or both. In the case of an engineering design problem, the outcome of analysis and/or modeling should be **design specifications**. In a scientific research question, the outcome may be the selection of what appears to be a promising research strategy.

12. **Implementation plan**

The next step after selecting a design solution and design specifications is making a plan to implement the solution. For example, this may a plan for acquiring, processing, and interpreting the data to solve an engineering problem or research question. The implementation plan will normally include elements such as the following:

- Safety – what are safety concerns and how will they be mitigated?
- Timeline – a detailed chart of what is to be done when, with an indication of anticipated decision points.
- Division of responsibility & effort – how will the various implementation activities be divided among team members? Who is going to do what?
- Two budgets – the actual budget of resources and finances needed to accomplish the project as a student; and the budget one would make if he/she were a contractor doing the work for a client.

13. **Implementation(or Research)**

This is the execution phase of the project. At the proposal stage, this is a description of the work that is going to be done. At the mid-project review, some of these things may have been accomplished already, so they will be reported as progress to date. At the end of the project, this will be the discussion of what was actually accomplished, versus the original plan.

- **Data acquisition**
- **Data reduction, analysis, interpretation, integration**
- **Error analysis**
- **Results**
- **Discussion and conclusions, including an assessment of reliability**

14. **Recommendations for future work**

If you were to continue this project, or if you had opportunity to do it over again, what more would you do or what would you do differently? If others follow in your footsteps and continue this work, what recommendations do you have for them?

15. **References**

A bibliography of references you have actually used in researching and executing the project.

16. **Resumés**

The CV or resumé of each team member.

17. **Appendices** (if appropriate)

For completeness of the work you will want to include such things as computer code you have written, copies of data, etc., as appendices, rather than including them in the body of the report.