Note: This Final Report Template used in ECE 4012 is modeled on commercial business proposals and contains elements of R&D proposals. Real-world examples of engineering proposals typically are not available because of the proprietary nature of the information disclosed therein.

Remember that your ECE4012 final total documentation as posted to your group's web site should provide sufficient stand-alone content to reproduce or continue your project. A Final Report typically is written in the past tense as you should be reporting truthfully what already and really has happened.

Descriptive Title of Project

ECE4012 Senior Design Project

Section L03, Antigravity Team
Project Advisor, Dr. Who

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Submitted

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Executive Summary

This section should explain the basic idea of your project (what you designed), why it was done, how much it will cost, and the outcome. It should be written at a high enough level so that it can be understood by non-technical people (i.e., management). This section should be 250-300 words in length, double-spaced.

Table of Contents

Descriptive Title of Project

The primary purpose of the project Final Report is to provide documentation to continue or reproduce the project. Additional purposes include allowing technical, financial, and scheduling evaluation of your earlier proposed project to assess its feasibility and the strengths of the technical approach in the context of what really happened. ***Note that the entire report should be double spaced.***

1. Introduction

The Introduction should be 2-3 sentences explicitly stating that team X is requesting Y amount of funding to develop Z.

1.1 Objective

Define the overall objective of your project. Put it in the context of the "big picture" if, for example, your project is a subsystem of a larger system or product, or if you concentrate on a particular aspect of your project.

1.2 Motivation

Why did you perform this project? Is it new? Who would use the product? How does it improve upon an existing product? Does it offer a more cost effective alternative than an existing product or solution? **Be sure to cite references for all relevant information.**

1.3 Background

What have others done in the area of your project? What are existing products? Is there research available on which your project is based? Are there key building blocks? **Cite references.**

2. Project Description and Goals

Give a clear description of what specifically was designed and prototyped by your group. This section should contain enough detail so that the next sections make sense, but should not include detailed technical information.

State the goals (needs) for this project in non-technical terms. The goals are such things as what the final product should or does do, the target price for the product, and the targeted user. There may be some overlap with information presented in previous sections, but the focus of this section should be a **bullet list** of product features with accompanying discussion. You may find it appropriate to extend your bullet list beyond what actually was accomplished to include what additional work might be desired, but be sure to identify clearly to your reader which features have and have not been achieved.

3. Technical Specifications & Verification

This section should cover the desired and final technical specifications of the project or product. Include qualitative and quantitative operational specifications, i.e., performance, interface, physical, etc. Explicitly show the originally proposed product specifications and the measured final product specifications in **tabular form**.

- Do not include specifications which were not required for your design.
- Do not include paragraphs of information or explanation.
- Include engineering units with each parameter.

An example table of specifications might include:

Description	Updated Value	Measured Value
Weight	< 10 kg	9.5 kg
Current from 120 VAC outlet	< 5 A	10.2 A at full load
Speed	> 5 cm/sec	4.6 cm/sec

4. Design Approach and Details

4.1 Design Approach

This section should outline the details of the design approach that you actually implemented. State any known aspects of the design (for example, if a key component or development platform has already been selected). If you have already prototyped some pieces of your project to evaluate feasibility, describe what you have done. Include any parts of existing products or software or previous projects that will be used. If there is a GUI, show what the resulting screens look like and what information is displayed. Identify what really were the technical "critical path" items and explain how the design process proceeded to address these key technical issues early in the process. Use block diagrams, schematics, etc. as appropriate to your report audience.

If your approach has not worked to your complete satisfaction and/or deviated from your projected specifications, provide relevant discussions in this section. **Clearly indicate design aspects that you did not resolve.** Also include recommendations for proceeding ahead with your project, possibly by

future design team, but note that the upcoming Conclusions section of this report offers opportunities to elaborate on lessons learned and what you might do differently if you were to repeat this project.

4.2 Codes and Standards

What are the most significant codes and standards that apply to your project? How did they affect your design decisions? **Cite references.**

4.3 Constraints, Alternatives, and Tradeoffs

Discuss other design alternatives you have considered and why you did not select them. What are the technical tradeoffs? In particular, include the constraints that affected your project. Include factors such as economic, environmental, sustainability, manufacturability, ethical, health and safety, social, and political where possible.

5. Schedule, Tasks, and Milestones

Provide an overall project time line in the form of a **Gantt chart** with clearly shown tasks, milestones, and critical paths. This Gantt chart should show the actual tasks and the actual time line of your project. **Note that most of the information in this section should be organized in the form of a Gantt chart and should not include lengthy narratives except to address the following:**

- For each team member, list their relative contribution to the overall project?
- For each task, what was the degree of difficulty and/or technical risk your team experienced?
- How these tasks were divided up between team members, i.e., who was assigned to each task?

6. Final Project Demonstration

How did you demonstrate and validate the project specifications (acceptance testing)? Provide a bullet list of items which were demonstrated during your final project demonstration.

Include a discussion of your updated specification parameters to those originally proposed for your project, i.e., elaborate on the Specifications section of this report.

Where possible, break your project into functional modules. For each module, explain how you performed prototype testing during the design process?

Provide a list with appropriate links to external documentation that you used during the final project demonstration, such as pictures, videos, measurements, captured data files, etc.

7. Marketing and Cost Analysis

7.1 Marketing Analysis

This section of the report contains information about the selling of your product idea to others.
A description of any existing similar products and a comparison to the proposed new product should be included. **Cite references**. How is your product different from the competition?

7.2 Cost Analysis

Present a cost analysis of estimated prototype engineering and construction. Assume that you are being paid a typical engineer's starting salary. Clearly show actual hours worked on the project for each person on your team (except for class lectures, include all time spent on the course, i.e., meetings,

report preparation, etc.). In terms of parts, be reasonably accurate on the "big ticket" (i.e., expensive) items, and provide estimates for small parts. Do not forget power supplies, cables, and packaging.

Determine a suggested selling price for your design prototype. Assume you sell a certain number of units over a five year time period and that the total development costs are amortized over all of these units. Include estimated materials and labor to fabricate, assemble, and test each unit. Factor in fringe benefits, overhead, and sales expense. Indicate expected profit (and percent profit) for each unit sold. Give reasonable estimates for parts pricing, not detailed parts costs. You can make appropriate assumptions and educated guesses, but you should know more for this report than you may have for your Proposal. Briefly explain how you determined the estimates, and cite references for actual prices you are using. Provide references to similar products in the marketplace and give their actual selling prices.

8. Conclusion

This is where you describe what really happened. Include narratives of your current status, what you would do differently, and lessons learned. Along with your final measurements of Specifications, this section is often the most useful part of a Final Report. Include what an independent team might need to know to extend your work to the next level. Also add a discussion of sustainability and contemporary issues as appropriate to your project if these are not already explicit in your report.

9. Leadership Roles

Briefly summarize the leadership roles for each person on the team. All team members must have at least one leadership role. Leadership roles may include those continued since ECE4011 into ECE4012. Those required for ECE4012 are Webmaster, Expo Coordinator, and Documentation Coordinator.

10. References

Include a list of references for all items cited in this report in IEEE style format. You should include references for background information, similar products or projects, items you purchased purchased, cost information, and any other information that you found and used for your project. You may have additional items not specifically referenced but which you consulted. Put any additional items, not specifically referenced but relevant to your work, in a separate section called "BIBLIOGRAPHY" in the form of an unnumbered list.

Appendices

Include material needed to understand your report and to reproduce or continue your project, but is too lengthy to incorporate into the body of the report, as additional files in your group's website (e.g., software listings, CAD files, component datasheet PDFs, images & videos…). There should be a summary list of such posted items in the Appendix with links to your website.