****

**Capstone Design Project**

**System Design Report**

**<Descriptive Project Title>**

**Project Client**

<Sponsor Name>

<Semester>

<Month>, <Year>

**Prepared by**

<Name (Discipline)>

<Name (Discipline)>

<Name (Discipline)>

<Name (Discipline)>

<Name (Discipline)>

<Name (Discipline)>

<Name (Discipline)>

Project Engineer <Name> - CORE Engineering

Chief Engineer <Name> - <Department>

# Table of Contents

[Table of Contents 2](#_Toc189572011)

[List of Figures 3](#_Toc189572012)

[List of Tables 3](#_Toc189572013)

[Glossary 4](#_Toc189572014)

[1. Introduction 5](#_Toc189572015)

[2. Project Overview 6](#_Toc189572016)

[Project Statement 6](#_Toc189572017)

[Project Objectives (Long-Term) 6](#_Toc189572018)

[Semester Objectives / Deliverables (Short Term) 6](#_Toc189572019)

[3. Proposed System Design 7](#_Toc189572020)

[System Overview 7](#_Toc189572021)

[System Architecture Diagram(s) 7](#_Toc189572022)

[Team (Subsystem) Lead Assignments 7](#_Toc189572023)

[4. System Evaluation Plan 8](#_Toc189572024)

[5. Significant Accomplishments (optional but desirable!) 9](#_Toc189572025)

[References 10](#_Toc189572026)

[Appendix - <student name> - Detailed Individual Design 11](#_Toc189572027)

[Introduction for This Work 11](#_Toc189572028)

[System Architecture and Interfaces for This Work 11](#_Toc189572029)

[System Architecture 11](#_Toc189572030)

[Interfaces from This Work to Other Project Elements 11](#_Toc189572031)

[Key Needs and Requirements/Use Cases for This Work 12](#_Toc189572032)

[Concepts for This Work 12](#_Toc189572033)

[Technical Design Challenges for This Work 12](#_Toc189572034)

[Test Strategy and Integration for This Work 12](#_Toc189572035)

[Individual Project Plan 13](#_Toc189572036)

[Applicable Standards 13](#_Toc189572037)

# List of Figures

[**Figure 1 System Block Diagram** **Error! Bookmark not defined.**](#_Toc80276556)

# List of Tables

[**Table 1 Sample Gantt Chart** **Error! Bookmark not defined.**](#_Toc80276556)

# Glossary

BEFORE submitting

Delete this text box and all instructions (in blue text) throughout the document

# Introduction

Suggested length – ½ page

# Project Overview

Material from Project Overview, Client Meetings 1 & 2

2 pages max.

## Project Statement

## Project Objectives (Long-Term)

## Semester Objectives / Deliverables (Short Term)

# Proposed System Design

Describe concept chosen by team to pursue

Do NOT include previously presented concept generations and selection

1 page max

## System Overview

## System Architecture Diagram(s)

Insert picture(s) here, with explanation, e.g. block diagram, CAD, UML, flow charts, etc. It is required that the technical work of each team member be visible in the diagram(s).

In the diagram, it is convention that the blocks represent functions within the system and the lines between the blocks represent interfaces between the functions. It is recommended that all of the interface lines / connections be numbered so that they can be referred to elsewhere in this document.

## Team (Subsystem) Lead Assignments

Table including subsystem names, technical lead, and interfacing subsystems

Every team member must have a leadership position

# System Evaluation Plan

Plan as to how to evaluate project at system level. Do not rewrite standards, simply make reference to them.

1 page max

Table including Requirements (taken from N&R worksheet) which will be demonstrated at end of semester and the name of the technical lead responsible

Every team member must have technical responsibility for an aspect of this plan.

# Significant Accomplishments (optional but desirable!)

One page max.

# References

Include specific references as needed for standards, tools/methods, etc.

# Appendix - <student name> - Detailed Individual Design

Each student should repeat this entire section. Cover ONLY your portion of the technical work for this project.

## Introduction for This Work

½ page max.

Explain what technical work is covered by this appendix.

## System Architecture and Interfaces for This Work

Text summary (not including tables/figures) 4 pages max.

### System Architecture

Refer to the system architecture figure(s) from the System Architecture Diagram(s) section earlier in this Document. Please do not insert another copy!

Describe the key system architecture elements that relate this work to the rest of the project, referring to the diagram(s). If it’s helpful, you may update the diagrams to number the items in the figure so that you can use those when describing it.

### Interfaces from This Work to Other Project Elements

Must include specific references to the system architecture figure. Include mechanical, electrical, and software interfaces, but focus only on how this work connects to the work of your team mates.

See <https://designlab.eng.rpi.edu/edn/projects/capstone-support-dev/wiki/Example> for sample Interfaces.

Table 1 – Interfaces For This Work

| **#** | **Source (from) and Inputs (Interface)**  | **Destination (to) and Outputs (Interface)**  | **Notes** |
| --- | --- | --- | --- |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |
| 4 |  |  |  |
| 5 |  |  |  |
| 6 |  |  |  |
| 7 |  |  |  |

This work MUST be listed on each line, in either the Source or Destination column, or possibly both. You may add more lines to the table if needed.

## Key Needs and Requirements/Use Cases for This Work

Text summary (not including tables/figures) is 1 page max.

From the overall N&R for the project, identify up to 5 key requirements and/or use cases for this work in a table. You may copy these from the team's Needs and Requirements spreadsheet, adding new items as you discover them. Do not just include the table! As with all figures and tables, the supporting text should explain the contents of this table. Be sure to clarify how they support the functionality of the completed project.

Note – at the end of the semester, ensure that all of the needs and requirements from EACH subsystem are merged back into the project's single needs and requirements spreadsheet.

## Concepts for This Work

Text summary (not including tables/figures) is 3 pages max.

Include sketches/summaries for at least 3 concepts relating to this technical work. For each, show/explain how it addresses the project's needs/use cases/user stories. If you are struggling to identify at least three concepts, we invite you to **consult with your PE as soon as possible**.

## Technical Design Challenges (Risks )for This Work

Text summary (not including tables/figures) is 1 page max.

Define and describe the perceived technical **design** challenges for this work. While there may be challenges associated with obtaining materials, working with a team, fabrication, scheduling, etc., this section must focus on the **technical** design challenges. Focus on facts and avoid opinions. Include justifications as to why you feel these will be challenges.

What unresolved technical issues or unanswered technical questions are preventing you from moving confidently forwards with the design work?

Things to **not** include: personal items, such as learning new software, material costs, purchasing / supply chain issues.

## Unit Test Strategy (Demo) and Integration for This Work

Text summary is 1 page max.

Explain how you will test your subsystem without requiring the rest of the project to be completed. This is commonly referred to as “unit testing”. When each individual unit or subsystem of a project has been individually tested to success, the team can then focus on integration. At the end of the semester, you will demonstrate your unit testing, referred to as the “Individual Technical Demo” – see the Capstone Support wiki.

Describe how your completed / tested subsystem will be integrated with the others to create the overall team project. Final testing then can confirm that the assembled project works to meet the specified requirements.

## Individual Project Plan

Text summary (not including tables/figures) is 1 – 2 pages max.

This is the Gantt Chart on the EDN filtered to show only your technical tasks. To create, go to Gantt Chart, filter for you, and export .png file (bottom right of page). If you have non-technical tasks, please use additional filters to exclude those. See your PE for help with filtering, if needed.

As with all figures, be sure to add a summary explaining your project plan – not just the figure!

## Applicable Standards

Table, typically 1 page max.

This section should identify which present industry and de facto standards are relevant to your portion of the project. Some of these standards become design constraints. Examples of things that might be applied to your project are found in:

<https://designlab.eng.rpi.edu/edn/projects/capstone-support-dev/wiki/Standards>

The categories below are suggestions. You may include others as needed. You should delete the ones that do not apply.

In the caption for the table, replace <this work> with words that describe your work.

Table - Applicable Standards for <this work>

| **Category** | **Standards Applicable** | **Purpose / Application to Your Work** |
| --- | --- | --- |
| Software |  |  |
|  |  |
|  |  |
|  |  |
| Electrical |  |  |
|  |  |
|  |  |
|  |  |
| Mechanical |  |  |
|  |  |
|  |  |
|  |  |
| Industrial |  |  |
|  |  |
|  |  |
|  |  |