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**EE 492 – SENIOR PROJECT II**

 **FINAL REPORT**

**TED University
Department of Electrical and Electronics Engineering**

**Group Name (Optional)**

**Project Title:** (The title of the EE 491/492 project)

**Project Team Members:** (The names of the students who work together in the same project team)

**Project Supervisor(s):** (Academic title and name of the supervisor(s))

**Submission Date:**

**SPRING 2022-2023**

# ABSTRACT

The Abstract is the first section of the final report which contains a short summary of the entire project report (usually 250-300 words). A single paragraph composed of 5-6 sentences up to half a page is usually considered a decent size for the Abstract section. The purpose and the content of the report should be clearly mentioned. A brief explanation of the work carried out throughout the first few weeks and the results obtained in this period should be included.

# TABLE OF CONTENTS

[**ABSTRACT ii**](#_Toc114826781)

[**TABLE OF CONTENTS iii**](#_Toc114826782)

[**LIST OF FIGURES iv**](#_Toc114826783)

[**LIST OF TABLES v**](#_Toc114826784)

[**1. INTRODUCTION 1**](#_Toc114826785)

[**2. PROJECT DESCRIPTION 1**](#_Toc114826786)

[**3. PROJECT ORGANIZATION 3**](#_Toc114826787)

[**4. BACKGROUND RESEARCH 4**](#_Toc114826788)

[**5. METHODS 4**](#_Toc114826789)

[**5.1. METHOD 1 (YOU MAY REPLACE IT WITH THE NAME OF THE METHOD) 4**](#_Toc114826790)

[**5.2. METHOD 2 (YOU MAY REPLACE IT WITH THE NAME OF THE METHOD) 4**](#_Toc114826791)

[**6. PRELIMINARY DESIGN 4**](#_Toc114826792)

[**7. PROTOTYPE 5**](#_Toc114826793)

[**8. DESIGN PROCESS 5**](#_Toc114826794)

[**8.1. ITERATION 1 (YOU MAY REPLACE IT WITH THE NAME OF THE PROCESS) 5**](#_Toc114826795)

[**8.1.1. TESTING AND RESULTS 5**](#_Toc114826796)

[**8.1.2. EVALUATION 5**](#_Toc114826797)

[**8.2. ITERATION 2 (YOU MAY REPLACE IT WITH THE NAME OF THE PROCESS) 5**](#_Toc114826798)

[**8.2.1. TESTING AND RESULTS 6**](#_Toc114826799)

[**8.2.2. EVALUATION 6**](#_Toc114826800)

[**9. FINAL DESIGN 7**](#_Toc114826801)

[**9.1. COST ANALYSIS 7**](#_Toc114826802)

[**10. TEAMWORK 7**](#_Toc114826803)

[**11. COMMENTS & CONCLUSION 7**](#_Toc114826804)

[**REFERENCES 7**](#_Toc114826805)

# LIST OF FIGURES

[Figure 1 – Sustainable Development Goals 2](#_Toc114826259)

[Figure 2 – Block Diagram of a Unit Feedback Control System 2](#_Toc114826260)

[Figure 3 – Flowchart of the Design Process (from Gassert & Enderle, 2008) 6](#_Toc114826261)

# LIST OF TABLES

[Table 1 – Project Timeline 3](#_Toc114785309)

[Table 2 – Project Work Management 3](#_Toc114785310)

# INTRODUCTION

This report template aims to help the students prepare their *final report* for the EE 492 – Senior Project II course. The students are required to follow the exact formatting of page setup, page, section, and subsection numbering, referencing, tables, and figures as given in this template. The grading of this report will be both over style and content. This report must be submitted by the **last day of the final exams** via [Moodle](https://lms.tedu.edu.tr/) as a PDF file. The PDF file should be named in the format as follows:

EE492\_SectionCode\_Semester\_FR\_[Initial(s) of student name(s)].[Student surname(s)]\_[YYMMDD].PDF

***Example:***

**EE492\_01\_F2324\_FR\_A.CALISKAN\_B.GUCLU\_C.BASAR\_231015.PDF (for group projects – *fall semester*)**

**EE492\_01\_S2324\_FR\_A.CALISKAN\_231015.PDF (for individual projects – *spring semester*)**

Like the interim reports, this section is expected to provide general information about the overall project, the progress made during previous report terms, as well as what has been accomplished specifically throughout the remainder of the semester. It should clearly mention the additional work that has been carried out after the second interim report has been submitted. A summary of the information given in the following sections should also be included at the end. Recall that the Introduction section is usually not comprised of subsections.

The main body of the final report starts here. The subsections of this report are a combination of the two interim reports. The following sections and subsections are expected to be included in this report; more sections may be added, if necessary. Although these sections appear to be identical to those in the previous reports, they are expected to contain more detail and should be written with more care than before. If any information provided in the corresponding subsections of the interim reports has been found incomplete or incorrect, this report will be the opportunity to present the latest and most up-to-date results and overall progress.

For an explanation of what is to be included in the sections and subsections, consult the first and second interim report templates.

# PROJECT DESCRIPTION

This section provides a thorough and detailed description of the project topic, as well as the motivation for the work and possible utilization schemes for the intended outcome in practice. It is important to emphasize that your design experience should be based on the knowledge and skills acquired in earlier coursework. The design should be subject to several realistic constraints. Finally, please state which Sustainable Development Goals (SDGs) are satisfied by your project and how. You may find a brief overview of the 17 SDGs below.

**SUSTAINABLE DEVELOPMENT GOALS**

The SDGs also known as the Global Goals, were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. You may find detailed information about the goals at <https://sdgs.un.org/goals>.

The 17 SDGs to transform our world are depicted in the following figure.



Figure 1 – Sustainable Development Goals

The steps that are taken throughout the design and implementation of the project need to be presented in this section. Visual elements such as schematic depictions, illustrations, block diagrams, and photographs of the intended design steps and those of similar or related previous designs should be utilized to provide the reader with a better understanding of the overall project. These should be first mentioned in the text and then appear later in the report, as shown in Figure 2.



Figure 2 – Block Diagram of a Unit Feedback Control System

# PROJECT ORGANIZATION

This section provides detailed information about the organization of the project. The project team and its members should be clarified. If the project is planned to be completed by a team, team members should clearly state how they share the project workload. Details of the project timeline should be presented with the help of the Gantt chart as in Table 1. Moreover, the project work management, which includes the objective of each task, expected outputs as well as possible risks, should be explained in Table 2.

Table 1 – Project Timeline

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Task #** | **Name of the Task** | **Responsible** | **Success Criterion (%)[[1]](#footnote-1)** | **EE 491 – WEEKS** |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| **1** | Literature review | Ali Velioglu | 20 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **2** | Circuit design on the breadboard | Ali Velioglu, Veli Alioglu | 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **3** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **…[[2]](#footnote-2)** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task #** | **Name of the Task** | **Responsible** | **Success Criterion (%)[[3]](#footnote-3)** | **EE 492 – WEEKS** |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| **4** | Softwater Prototype Design | Ali Velioglu | 20 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **5** | Tests | Ali Velioglu, Veli Alioglu | 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **6** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **…[[4]](#footnote-4)** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Table 2 – Project Work Management

|  |  |  |  |
| --- | --- | --- | --- |
| **Task #** | **The Objective of the Task** | **Expected Output** | **Possible Risks** |
| **1** |  |  |  |
| **2** |  |  |  |
| **3** |  |  |  |
| **…** |  |  |  |

# BACKGROUND RESEARCH

This subsection presents the theoretical background obtained in courses taken in the first three years of the undergraduate program that will be used in the project. Provide the discussion of these topics such as available methods and tools if necessary mathematical formulae and derivations. For example, the output of the system in Figure 2 is given as in Equation 1.

|  |  |
| --- | --- |
| $$y\left(t\right)=\frac{C\left(s\right)G\left(s\right)}{1+C\left(s\right)G\left(s\right)}r\left(t\right)$$ | (1) |

For each topic, state the related course name and number.

# METHODS

To achieve the goal of the project, there must be more than one approach or method. In this section, you are required to:

* Describe each of the methods or approaches.
* Present a discussion of the type of goal and methods.
* Describe each method in a subsection in detail.
* Present the advantages and disadvantages of each method.
* Give citations when you use references for each method.

## **METHOD 1 (YOU MAY REPLACE IT WITH THE NAME OF THE METHOD)**

Explain the first method in detail. Explain the advantages and disadvantages. Use references. Use figures when necessary.

## **METHOD 2 (YOU MAY REPLACE IT WITH THE NAME OF THE METHOD)**

Explain the second method in detail. Explain the advantages and disadvantages. Use references. Use figures when necessary

# PRELIMINARY DESIGN

Based on the methods provided in the previous section,

* Choose one of the methods and explain the reasoning behind your choice.
* Provide a preliminary design using the chosen method. Use figures, flow charts, etc. to describe the preliminary design.
* Clearly identify the parameters and design choices in the preliminary design. At this stage, you do not need to determine the value of the parameters. You do not need to make design choices. However, you do need to identify what the parameters and design choices are.

# PROTOTYPE

In this section, introduce and describe the hardware/software prototype. Indicate,

* the purpose for building the prototype,
* what the prototype does,
* an overview of its key features.

If appropriate, include a photograph, flowchart, or another visual source for the prototype.

# DESIGN PROCESS

This section presents the steps of the design process performed in constructing the prototype. The engineering design process is a series of steps that engineers follow to solve a design problem, and often involves an iterative process. Iteration is, in general, defined as the act of repeating something repeatedly to improve the process and eventually achieve the desired goal. In a typical design loop, *first,* a solution is generated, *second,* the solution is implemented, and *third,* the result of the implementation is tested and evaluated. If the results do not satisfy the requirements, additional solutions are generated, and the above three-step process starts over again. This cycle and iteration continue until satisfactory results are obtained and the desired goal is achieved. An example flow chart that shows the design process is given in Figure 1.

In the following subsections, discuss how the design is modified in each iteration by providing and evaluating the results obtained during testing, including difficulties encountered and new solutions proposed.

## **ITERATION 1 (YOU MAY REPLACE IT WITH THE NAME OF THE PROCESS)**

Explain the first iteration in your prototype design.

### **TESTING AND RESULTS**

Describe how the requirements were tested, provide results that show what you obtained, and interpret the results, including whether the requirements were satisfactorily satisfied.

### **EVALUATION**

Honestly assess the strengths and weaknesses of your design and develop new solutions if certain requirements are not met. Discuss what modifications and solutions are needed to improve the design.

## **ITERATION 2 (YOU MAY REPLACE IT WITH THE NAME OF THE PROCESS)**

If the design is not validated in the first iteration, explain the second iteration in this section. Clearly explain what modifications were performed to improve the design.

### **TESTING AND RESULTS**

Describe how the requirements were tested, provide results that show what you obtained, and interpret the results, including whether the requirements were satisfactorily satisfied.

### **EVALUATION**

Honestly assess the strengths and weaknesses of your design and develop new solutions if certain requirements are not met. Discuss what modifications and solutions are needed to improve the design.

**(Include new subsections 3.3, 3.4, etc., if additional iterations were performed to reach the prototype design. Discuss the strengths and weaknesses of your prototype design in the last iteration and suggest new solutions to be performed in the final design.)**



Figure 3 – Flowchart of the Design Process (from Gassert & Enderle, 2008)

# FINAL DESIGN

Describe the final design in detail.

* Indicate the methods used in the final design and explain the reasoning behind your choice. Use figures, flow charts, etc. to describe the final design.
* Clearly identify the parameters and design choices in the final design.
* Provide the results of testing for the final design.
* Assess the strengths and weaknesses of your final design and discuss whether the requirements are met in the final design.

## **COST ANALYSIS**

Itemize the cost of each component of the final product and discuss the cost effectiveness of the project.

# TEAMWORK

This section is dedicated to clarifying the details of the team efforts if the project is carried out by a group of students. How the workload has been split up amongst the group members needs to be clearly explained in this section. Each member’s individual contributions to the project must be visible to the reader.

# COMMENTS & CONCLUSION

The inclusion of the comments and conclusions section is mandatory in the final report. It should start with a summary of the report. and present an elaborate picture of the status of the design project. The author is expected to briefly discuss the obtained results in terms of goals set for the semester, accuracy, sufficiency, etc. Finally, the steps of the proposed future studies need to be indicated.

# REFERENCES

(When a reference, such as a book [1-2], handbook [3], report [4], journal [5], conference paper [6], or any other document is cited in the text, it should be properly listed in the References section. Use the [IEEE Citation Reference](https://ieeeauthorcenter.ieee.org/wp-content/uploads/IEEE-Reference-Guide.pdf) format.)

|  |  |
| --- | --- |
| [1] | J. K. Author, “Title of chapter in the book,” in *Title of His Published Book, x*th ed. City of Publisher, Country if not USA: Abbrev. of Publisher, year, ch. *x*, sec. *x*, pp. *xx–xx.* |
| [2] | B. Klaus and P. Horn, *Robot Vision.* Cambridge, MA: MIT Press, 1986. |
| [3] | *Motorola Semiconductor Data Manual*, Motorola Semiconductor Products Inc., Phoenix, AZ, 1989. |
| [4] | J. H. Davis and J. R. Cogdell, “Calibration program for the 16-foot antenna,” Elect. Eng. Res. Lab., Univ. Texas, Austin, Tech. Memo. NGL-006-69-3, Nov. 15, 1987. |
| [5] | R. E. Kalman, “New results in linear filtering and prediction theory,” *J. Basic Eng.*, ser. D, vol. 83, pp. 95-108, Mar. 1961. |
| [6] | C. Berrou, A. Glavieux, and P. Thitimajshima, “Near Shannon limit error-correcting coding and decoding: Turbo-codes. 1,” in *Proc. Int. Conf. Commun.*, Geneva, Switzerland, May 1993, pp. 1064–1070. |
|  |  |

1. The sum of the percentages specified in this section must be 100. [↑](#footnote-ref-1)
2. The rows in the table can be expanded as needed. [↑](#footnote-ref-2)
3. The sum of the percentages specified in this section must be 100. [↑](#footnote-ref-3)
4. The rows in the table can be expanded as needed. [↑](#footnote-ref-4)