

Project Title

By

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Supervised by

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Submitted in partial fulfillment of the requirements for the degree of

BACHELOR OF SCIENCE
in

Computer Engineering [(1)]

Networks & Information Security Engineering [(2)]

at

PRINCESS SUMAYA UNIVERSITY FOR TECHNOLOGY

Amman, Jordan

Semester Year

This is to certify that I have examined

this copy of an engineering documentation by

Student Name & Student Name

And have found that it is complete and satisfactory in all respects,
And that any and all revisions required by the final Examining Committee have been made

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Dr. Ahmad Ali (Supervisor)

Dr. Ibrahim Sami (Department Head)

Acknowledgments

Recognition or favorable notice for people.

In the Acknowledgments section, you express gratitude to those who supported and contributed to your project. This can include:

- Supervisor – Thank your professor, mentor, or advisor for their guidance.
- Team Members – If applicable, acknowledge your colleagues or teammates.
- Institutions and Organizations – Recognize your university, department, or any institution that supported you during your project.
- Family and Friends – Show appreciation for their moral and emotional support.
- Others – Mention any other individuals or entities that contributed significantly (e.g., industry professionals, companies, or research participants).

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Signature:

Date

Abstract

It is a concise summary of your project. It helps readers quickly understand your work's purpose, methodology, key findings, and significance. Describe your project and the results achieved briefly in paragraphs. The abstract is typically 1-3 paragraphs at most and should not exceed one page.

- Include the importance of your work, the difficulty of the area, and the impact it might have if successful.
- Briefly state the problem or research question. Explain the significance of the study.
- Summarize the research design, approach, or methodology. Mention key techniques, experiments, or analysis methods used.
- Highlight the most important findings of your project. Use quantitative or qualitative data if applicable.
- Summarize the main conclusion of your project. Explain the broader impact or application of your findings.

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1 Introduction [**Required**]

This is the first paragraph; the style used is "Thesis Body," which we defined; you will use this style in writing the body of your thesis; this style has 12pts Times New Roman font, lines are 1.5-line spaced, and paragraphs are 12pts spaced and justified. The first line of each paragraph has a default blank space at the start; this space is generated automatically; however, make sure these specifications are met. In the next paragraph you'll find some samples for the figures and tables captions.

1.1 Motivation

Background of the design project. (Motivation e.g., why is the design important)

1.2 Objectives

Clearly define what your project aims to achieve. State the primary goal of your project. Break down the main objectives into smaller tasks that describe how you will achieve the main objective.

1.3 List of Design Requirements [**Required**]

List Quantified Design Requirements (That can be verified) [should match the offering template]

1.4 List of Design Constraints [**Required**]

List Quantified Realistic Constraints (That can be validated) [should match the offering template]

1.5 List of Engineering Standards [**Required**]

An engineering standard that will be incorporated into the design process. [should match the offering template]

1.6 Design Overview [**Required**]

Describe the overall design and include a high-level diagram, as shown in Figure 1-1.

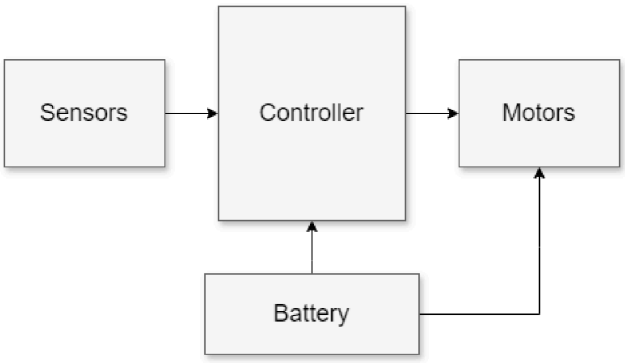


Figure 1-1:Overall Design

1.7 Load Distribution [Required]

Indicate who exactly in the group is responsible for what. Everyone should have design tasks. As shown in Table 1-1

Table 1-1: Load Distribution

Task	Sami	Lina	Ali	From/To
Introduction	70%	20%	10%	Oct
Initial Designs Process	30%	30%	40%	Oct-Nov
Sketching	0%	60%	40%	Oct-Nov
Literature Review	40%	20%	40%	Nov-Dec

2 Background and Literature Review [**Required**]

2.1 Background

Provide general information about the research and the problem being addressed. Brief description of the used technologies, equipment, circuits, design, …etc.

2.2 Literature Review

- Evaluate existing research relevant to a specific topic.
- Review and contrast 5-7 conference or journal papers that address a similar problem.
- Include references, such as conferences [1], journal papers [2], websites [3], or thesis [4].
- Highlight any requirements or constraints of published work.
- Follow a similar format as IEEE guidelines; link below: http://www.ieee.org/documents/ieeecitationref.pdf
- Use MS Word to generate the references and citations.

  For example: Conference reference [1], Journal reference [2], website [3], thesis [4].

2.3 Summary

Summarize the key findings from the literature, highlight what is missing in the existing studies, and how your research contributes to the field.

3 Design [Required]

3.1 Analysis of Design Requirements [Required]

Analyze the quantified design requirements. Make sure all requirements are addressed. The analysis should focus on how the requirement is shaping your design.

3.2 Analysis of Design Constraints [Required]

Analyze all quantified design constraints in depth. Discuss how they will impact your design. For example, the economic constraint of a certain budget will impact whether you use a PIC or a PC to control your project.

3.3 Discussion of Engineering Standards [Required]

Discuss the use of Engineering Standards in your project.

3.4 Different Design Approaches [Required]

Discuss different design options in detail. Each option is presented along with its advantages and disadvantages. Design options need to take design requirements and realistic constraints into account.

3.5 Design Development [Required]

Present the design developed. (Please show your thought process given the requirements, constraints, and engineering standards.

- Flow charts
- Schematic
- Pseudo codes
- System-level diagrams
- Architecture diagrams
- System/transistor diagram

As shown in Figure 3-1 below.

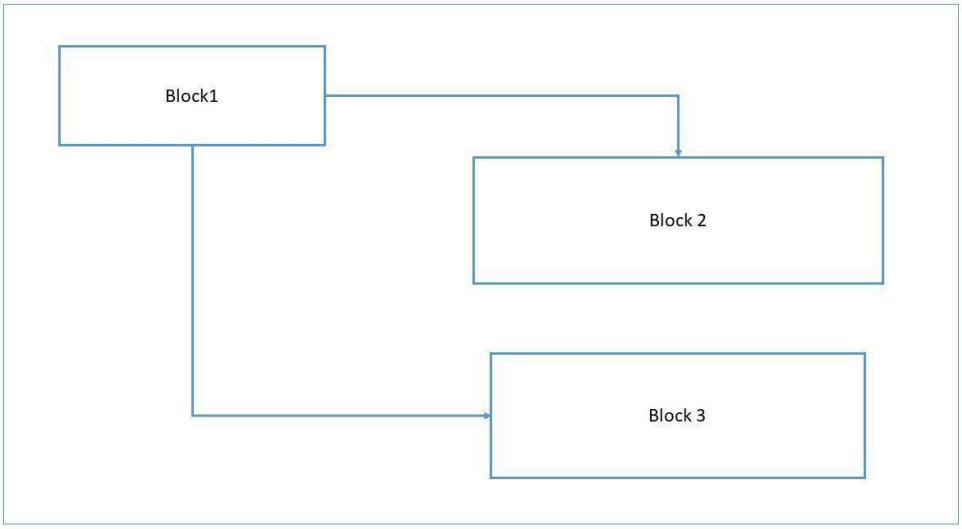


Figure 3-1: Main System Design

This section should also discuss how the proposed design will satisfy each requirement given the realistic constraints of the design problem. See Figure 3-2.

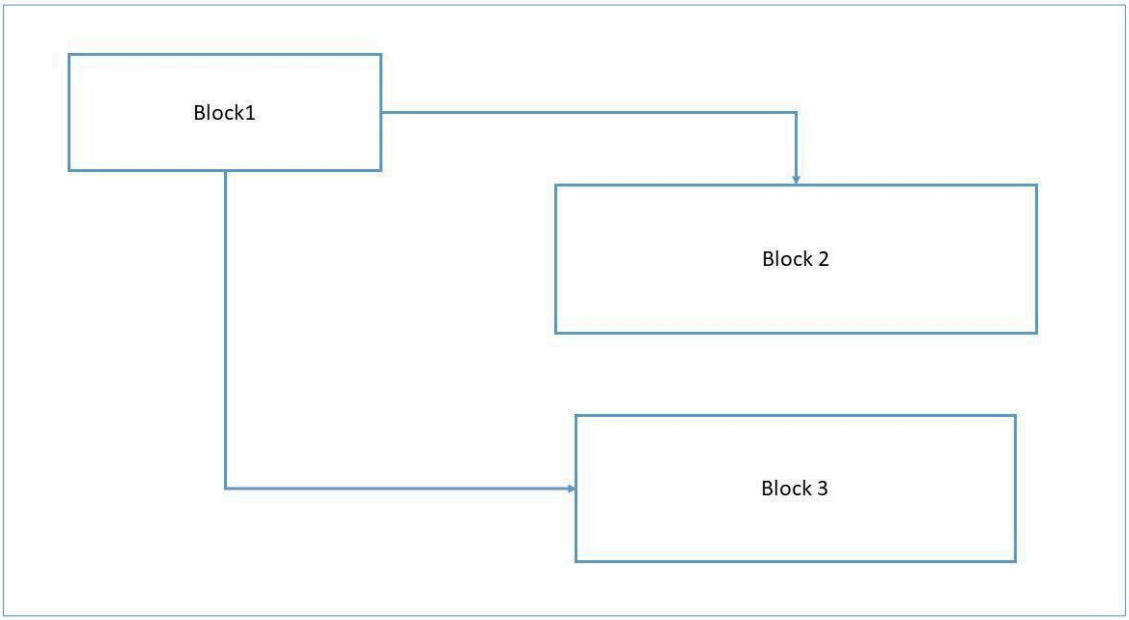


Figure 3-2: Sub-System Design

4 Results [Required]

4.1 Experiment/Simulation/Prototype Setup [Required]

This section discusses the setup accomplished by completing the project. You discuss what you have built. The setup covers both:

- Hardware
- Software

4.2 Testing [Required]

Describe the tests or analyses performed, and mention the tools, software, or methods used. Any completed project needs to be tested against certain scenarios and test cases. In this section, you discuss the individual experiment setups and what each one is designed to achieve

4.3 Experiment/Simulation Results Discussion [Required]

This section presents and discusses the results of the previously defined experiments. Use:

- Tables
- Graphs
- Waveform
- Figures

For Example, see Table 4-1 and Table 4-2 below.

Table 4-1: Sample Test Results

Parameter	Test1	Test2	Test 3
Par 1	4	4	7
Par 2	5	6	7
Par 3	4	4	4

Table 4-2: Second Sample Test Results

Parameter	Test1	Test2	Test 3
Par 1	4	4	7

Par 2	5	6	7
Par 3	4	4	4

4.4 Validation of Design Requirement within the Realistic Constraints [Required]

- Discuss and analyze whether the requirements and realistic constraints are met.
- If requirements are not met, please provide sufficient explanations. See Table 4-3.

Table 4-3: Validation of Requirements and Design Constraints

	Parameter	Required	Achieved	Explanation
Requirements	Requirement # 1	5nS	4.3nS	This was not achieved because ……
	Requirement # 2			
	Requirement # 3			
	Requirement # 4			
Economic constraints	Price	$10	$9.45	
Manufacturability and Sustainability constraints	Temperature Range	-40 to 125Cº	✓	

5 Conclusion and Future Work [**Required**]

- State the main objective of your project.
- Summarize your key findings or results.
- Highlight contributions, explain how your work adds value to the field, and mention any constraints that affected your results.
- Suggest possible future improvements or how the project can be improved.
- If the project is expanded or applied to other domains.
- If some new technologies or methodologies could be integrated.
- Suggest new research directions based on your findings.

References [Required]

[1] S. Zhang, B. Sun and T. Chen, "Research on Data Mining Technology Based on Data Stream Management Systems," in *2024 International Conference on Electronics and Devices, Computational Science (ICEDCS)*, 2024.

[2] A. Jamshed, B. Mallick and R. & Bharti, "A Systematic Review on Sequential Pattern Mining-Types, Algorithms and Applications," *Wireless Personal Communications,* vol. 138, no. 2024, p. 2371–2405, 2024.

[3] "sparkfun," 2024. [Online]. Available: https://learn.sparkfun.com/tutorials/.

[4] M. KHADER, "New Density-Based Method For Big Data clustering," Princess Sumaya University for Technology, Amman, 2020.

Use the MS References tool.

Appendices

These are detailed documentation of points mentioned in the report (e.g., technical data, questionnaires, chart …. etc.), which are considered supplementary information but too long or not quite relevant enough to include in the main body of the report.

Appendices may be labeled with letters such as Appendix A, Appendix B, ...etc.

Example,

Appendix A: Offering Template **[Required]**



Princess Sumaya University for Technology
King Abdullah II School of Engineering
Senior Design Projects

Design and simulations of a digital Low Drop-Out (LDO) with fast transient response

1	**Advisor Name**	Dr. Hani Ahmad Assi
	Co-Advisor Name	
2	**Year / Semester**	Fall 2016-2017
3	**Title of Senior Design Project**	Design and simulations of a digital Low Drop-Out (LDO) with fast transient response
4	**Design to be Achieved**	This project involves the design and simulations of digital PMOS LDO to achieve fast transient response to a sudden load change. This type of circuit is used in power management applications and circuits that are sensitive to supply variations.
5	**Engineering Standard**	180nm CMOS standard Technology
6	**Design Requirements**	**The design shall achieve the following requirements:** 1- Use180nm standard CMOS technology that conforms to Mixed mode/RF specifications in the in following manufacturing foundries: a. United Microelectronics Corporation (UMC): http://www.europractice-ic.com/technologies_UMC.php b. Taiwanese Semiconductor Manufacturing Company (TSMC): http://www.europractice-ic.com/technologies_TSMC.php 2- The supply voltage shall be 3.3 V to conform to180nm standard CMOS technology. 3- Regulated output at steady state shall be 2.5V. 4- Regulated output voltage shall not change more than +/- 200 mv for a transient load from 0 to 100mA in 50ns. 5- The LDO shall handle loads up to 100mA. 6- Power Supply Rejection Ratio (PSRR) shall be more than 50 dB. 7- Quiescent current shall be below1mA. 8- Output cap shall be above 4.7uF. 9- For simulations, the latest UC Berkeley BSIM models for NMOS and PMOS devices shall be used: http://ptm.asu.edu/modelcard/180nm_bulk.txt 10- LT spice software is used to simulate the LDO.

7	**Realistic Constrains**	**Economic**	- Area of the whole module including power stage (PMOS) and control (Op-Amp, buffer and biasing) shall not exceed 0.5mm^2 given that the manufacturing cost is approximately \$1350/mm^2.
		Environmental	- LDO should be properly operating at the commercial temperature range standard which is 0-70C.
		Manufacturability and Sustainability	LDO integrated circuit, if manufactured, shall achieve 99% yield (3 sigma in a Gaussian distribution)
		Other	
8	**Deliverables**	**Documentation**	Yes
		Portfolio	
		Video	
		Other	Schematics and HSPICE Simulations
9	**Background of Students**	Students should have passed electronics 2.	
10	**Number of Students**	3	

Advisor Signature Co-Advisor Signature Department Head Signature

Appendix B: Code