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Design and Analysis of Oversampling ADC

An Internship Report (XX367P)

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In partial fulfillment of the requirements for the degree of Bachelor of Engineering in

Electronics and Communication Engineering

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RV College of Engineering®, Bengaluru

(*Autonomous institution affiliated to VTU, Belagavi*)

Department of Electronics and Communication Engineering

CERTIFICATE

Certified that the internship project (XX367P) work titled ***Design and Analysis of Oversampling ADC*** is carried out by **P Narashimaraja** (**1RV22EC005**) who is bonafide student of RV College of Engineering, Bengaluru, in partial fulfillment of the requirements for the degree of **Bachelor of Engineering** in **Electronics and Communication Engineering** of the Visvesvaraya Technological University, Belagavi during the year 2024-25. It is certified that all corrections/suggestions indicated for the Internal Assessment have been incorporated in the internship report deposited in the departmental library. The internship report has been approved as it satisfies the academic requirements in respect of internship work prescribed by the institution for the said degree.

Guide	Head of the Department	Principal
Mr. Ramavenkateshwaran	Dr. Ravish Aradhya	Dr. K. N. Subramanya

External Viva

Name of Examiners	Signature with Date
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2.	

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EXECUTIVE SUMMARY

The objective of this report is to provide a comprehensive account of the internship undertaken at [Company Name] in the [Department Name] from [Start Date] to [End Date]. This internship served as a bridge between academic theory and industrial application, offering a profound understanding of [mention core field, e.g., Embedded Systems/VLSI/Signal Processing] within a professional corporate environment.

The first phase of the internship was dedicated to understanding the organizational ethos of [Company Name], exploring its business model, product portfolio, and professional standards. During the technical tenure, I was integrated into the [Project/Team Name] team, where I was assigned tasks related to [mention 1-2 key tasks, e.g., circuit simulation, software debugging, or data analysis]. This phase provided hands-on exposure to industry-standard tools such as [mention key tools, e.g., Cadence, MATLAB, or Python] and followed the [mention methodology, e.g., Agile or Waterfall] development cycle.

The experience resulted in the successful completion of [mention a specific achievement or learning outcome]. Beyond technical proficiency, the internship facilitated the development of essential soft skills, including collaborative teamwork, professional communication, and time management. This report documents the technical methodologies employed, the reflections on the learning process, and how the experience has contributed to my professional growth as an Electronics and Communication Engineer.

Guidelines for Students:

- Keep it to one page: The summary should be concise and take up no more than one side of a sheet.
- The "So What?" Factor: Focus on what was achieved. Instead of just saying "I worked on coding," say "I developed a script that optimized data processing by 10%."
- No Citations: Do not use references or citations in the executive summary.
- Tense: Write it in the past tense since it describes a completed experience.

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Chapter 1

Profile of the Organization

CHAPTER 1

PROFILE OF THE ORGANIZATION

Every chapter should start with an introduction paragraph. This paragraph should brief about the flow of the chapter. This introduction can be limited within 4 to 5 sentences. The chapter heading should be appropriately modified (a sample heading is shown for this chapter). But don't start the introduction paragraph in the chapters like "This chapter deals with....". Instead you should bring in the highlights of the chapter in the introduction paragraph.

1.1 Organizational Structure

Provide a brief history of the company (year of establishment, founders) and describe the hierarchy.

What to fill: Mention if the company is a startup, MNC, or public sector unit. You may include a high-level organizational chart showing how the different departments (e.g., R&D, Sales, HR, Engineering) relate to one another.

1.2 Products

List the tangible items the company manufactures or develops.

What to fill: Describe the core hardware or software products. For example, if interned at an electronics firm, list specific chips, devices, or consumer electronics they are known for in the market.

1.3 Services

Describe the intangible offerings provided by the company to its clients.

What to fill: Mention services such as consultancy, technical support, cloud hosting, software maintenance, or design services. Explain how these services add value to their customers.

1.4 Business Partners

Identify the ecosystem in which the company operates.

What to fill: List major collaborators, technology partners (e.g., "AWS Cloud Partner"), or key vendors. Mention any strategic alliances that help the company reach a global or local market.

1.5 Financial

Provide an overview of the company's economic standing.

What to fill: Mention the annual turnover, revenue growth, or funding rounds (for startups). You do not need exact figures if they are confidential; you can use general terms like "Multi-billion dollar revenue" or "Series B funded."

1.6 Manpower

Detail the human resource aspect of the organization.

What to fill: Mention the total number of employees globally and at the specific location where you interned. Briefly describe the diversity of the workforce (e.g., ratio of engineers to administrative staff) and the work culture.

1.7 Societal Concerns

Describe the company's Corporate Social Responsibility (CSR) initiatives.

What to fill: Mention how the company gives back to society. This could include environmental sustainability (green energy), educational programs, community health initiatives, or ethical sourcing of materials.

1.8 Professional Practices

Outline the standards and methodologies the company follows in its daily operations.

What to fill: Mention certifications like ISO 9001, CMMI levels, or specific Agile/Scrum methodologies used in development. Also, include their policies on data privacy, workplace safety, and professional ethics.

Chapter 2

Activities of the Department

CHAPTER 2

ACTIVITIES OF THE DEPARTMENT

Overview of the Functional Unit: In this chapter, students should describe the specific department or team they were embedded in during the internship. While Chapter 1 focused on the entire company, this section focuses on the immediate work environment.

2.1 Departmental Role and Objectives

Define the primary purpose of your department (e.g., Embedded Systems Team, VLSI Design Group, or Quality Assurance). Explain how this department contributes to the company's overall product lifecycle.

2.2 Technical Infrastructure

Describe the tools, hardware, and software environment used within the department. Mention specific lab equipment, servers, or proprietary software frameworks utilized by the team.

2.3 Workflow and Methodologies

Detail the operational processes followed, such as the Software Development Life Cycle (SDLC), Agile Sprints, or hardware testing protocols.

2.4 Use of Acronyms and Glossaries

Acronyms are nothing but the short form of regular repeated word. Say for example, you have a repeat word "Integrated Circuits" and you want to use a short form for it as "IC". For which you have to first define the word and use it wherever you wanted to refer it.

First, let's look at the definition, which has to be entered in `Glossaries.tex` under `CoverPages` directory.

```
%\newacronym{<Ref>}{<Short-Form>}{<Expanded word>}
\newacronym{ic}{IC}{Integrated Circuits}
```

In order to use the defined acronym, use the commands `\gls{<Ref>}` as shown below

Note: For the First time, the expanded form appears along with the Short-form definition inside parenthesis. But when the `\gls{}` is repeated, only Short-form appears inside the parenthesis.

Now, let's look at the definition of symbols. Follow the syntax to define the symbol first, inside `Glossaries.tex` under `CoverPages` directory.

```
%\newglossaryentry{<Ref>}{name=<Symbol>, description={<description about the symbol>}
\newglossaryentry{rc}{name=$\tau$, description={Time constant}, type=symbolList}
```

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Chapter 3

Tasks Performed

CHAPTER 3

TASKS PERFORMED

Core Internship Contributions: This chapter is the technical heart of the report. It should detail the actual work assigned to the student and the output generated.

3.1 Summary of Tasks Performed

Provide a chronological or module-wise breakdown of the assignments completed. This should include initial training, research phases, and the execution of specific technical tasks.

3.2 Problem Statement/Goal

Clearly define the specific problem you were asked to solve or the goal of your assigned module.

3.3 Implementation Details

Describe the steps taken to complete the tasks. Include flowcharts, circuit diagrams, or snippets of logic (if permitted by the company) to demonstrate your involvement.



Chapter 4

Reflections

CHAPTER 4

REFLECTIONS

Self-Assessment and Learning Outcomes: This chapter focuses on the personal and professional growth of the student. It is a qualitative look at how the internship transformed their skills.

4.1 Results

This section will discuss the overall results obtained from the project.

4.2 Learning outcomes

Technical Knowledge Acquired: List the specific technical competencies gained. This could include proficiency in a new programming language (e.g., Python, Verilog), mastery of simulation tools (e.g., MATLAB, Cadence), or understanding of industry-standard protocols (e.g., I2C, SPI). Mention how this bridges the gap between your college curriculum and industry requirements.

Soft Skills Acquired: Reflect on the non-technical skills developed during the tenure. Discuss improvements in professional communication, time management, teamwork within a corporate hierarchy, and the ability to work under real-world deadlines. Mention any experience gained in documentation and presentation during team meetings.

4.3 Conclusion



Appendix A

Code

APPENDIX A

CODE

A.1 First Appendix

You can use `tcblisting` for creating the code snippets. The following example illustrates how one can customize the `tcblisting` to achieve the `tcl` script. Similarly, one can use it for other programming language listing, including HDL.

```
# Since our design has a clock with name clk,
## specify that name under [get_port ]
create_clock -period 40 -waveform {0 20} [get_ports clk]

# Setting a 'delay' on the clock:
set_clock_latency 0.3 clk

# Setting up constraints on your I/P and O/P pins
set_input_delay 2.0 -clock clk [all_inputs]
set_output_delay 1.65 -clock clk [all_outputs]

# Set realistic 'loads' on each output pin
set_load 0.1 [all_outputs]

# Set 'maximum' fanin and fan-out for the input and output pins
set_max_fanout 1 [all_inputs]
set_fanout_load 8 [all_outputs]
```