QUALITIES OF A GOOD MASTER THESIS

Marius Ubostad, 2021-10-26, version 1.0

This document is summary of input from NTNU and industrial partners in NTNU Mikroelektronikkforum (MEF) on views of what makes a great Master Thesis.

There are different views on evaluation criteria for a Master Thesis and how to weigh these for a final evaluation. This can differ whether the Thesis is evaluated internally in different groups or externally. The goal for this document is to align on some common criteria which would serve as guidelines for the award of best Master in Microelectronics at NTNU and set some expectations for external supervisors and Master thesis offered by external companies. This document should be considered as a supplement to official Thesis evaluation forms. The audience is industrial partners and faculty staff at NTNU.

1. THESIS DESCRIPTION AND GOAL

What – Why – How.

The problem description and goal of the work have a dependency on the thesis description defined internally or externally as well as the ability of the candidate to clarify the goals of the Thesis and put the work in a greater content.

The introduction should guide the reader to a clear understanding of the problem to solve and why, as well as provide the requirements for a successful result and how to get there.

I want to put humans on Mars because the Earth will die someday when the sun blows up, or Earth gets hit by an asteroid. What do I need to develop to do that? First thing, I need vertical landing reusable rockets. Does anyone know how to do that? No, ok, then I need to figure out how.

2. DESCRIPTION OF CURRENT STATUS

Most problem descriptions will have dependencies on previous research and development. It is important to connect the work towards existing solutions and the introduction should include description of current status on e.g. technical solutions and why is it an interesting problem to solve.

The thesis should contain references such that a reader not skilled in the art can find the necessary knowledge.

The problem description should be precise, and connected to relevant research.

3. NEWNESS FACTOR

One property that separates a good Master Thesis from other reports is the level of newness factor or originality. The bar is in most cases not at the level of providing significant research results in the relevant field but can include combining available methods to solve the problem or provide a different angle.

Does the master have sufficient technical content and level expected of a master thesis in this field? Does it have sufficient academic and scientific focus?

What is the key contribution of the thesis, is it a new contribution, or is it a reproduction of previous work in a new light?

4. DEMONSTRATION OF KNOWLEDGE AND LEARNING

Any reader skilled in the art should be able to read the thesis. The author should demonstrate technical knowledge and provide the necessary technical background and theory. The author should make a judgement and priority of background theory needed to understand the results. It should not be a copy of information produce elsewhere.

5. QUALITY OF REPORT

Is the report well written, and is it readable? Does it tell a good story? A good Master Thesis has a logical build-up and connection between different sections, clear representation of what is known, and what is new. An efficient report will help the reader to quickly understand the *Why – How – What.* In addition, the readability of text, figures and tables are important to understand the results, as well as excellent written language [2].

6. CRITICAL REFLECTIONS

Does the master solve, and address the problem statement? The analysis and conclusions should be based on presented data and include a clear representation of what is known, and what is new. The author should demonstrate a methodical style of work. Does the conclusion match the results? Does the discussion apply to the results? Is the main contribution of the candidate clear?

The thesis could also give an overview of what the author feel are interesting future directions of the work. What was considered future work, and what would the author further like to explore. This part of the thesis is an opportunity to spawn new Master Thesis, and Ph.D thesis.

7. FORMAL REQUIREMENTS

An assessment [1] form has been developed at NTNU to outline the formal requirements for a master thesis.

The thesis should contain sufficient information such that a person skilled in the art can reproduce the work, as such, the tools used, the methods used, and the source code (should the author desire) could be added in an appendix.

8. CONCLUSION

This memo is a living document which will be revised and updated when the Mikroelektronikkforum meets to discuss this topic or when relevant input is received from the members of MEF. The criteria outlined here should serve as guidelines for the industry providing external Master and for the award of best Master in Microelectronic at NTNU.

REFERENCES

[1] Assessment form for master thesis at IE, Online: https://innsida.ntnu.no/wiki/-/wiki/Norsk/sensurskjema+for+masteroppgaver+mnt-fag

[2] "On Writing Well", William Zinsser, online: https://www.amazon.com/Writing-Well-Classic-Guide-Nonfiction/dp/0060891548