Guidelines for theses

Prof. Dr.-Ing. Felix Woelk – 07.02.2018
FH-Kiel, FB IuE, Institut für Informatik

Introduction and sources

These guidelines are based on the following documents. They have been adopted to the needs of computer science and to my own individual expectations.

- Hasenpaath, Jochen „Empfehlung zu Aufbau und Gestaltung studentischer Arbeiten“, 2016, internes Dokument. FH-Kiel
- Bohlmann, Behrend „Hinweise zur Berichterstellung“, 2012, internes Dokument, FH-Kiel
- Finkemeyer, Bernd „Bewertung-V2.3-Blanko.xlsx“, 2018, internes Dokument, FH-Kiel

Rules

The following rules should guide you while working on your final master or bachelor thesis:

1. The final thesis must be submitted in digital form (pdf) to me - in addition to the printed form which is necessary for the examination office.
2. If you have evaluated data in your thesis, you must also submit the raw data in digital form to me (e.g. time measurements, questionnaires, etc.). It is good scientific practice to archive the raw data and thus make the results verifiable.
3. The thesis should consist of the following parts:
   a. Title page as shown in appendix
   b. Table of contents
   c. Abstract, max. one page
   d. Statement of confidentiality for the company (if necessary)
   e. Main part with text about the topic (see checklist)
   f. Bibliography
   g. Appendix: If applicable table of figures, table of abbreviations, etc.
   h. As last page, the statement about the resources used and the independency of the work (see No. 10).
4. Page format and layout:
   Use Din A4 with sufficient space for perforation.
   Use headers and footers with page numbers, title and author.
   The Layout should be consistent (e.g. headings always in same format – font, size, colour, indentation, ...).
   The layout should be representative for a scientific work in the engineering domain.
   The text must be readable (e.g. Arial 11 or 12 Pt).
5. Length of the thesis:
   Keep the following in mind while writing your thesis: You are a (would-be) engineer
and your intended audience are fellow engineers. Having very little time is characteristic for your audience. Nonetheless they want to learn the essentials about your work. The main tenor and all important aspects of your work must be accessible through the text.

6. Tune graphics and images for readability and discriminability also in grey-level printouts.

7. Reference all graphics, images and tables from your text. Always explain graphics, images and tables either in the caption or in the text.

8. Quotations:
   No scientific work is complete without references to information sources. It is mandatory to list all used information sources without exception in the list of references.
   a. Within the text, literary quotes are marked directly at the corresponding text area. Preferably the Harvard quotation style should be used: (name year) or (name year order), e.g. (Müller 1998) or (Müller 1998a). Names can be abbreviated meaningfully. If several works of the same author are quoted from the same year, they are distinguished by a, b, c ....
   b. In the bibliography, the quotations are described in detail. Sources are sorted alphabetically:
      Mueller, Karl (1998a): title, ...
   c. Quotations must at least contain the following:
      • **Journals**: Name, first name / further authors – if applicable, title/subtitle, in: name of journal, volume/number, year, pages a – b
      • **Books**: Name, first name / further authors – if applicable, title/subtitle, publisher, place, year, pages a – b
      • **E-Books**: Name, first name / further authors– if appl., title/subtitle, publisher, place, year, retrieved from / doi, paragraph number
      • **Internet sources**: Name, first name / further authors – if applicable, title, online, ULR: http://...., version: date, accessed on: Date

A summary of the Harvard style can - for example - be found here: [https://libweb.anglia.ac.uk/referencing/files/Harvard_referencing_201718.pdf](https://libweb.anglia.ac.uk/referencing/files/Harvard_referencing_201718.pdf)

It is generally a good idea to use a management system (f.e. [https://www.zotero.org/](https://www.zotero.org/)) for your literature. Even though this makes citing easier, the full responsibility for correct citations and complete entries in bibliography remains completely with you.

9. Internet resources / Wikipedia
   There is no general consensus about the suitability of internet resources for quotations. Quoting internet resources is hence only acceptable when no other written source is available. You should only quote, in principle, what can be reproduced and verified by the reader of the work. This is usually given by naming the author of the source. Sources without the name of the author cannot be referenced. There is generally no review of sources in the internet and hence these sources need to be critically questioned.
   **Hint:** Correctly maintained wikipedia articles are based on references to written sources. These written sources should be preferred when quoting.
10. The last page of your thesis must contain the following statement:

**Statement**
I hereby declare that I have prepared the present work independently and without the use of resources other than those indicated; Thoughts which are taken literally or meaningfully from other works, are indicated with the text.
I hereby certify that I have not submitted any examination papers with the same or similar subject to an examination authority or other university.

Place, Date  Signature

11. In accordance with this statement, all quotations which are taken literally or meaningfully from external sources (also images, tables, audio files, etc.) shall be marked and the sources shall be indicated in a verifiable manner. This also applies to sources from the Internet (also see point 9). **Failure to comply to this rule is a serious offence and may result in grade 5.0 – failure.**

12. Source code is usually not part of the written thesis. In justified exceptions (for example, for your own algorithms), use pseudocode. If the software architecture is of interest, it should be presented in UML. It is not necessary to list source code in the appendix.
Rating

The following criteria are taken into account for the evaluation of your work:

- **Processing of task(s)**
  - Creativity and own ideas
  - Application of expertise
  - Clarification of the task and objectives
  - Analytical thinking
  - Expertise
  - Self-taught learning
- **Quality of results**
  - Completeness of solution
  - Compliance of results with formal scientific criteria
  - Feasibility / usability
- **Style of work**
  - Systematic approach to problems
  - Motivation for the project
  - Independence
  - Time management
  - Teamwork and collegiality
  - Cooperation and communication externally (e.g. to supervisor)
- **Written work / thesis**
  - Structure / Outline of the thesis
  - Completeness
  - Interpretation of results and methods
  - Usage of scientific methods
  - Optical form of work

Checklist

The following checklist will help to structure the individual areas of the written thesis. Not all points can be applied to all work.

1. **Introduction**
   a. Does it inform briefly about the whole purpose of the work? This includes the description of the problem (what is covered, what is not covered).
   b. Definition of the goal: clear, precise, unequivocal?
   c. Have the methods and how the goal should be achieved been described?

2. **Main part**
   a. Have concepts and definitions been introduced?
   b. Have only definitions, terms, features and their interrelations been introduced and used that are necessary to achieve the goal?
   c. Has the current literature been incorporated? Has a comprehensive literature analysis carried out?
   d. Is there a summary of the theoretical foundations?
e. Is it clear what part of the work is yours? This part should cover approximately half of your document. The other half usually covers introduction, basics, motivation, literature review, etc. This part must have scientific or innovative content - a pure implementation is not enough. Scientific content means for example that something has been invented, optimized, evaluated and/or compared. Alternatively a hypothesis can be verified or falsified. Master theses always need some portion of innovation.

f. When evaluating the results: Have the assessment criteria been introduced?

3. Conclusion
a. Are the results of the study summarized in a concise form?
b. Have Looking back on the objectives formulated in the introduction? Have the goals been achieved?
c. Has the path to goal (intermediate results) been sketched?
d. Were the results evaluated in the discussion after a brief summary (have the evaluation criteria been applied)?
e. Were the results presented in the scientific context?
f. Were questions raised beyond the scope of the work?
g. Were the results compared with the results of other work?
h. If unsolved problems have been identified, do they appear in the outlook?
i. Is future work briefly suggested in the outlook?

4. Abstract (Abstract)
a. Brief summary of the work, first overview for the reader
b. The task, the solution and the achieved goals are outlined in a few sentences.
c. Maximum one page, usually a half page.

5. General
a. Is the work comprehensible? Does it have language or orthographic deficiencies?
b. Have someone proof read the thesis.
c. Is the work written in a businesslike, sober, matter-of-fact language? Write in passive voice and avoid emotional expressions.
## Do’s and don’ts

<table>
<thead>
<tr>
<th>Description</th>
<th>Do’s</th>
<th>Don’ts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Passive voice rather than first person</strong></td>
<td>“In this document, a learning software for robotic programming has been developed and tested.”</td>
<td>“I have developed and tested a learning software for robotic programming”</td>
</tr>
<tr>
<td><strong>Businesslike, sober &amp; matter-of-fact language rather than enthusiastic and emotional expressions</strong></td>
<td>Decisions have been taken whenever necessary and responsibility has been acknowledged.</td>
<td>“We had the fearlessness to take choices and to acknowledge responsibility for them.”</td>
</tr>
<tr>
<td><strong>Avoid exaggerated statements (no one has died from a lack of web technologies)</strong></td>
<td>“Web programming technologies are becoming increasingly important in these days [citation needed].”</td>
<td>“Web technologies are nowadays that much important for a human being like water.”</td>
</tr>
<tr>
<td><strong>Know what you are writing about and be prepared to proof and/or explain everything you write</strong></td>
<td>If you mention f.e. neural networks in your work, you should be prepared to explain their main components, how they work and how the training is conducted (backpropagation).</td>
<td>Put buzz words in your text without really understanding what they mean, f.e. when mentioning usability in your text, you should know the definition of usability from DIN EN ISO 9241. You could also quote the definition in your work.</td>
</tr>
<tr>
<td><strong>Reference quality checked sources, i.e. regular scientific or classroom books rather than internet sources</strong></td>
<td>The definition of usability from DIN EN ISO 9241 as summarized in [2] can be regarded as a guideline for the development of software.</td>
<td>The definition of usability can be found in [1]. I can act as a guideline to …</td>
</tr>
<tr>
<td><strong>Think about the reader rather than about the writer (yourself).</strong></td>
<td>In this project ... [something important] has been developed. It will help future users to ... [something meaningful].</td>
<td>“I developed a website. I learned about JavaScript and php. I think the final website looks much better.”</td>
</tr>
<tr>
<td><strong>Keep personal impressions and learnings to yourself</strong></td>
<td>That is nice, but not interesting for the reader. Just drop these statements without replacements.</td>
<td>“Working on this project has been an amazing experience. I have learned so much.”</td>
</tr>
<tr>
<td>Description</td>
<td>Do's</td>
<td>Don'ts</td>
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<td>Introduce all technical terms before using them</td>
<td>“Evaluation of a new or only superficially known technology in a well-defined amount of time (time-boxed) is called a spike. The goal of the spike is to familiarise oneself with the technology such that a sound effort estimation can be done afterwards. This procedure has been used for the hotel booking feature of the website.”</td>
<td>“We used a spike in some sprints for hotel booking.”</td>
</tr>
<tr>
<td>Use short, clear and simple sentences rather than long and complicated sentences.</td>
<td>“An agile methodology for software development is presented in this work. Selecting the right procedure for software development has important implications. The choice of the methodology will be justified.”</td>
<td>“Indeed, presenting another procedure and all the for most part, any sort of progress in a project may make a few specialized, human, and political issues I will depict the choices we made remembering the true objective to constrain their event, and how we made sense of the arrangements.”</td>
</tr>
<tr>
<td>Thank only those who really helped you.</td>
<td>If you received noticeable support or help from someone, it is a nice gesture to mention him or her in the acknowledgements.</td>
<td>If, however, you have never met the person and enthusiastically thank him or her in the acknowledgements, you make yourself non-credible and everything else that you write will be read with some scepticism.</td>
</tr>
<tr>
<td>Reference all images and tables in the text. Explain the content of the contents and its purpose.</td>
<td>“The relative performance of all classifiers in dependence from the number of trainings examples is shown in figure 1. The neural network shows superior precision to all other classifiers when using a large number of training data.”</td>
<td>Not mentioning figure 1 at all. Not explaining what can be seen in figure 1. Not giving conclusions.</td>
</tr>
</tbody>
</table>
### Description

**The motivation should explain why anyone should continue reading. It should not describe your own motivation.**

“Virtualisation technologies are becoming increasingly important [citation needed]. Many companies are for example using virtualisation for deployment testing [citation needed].”

“I have chosen the topic because I wanted to learn about virtualisation technologies.”

**Be informative: Explain why certain things have been done not only what has been done.**

“In planning poker, the individually estimated effort is revealed simultaneously by all participants. This avoids that experienced developers and spokesmen influence the other estimations [citation needed].”

“In planning poker, the individually estimated effort is revealed simultaneously by all participants.”

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**Summary**

This document summarizes the most important aspects of written student work. I wish you success and a lot of fun with your thesis.

Felix Woelk
Appendix 1: Title page

Title of Thesis

Master-Thesis/Bachelor-Thesis

at University of Applied Science Kiel
Department of Computer Science and Electrical Engineering

Degree Programme: (Name of the programme)

Submitted by: (Full Name)

Company: (Name of the company suggesting the topic)
Supervisor: (Supervisor in the company)

First examiner: (Name, title and institution)
Second examiner: (Name, title and institution - if applicable)

Submitted on: (Date)