KTH Electrical Engineering

Electric Power Systems Lab

EG201X DEGREE PROJECT IN ELECTRIC POWER SYSTEMS

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Writing a Master Thesis in Electric Power Systems

One of the most important parts of the Degree Project course is to write a technical report. This document provides background and advice for thesis writing, as well as instructions on mandatory contents and formats for the thesis.

INTRODUCTION

The modern engineering education approach which is used at KTH does not only include a high-level technical content, but also puts special attention to general engineering skills such as report writing. However, although KTH students already are acquainted with technical writing, the technical report of a master thesis project is most likely the longest and the most advanced report that a master student will write during the education. Many students will therefore have to improve their writing skills another step compared to reports in other courses in order to produce a thesis of sufficient quality. The necessary skills will mostly be acquired through practical work and interaction with the student's supervisor. This document is intended to support that process, by providing general instructions and advice for master thesis writing.

Requirements

Before we go into the details of report writing, it is a good idea to have a look on the objectives of a master thesis, in order to understand which requirements a master thesis has to fulfil. Here we will identify the objectives, and we will then return to these objectives in the description on how to write a master thesis, in order to show how the instructions in this document are related to the objectives of the education.

The specific objectives of the master thesis course are listed in table 1. However, the master thesis is generally the last course of the student's programme, and the underlying idea of the master thesis is that this is the time when the students should apply all skills they have obtained during their education on a real engineering problem. Hence, it is also relevant to consider the programme objectives, i.e., the requirements that a student should fulfil in order to earn a degree. These objectives may vary slightly between different programmes, but all are based on the Swedish Higher Education Ordinance (see table 2).

Most of these objectives are directly applicable to the master thesis. As can be seen in the tables, many of the objectives are related to practical, technical skills (cf. C1, K1–2, S1–3, S5). Accordingly, the main focus of the master thesis will be the technical contents. Engineers must also be able to apply their skills in reality, which means that one must be able to deal with missing or faulty input data and yet provide useful conclusions (cf. C2, S4). This is a common problem in most master thesis projects, and the thesis must of course explain how these issues were solved. Moreover, the engineer should not only solve technical problem, but must also be able to see the relation between technical solution and their role in society (cf. S5, J1–3). Therefore, the master thesis cannot only focus on engineering, but must also comment upon "the big picture". Finally, there are some objectives that are more related to the work process, i.e, that engineers must be able to search for knowledge, present and critically assess results, and cooperate with others (cf. C3–5, S4, S6–7, J3). These objectives are relevant to master thesis projects, but are only indirectly incorporated in the thesis itself.

Table 1 Course objectives.

Number	Objective
C1	Apply relevant knowledge and skills, within the area, to a given problem.
C2	Within given constraints, even with limited information, independently analyse and discuss complex inquiries/problems and handle larger problems on the advanced level within the area.
C3	Reflect on, evaluate, and critically assess one's own and others' scientific results.
C4	Document and present one's work with strict requirements on structure, format, and language usage.
C5	Identify one's need for further knowledge and continuously develop one's own knowledge.

Overview

This document is both intended to be an instruction, which students should read before starting the master thesis work, and to serve as a reference, when students are in the process of writing the thesis. The document is divided in three main parts:

- **The reader.** This section discusses possible readers of a master thesis, with a focus on the readers expectations and use of the report.
- **The structure.** Here, the contents of each part in a thesis is discussed.
- **The writing.** The last section covers requirements on format as well as advice on style when writing a thesis.

THE READER

It does not matter if you have found a very advanced solution to a technical problem if you cannot communicate this solution to others. This is expressed in the programme objectives, which state that as an engineer, you are expected to be able to present both conclusions and arguments (S7). All master thesis projects should produce a technical report which fulfils this objective. Obviously, this cannot be done, unless the report is understandable to the readers. Therefore, as an author of a technical report, you should always keep the readers' perspective in mind. In order to do that, you need to know a few things about the possible readers of a master thesis. (Remember that according to S7, you should be able to present your results to different audiences, i.e., not only to experts in your field.)

All readers have different background knowledge and different reasons for reading your report. To simplify this discussion, we will however categorise the readers in three main groups, which are presented in the following sections.

Table 2 Requirements for a Master of Science in Engineering degree.

Number	Objective
Knowledge and understanding	
K1	Demonstrate knowledge of the disciplinary foundation of and proven experience in his or her chosen field of technology as well as insight into current research and development work.
K2	Demonstrate both broad knowledge of his or her chosen field of technology, including knowledge of mathematics and the natural sciences, as well as a considerable degree of specialised knowledge in certain areas of the field.
Competence and skills	
S1	Demonstrate the ability to identify, formulate and deal with complex issues autonomously and critically and with a holistic approach and also to participate in research and development work and so contribute to the formation of knowledge.
S2	Demonstrate the ability to create, analyse and critically evaluate various technological solutions.
S3	Demonstrate the ability to plan and use appropriate methods to undertake advanced tasks within predetermined parameters.
S4	Demonstrate the ability to integrate knowledge critically and systematically as well as the ability to model, simulate, predict and evaluate sequences of events even with limited information.
S5	Demonstrate the ability to develop and design products, processes and systems while taking into account the circumstances and needs of individuals and the targets for economically, socially and ecologically sustainable development set by the community.
S6	Demonstrate the capacity for teamwork and collaboration with various constellations.
S7	Demonstrate the ability to present his or her conclusions and the knowledge and arguments on which they are based in speech and writing to different audiences in both national and international contexts.
Judgement and approach	
J1	Demonstrate the ability to make assessments informed by relevant disciplinary, social and ethical aspects as well as awareness of ethical aspects of research and development work.
J2	Demonstrate insight into the possibilities and limitations of technology, its role in society and the responsibility of the individual for how it is used, including both social and economic aspects and also environmental and occupational health and safety considerations.
J3	Demonstrate the ability to identify the need for further knowledge and undertake ongoing development of his or her skills.

Source: Swedish Higher Education Ordinance, Swedish Code of Statutes (1993:100), www.hsv.se.

The General Reader

This is a reader who may not have an engineering background, and whose main focus will be on the practical implications of your work. They will generally not read the report from start to beginning, and will probably skip the technical parts of report. Hence, these readers will primarily be interested in a summary of your work, a good background description of the project and the discussion of your conclusions.

Writing for a general reader is more difficult than for a reader who has some technical background knowledge.

- Make sure that all designations that you use are clearly defined. Moreover, they should be easy to find—remember that the reader might not be reading your report from start to beginning, but flipping back an forth between different sections.
- The reader will appreciate if you can use efficient figures and tables to illustrate the text.
- The general reader will need assistance to interpret your results; hence, make sure that your conclusions are supported by arguments that are easy to follow.

The General Engineer

The general engineer is reading your report for more or less the same reasons as the general reader, and will as the general reader focus on the summary, background and the conclusions, but this reader also has enough mathematical and technical knowledge to take an interest in the more technical parts of the report. The general engineer will however probably not read the report from start to beginning, but will browse through the pages and look for specific details that are of interest to him or her.

The advice for the general reader are also valid for the general engineer, but the latter will also be interested in some details of your solution. Although this is a qualified reader, you can help this reader by providing as much technical background information as possible (without making your report as thick as a telephone book of course). Here are a few examples of what you can do:

- All important mathematical formulae should not only be stated, but also commented and explained in the main text of the report.
- A general engineer might not be familiar with the details of the models and methods that are standard within your field of engineering, either because the general engineer comes from another field of engineering or because they have not been applying their knowledge in your field for a long time; therefore, you should try to provide simple educational examples, short summaries of necessary background theory (although it is well-known within your field[1]) or at least a reference to a good textbook on the topic.
- Make sure that the analysis is easy to follow. For example, in a discussion of a simulation results, you should not just present your conclusions of the results, but also give the reader an indication on where in the figures or tables one can find the support of your conclusions.

The Specialised Engineer

This is a very qualified reader, who knows as much—or even more—about the topic as yourself. As the other readers, the specialised engineer will be interested in your overall results (i.e., the summary and your conclusions). The background is however less important to the specialised engineer, because this reader is already familiar with the field., but on the other hand, the specialised engineer might be interested in your background description in order to verify that *you* have understood the problem correctly. The specialised engineer can also be interested in the details of how you have solved your problem, either because the reader wants to apply your solution or because the reader wants to verify that it is correct.

Hence, the specialised engineer is a demanding reader, who might need good arguments to accept your findings. Here are a few examples how you can convince this kind of reader:

- Clearly state all assumptions and limitations that you have done.
- Describe which data you have used including the source of the data. Explain if data have been processed in some manner, for example if you have removed extreme values. If possible, you may include detailed data in appendices to the report.
- Make sure that the reader can follow all steps in your calculations. Preferably, all equations needed to perform the calculations should be described in the report, but sometimes it might be necessary to just refer to a well-established method or to provide only an overview of the computation method. For example, if you have to solve a large system of non-linear equations, you may simply state that this can be done using the Newton-Raphson method. (However, here you should also consider the needs of

1. For example, most engineers have studied numerical analysis at some time during their education, but if the Newton-Raphson method is central to your master thesis work, you could still include a quick overview of the method in an appendix for those readers who do not remember everything what their teachers have taught them.

the general engineer.)

THE STRUCTURE

A technical report should be structured so that readers easily can find the information that they are looking for (cf. the section about readers); the need for a good structure is emphasised in course objective (C4). Fortunately, there is an informal standard structure for scientific texts in the field of electric power systems. Here, we will explain how to apply this standard on a master thesis; the description includes chapters and sections that can appear in the thesis, comments on the purpose of each part of the thesis and some advice on the writing. Those headings that are mandatory in all theses are indicated by *****.

Preamble

The preamble includes a title page, the abstract of the thesis and sometimes an acknowledgement to those who have assisted the author while writing the thesis. The remainder of the preamble includes table contents and suchlike to help readers find what they are looking for in the thesis.

**Title page*

The title page refers to the first page of the report (i.e., not the cover of the report). It should include the title of the thesis, the name of the author and the organisation (i.e, Electric Power Systems Lab, Royal Institute of Technology). It is also nice to add the KTH logotype[2] (and other logotypes, if other institutions have played an important role in the thesis) and the report number. Your supervisor will provide your report number when your report has been approved by the examiner.

**Abstract*

The abstract should be a short summary (in general only one page) that describes the background of your project, the work you have done and the conclusions. The Abstract should according to KTH rules be provided both in English and Swedish, regardless of which language you have used for report.

Since the abstract should summarise the report, you cannot write the abstract until the remainder of the report is ready (except for maybe some minor editing). Although this means that the abstract is based on texts that you already have at hand, writing a good abstract is surprisingly difficult, because you need to keep it short and focus on the most important results. This is also a section of the report that must be understandable to all categories of readers, which means that you should avoid abbreviations and special expressions that are not known to the general reader. Moreover, the abstract should be independent of the main report, i.e, you cannot assume that the reader of abstract has read any other parts of the report.

A hint to structure a good abstract is to try to write one paragraph for each of the following headings:

- **Why is it necessary to study this field?** Briefly explain the background of the problem (cf. programme objective J2), and define the problem that you have studied.
- **What have you done in your project?** Explain which theoretical development that was necessary, mention the main methods and models that have been used, and describe the practical testing (for example case studies) that you have done.
- **Which results did you get?** Here you will either have to provide a general over-

2. The logotype for the School of Electrical Engineering can be found at http://intra.kth.se/blanketter-mallar/logotyper/download/skolan-for-elektro-och-systemteknik-ees-1.30680?l=sv_SE.

view (for example, "The case studies show that the X method can significantly decrease the costs of the system.") or you can select a few key numbers to be reported.
- **What are your conclusions of the project?** Discuss how the findings from your project can be used in practice (cf. programme objectives J1, J2 and S5). Mention if further studies are needed in the field (cf. programme objective J3).

Acknowledgement

It is not mandatory to include an acknowledgement, but it is always a nice gesture to thank those that have supported you during your work.

**Table of contents*

The table of contents is mandatory and should include the main headings in the preamble, the numbered chapters and subsections in the main report, the list of references, and the titles of any appendices. It is not uncommon that a reader remembers having seen some interesting data in a thesis, but cannot remember exactly where; therefore, it is appreciated if you can include a List of Figures and a List of Tables if that is supported by your word processor.

Nomenclature

If you are using a lot of abbreviations or mathematical symbols, it is recommended to include lists of abbreviations and symbols in the preamble.

Main Text

This is the central part of the report, and it should cover both the overview and the details of the work. The beginning and the end of the main text should follow the standard, whereas the structure of the middle part is more flexible. Here, we suggest that the central part follows the structure Background theory–Modelling–Case study. The titles of these chapters can of course be adjusted to suit the topic at hand, and you might also want to use more than one chapter for each of these parts (for example, if you have done two different case studies, you could have one chapter for each).

**Introduction*

This is one of the most important parts of the report, as it here you explain what you are doing and—not the least—why this topic has to be studied. If your introduction is poor it will not matter how clever you have been in solving your problem, because the reader might think that you are dealing with something else or that you do not understand the full complexity of the problem at hand, and simply disregard the remainder of the report.

The Introduction chapter should include the following parts:

- **Background.** This is where you explain why your study is needed. This is an important section for all kinds of readers, but you especially think about the general reader in this section. Explain how the field of study of your project is related to the needs of the society and economical, social as well as environmental development (cf. programme objectives J2 and S5).
- **Problem definition.** Try to clearly define the technical problems that your study is dealing with (cf. programme objective S1). Preferably, this should be done without including technical details—those can be saved for the later parts of the report—so that this part is also understandable to the general reader. (This section might sometimes be merged with the next one.)
- **Objectives.** Describe what you are going to do in the report. This means that you should explain if you intend to solve the entire problem defined in the previous section, or some specific parts, what kind of data collection and testing you will do, etc.

- **Overview of the report.** This section can be seen as a reading instruction. Describe the contents of each of the following chapter (i.e., excluding the Introduction chapter, which the reader is already studying) with one or a few sentences. If the report has any appendices then those should also be described, although you can allow yourself to be less detailed. For example, you may summarise the contents of several appendices in one sentence: "Appendices A-C provide further details about the mathematics used in chapter X."

Presentation of the Field

It is advisable to use the second chapter to provide further background on the topic of your study (cf. programme objectives K1 and K2). Unlike the background description in the Introduction, this chapter does not have to be aiming at the general reader, but for the general engineer. (It is however not a disadvantage if you can keep this chapter on a level that is understandable to the general reader as well.)

For example, if you are going to develop new control algorithms for the power system, you could describe the relevant control theory. Similarly, if you are comparing different ways of designing an electricity market, you could describe the general principles of electricity trading. This chapter can also provide a non-technical background. For example, if you are studying the power system in a specific country, you could give an overview of the society and life in that country.

Models

The model chapters (you might need several if you are using alternative solution approaches) should describe the computation and analysis methods that are applied in the thesis. This presentation should focus on a general description on the mathematics used; hence, you should not mix the models with inputs and results from case studies. If some part of a model is difficult to explain without a practical example then try to use a simplified example. Details and examples of really complex models can be put in appendices if you think that they are only interesting for a few readers.

It is important to remember that you should not only describe the models you are using, but that you should also motivate *why* you have chosen these models and which alternatives there are (cf. course objective C2 and programme objective S3). Describe obstacles in the modelling process (for example limitations of the model), how you managed them, worked around them or why you could not overcome them.

Case Studies

In the case study chapters (again, you might need several if you have investigated more than one problem) you show that you can apply theory on practical problems and provide useful results (cf. programme objectives S4 and S5). A case study should be divided in the following parts:

- **Background description.** This should be a short introduction to the case study, where you provide some general facts about the study (these background facts may very well be of a non-technical nature—that might help the reader to get acquainted with the study) and a few words on why this particular case study was included in your project. Describe obstacles in the working process (for example difficulties to obtain the necessary data), how you managed them, worked around them or why you could not overcome them.
- **Inputs.** Describe how you have obtained data and which approximations you were forced to make. The most important data should be presented here, whereas extremely detailed inputs can be put in an appendix.

  The detailed input data might sometimes be confidential and can then be excluded from the report. However, you must still present your sources and an overview of the input data that is sufficiently detailed to make your results reasonable.

- **Results.** Here you describe the results that you have obtained. Try to use tables and figures to make your results as clear to the reader as possible. Focus on the most important results and put any detailed results in an appendix.
- **Discussion.** This is a very important part, where you should explain the conclusions that you have drawn from the results. Make sure that it is clear how you have been thinking and that you explain how the conclusions are supported by the results you have obtained. You should also discuss any uncertainties about the validity of your conclusions (for example unreliable input data or limitations in the model) and whether the conclusions are specific to this case study or if similar results can be expected in a general case.

*Closure

This chapter should not only summarise your thesis, but also point out directions for future work in the field. Consequently, the Closure chapter must at least include a summary section and a future studies section. However, the headings of the chapter must be adopted to the nature of the degree project. Below follows a list of topics that you should consider when writing this chapter.

- **Summary.** First of all, you should remind the reader about the background and justification of the project; this is something that you have already explained in the Introduction chapter and the reminder can therefore be quite brief. Then you should summarise what you have done. You should also discuss to which degree you have fulfilled the objectives stated in the Introduction chapter, and if necessary describe any obstacles that prevented you from achieving these objectives.
- **General conclusions and recommendations.** This is where you summarise and discuss your conclusions (cf. programme objectives S1 and S2). You should also consider the implication of your results on the society and development (cf. programme objectives J1 and J2). You may also include your reflections on the problem you have investigated, but be very careful in differentiating between conclusions supported by the study and what is your personal view or speculation.
- **Conclusions from case studies.** It is advisable to have a separate section for results that are specific to the case studies you have investigated. As for general conclusions, you can discuss and reflect upon the case study results and to which extent they are applicable to other cases, but it should then be clear what is facts and what is conjecture.
- **Future studies.** There are no complete solutions to engineering problems; there are always details to be improved and alternative ideas to test. In this section, you should highlight the issues that you think deserve further studies (cf. programme objective J3).

*References

This is a list of the main references that you have used in your project. Instructions on the format of references are found on page 12. The references can either be listed in order of appearance or alphabetically.

The degree project should rely on scholarly and scientific foundation. For this reason the requirements are high regarding the references on literature. You should refer to scientific literature and not only to manuals, company reports and course literature.

Appendices

There is no typical structure for appendices of a technical report; some reports do not need any appendices at all, whereas others include dozens of appendices. The topics of the appendices also vary widely: repetition of background theory, examples that do no fit in the main text, mathemati-

cal details that are not interesting for most readers, detailed input data and results, etc. It is up to the author to decide what is appropriate. However, there should be a connection to the main report; hence, you should not include an appendix if there is no point in the main report where you are referring the reader to the appendix. Moreover, you should try to give some instruction to the reader what the objective of the appendix is and who the intended reader might be. For example, if you are providing a repetition of matrix algebra in an appendix, you can state that "The analysis in chapter X is using matrix algebra. Here, a short summary of the mathematical theory is given. More detailed descriptions are found in [X] and other textbooks on linear algebra".

THE WRITING

Writing a master thesis is hard and time-consuming work. Therefore, it is important to start the report writing already in the beginning of the project, and to continuously update the report as you collect more information, develop new models and obtain simulation results. It is very difficult to do the work first and save the report writing until the last part of the degree project. Besides, continuously writing down what you have done will help you organise your work, and you will get a better overview of the state of your project.

It is therefore generally a good idea to start by writing a draft table of contents (i.e., set up headings for chapters and subsections) and writing the Introduction chapter. The remainder of report can then be written in parallel with the project work; write the presentation of the field while you are reviewing the literature, write the model chapter while you develop the model, write the case study chapters while you run your simulations, etc. Obviously, as the work proceeds, you will find that your first texts need to be updated, completely rewritten or even cut out from the report.[3] The Conclusions should not be written until you have done most of the work, and the Abstract should be the last part that you complete.

The Unit for Language and Communication offers assistance in academic writing. Please refer to the section "Academic writing" at http://language.lib.kth.se/first_en.asp for further information.

Language

Anyone who have read a few novels and a few technical reports will notice that there is a significant difference in the language used. Although the objective of a novel may not only be to entertain the reader, the language of a novel is used to boost the reading experience.[4] The language of a technical report on the other hand is relatively dry and may give a bureaucratic impression. The focus of the technical report is to communicate technical knowledge and results (cf. programme objective S7); therefore, accuracy and clarity is much more important for a technical report than being fun to read.

The best way of learning an appropriate language for technical reports is to read what others have written. You will then learn to recognise specific words and phrases that are used within your field of engineering, and you should not hesitate to use these expressions yourself where appropriate.

As highlighted in course objective C4, the language of the thesis is important. However, many students are writing their thesis in another language than their mother tongue and some minor spelling or grammatical errors are of course acceptable, as long as they do not affect the readability of the thesis. Students should be aware that the degree project course is not a language course, and

3. However, do not through away texts or figures, because you might later want to include them again, for example in an appendix.
4. At least in good novels.

that supervisors and examiners will have limited possibilities to instruct students in spelling and grammar.

Below follow some advice concerning the language in a master thesis:

- Use a spell-checker!
- Keep the language simple; do not exaggerate the bureaucratic language of a technical report! This does not mean that you should always avoid uncommon or complicated words and phrases, but you should consider if there is a more straightforward way of saying the same thing—try to use the same expressions as you would do if you explained the same thing by word of mouth.
- Important words and phrases should be consistent. Varying your language by using synonyms makes a text more entertaining to read, but the result might be confusing if you use different expressions for vital concepts in your work. If you for some reason vary between different phrases for the same thing then you should specifically point out that in this report the expressions X, Y, Z are used interchangeably.
- Keep the subject and the predicate close to each other.

  Example: Compare the following two sentences:

  - In figure X a schematic overview of the HVDC line installations between NORDEL and UCTE is shown.

  - Figure X shows a schematic overview of the HVDC line installations between NORDEL and UCTE.
- Long sentences can be difficult to understand, and you should consider if they can be split in shorter sentences.

  Example: Compare the following two texts:

  - As highlighted in course objective C4, the language of the thesis is important, but as many students are writing their thesis in another language than their mother tongue, some minor spelling or grammatical errors are of course acceptable, as long as they do not affect the readability of the thesis.

  - As highlighted in course objective C4, the language of the thesis is important. However, many students are writing their thesis in another language than their mother tongue and some minor spelling or grammatical errors are of course acceptable, as long as they do not affect the readability of the thesis.

Format

There is a standard format at KTH for the cover of a master thesis (your supervisor will take care of that part), but the format of the report itself can be decided by the student, as long as it fulfils the requirements presented below. In some cases, the master thesis is written for a company or as part of a research project, and you may then disregards the instructions below if they are in conflict with the format required by the institution who initiated the project.

Page Layout

The keywords for the page layout are neat and clear; the layout should make reading as comfortable as possible. Therefore, the layout should fulfil the following requirements:

- A master thesis should generally be in A4 format, with a single column and single line spacing. Leave at least 2 cm margin around the text.
- Headings should be aligned to the left, whereas body paragraphs should normally be justified (exceptions can be made for tables and figures).
- The font must be easy to read, i.e., not too small and not too large. The recommended font size is 12 points for normal text.
- Chapters should be numbered using arabic numbers. Subsections should also be num-

bered, so that 1.1 is the first subsection of chapter 1, and 1.1.2 is the second subsection of section 1.1. Avoid using more than three levels in the section numbering.
- There should be page numbers on every page (except for the title page if you include one). Use roman numbers (i, ii, …) for the preamble and arabic numbers (1, 2, …) for the main text and any appendices. If possible, the page numbers should consequently be located in the same place of the page.

It is convenient for the reader if you can add chapter and sections headings in the page headers or footers, but this will of course depend on whether this is supported by your word processor.

Equations

Complex equations can be difficult to typeset. You can ask your supervisor for advice on appropriate software. The following requirements should be fulfilled:

- All mathematical symbols must be italicised both in the text and in equations. Units should be used according to SI and may not be italics.
- All equations should be numbered, so that they can be easily referred to. Preferably, the number should include the chapter number and a counter. If the software used to write the report cannot easily manage chapter numbers it is possible to exclude them and just use a counter. The equation number should appear near the right margin after the equations, as in the example below:

$$\textit{Equation} \qquad (1.1)$$

- Refer to equations only by their number, for example "(1.1)" and not "Eq. (1.1)" or "equation (1.1)", except at the beginning of a sentence: "Equation (1.1) shows…".

Tables and Figures

Creating informative tables and figures is more difficult than it might seem at first glance, and it will in many cases take time and careful consideration to get them right. Tables and figures should assist the reader in understanding the thesis; hence, you should always ask yourself what the main message of the table and figure is. Do not add tables and figures unless you refer to them and discuss them in the main text. Moreover, you should fulfil the following requirements:

- The font must be easy to read, i.e., not too small and not too large. The recommended font size is 10 points for figure captions and tables. Do not forget that text inside figures should also be readable—if possible, use a 10 points font here as well.
- Tables and figures should be located as closely as possible to the paragraphs where they are first mentioned. If you discuss a table or a figure in several sections of the thesis, it is better to repeat the table or figure, instead of forcing the reader to flip back and forth.
- Table and figures should also be numbered using the chapter number and a counter, for example as follows:

Table 1.1 Table caption.

Figure 1.1 Figure caption.

  If the software used to write the report cannot easily manage chapter numbers it is possible to exclude them and just use a counter.
- Refer to tables and figures as "table 1.1" and "figure 1.1",. i.e., do not use capital letters except at the beginning of a sentence.
- You may use colour in figures, but remember that the thesis should also be readable when printed in black-and-white.

References

The references should fulfil the following requirements:

- Avoid references to web pages, because you never know if the a web site is going to be

Table 3 Format for references.

Type of publication	Format
Journal paper	[1] First author, second author, … & last author, "Paper Title", *Journal Name*, volume, number, date.
Conference paper	[2] First author, second author, … & last author, "Paper Title", *Proceedings of* …, volume, conference location, date
Report	[3] First author, second author, … & last author, "Report Title", type of report (internal report, master thesis, doctoral dissertation, etc.), publisher, place of publication, date.
Book	[4] First author, second author, … & last author, *Book Title*, publisher, place of publication, date.
Interview	[5] Name, organisation, personal communication.

changed or disappear; thus, your reference might no longer be valid. If an electronic version of a publication is available on the internet, you may indicate that by adding the address within brackets after the reference.

Example:

[1] "Nordel Annual Report 2008", Nordel, 2008. [Available at https://www.entsoe.eu/]

- The format of different types of references are shown in table 3.
- Refer to literature references by their number in square brackets, for example [1]. The sentence punctuation follows the brackets. If there are multiple references then each reference is put in a square bracket, for example [1], [3]. Multiple references which are numbered in a sequence can be referred to as an interval, for example [1]-[3]. Do not use "Ref. [3]" or "reference [3]" except at the beginning of a sentence: "Reference [3] shows…".