Guidelines for the preparation of final theses at the Faculty of Engineering

(Bachelor’s theses, Master's theses)

Approved by the Examination Committee of the
Faculty of Engineering
on 12 February 2010,
amended on 11 June 2013, on 13 November 2020

List of Contents

1 The objective of these guidelines

This document serves as a guideline for preparing final theses (dissertations), i.e. *Diplom* theses, Bachelor's theses and Master's theses. It supplements and expands on the obligations arising from the legal requirements for theses. In cases of doubt, the legal requirements take precedence over these guidelines.

2 Information for final theses

2.1 Legal requirements

2.1.1 Procedure

- Before starting the thesis, students must apply for their topic to be issued. Topics can be found at various sources, including http://jobboerse.fh-rosenheim.de/. Students can also apply for approval of their own topic, which may also be derived from an industrial scenario, for example. A suggestion for who should act as first examiner and second examiner can also be made. Applications for topics to be issued are submitted online via the document management system (DMS) for theses https://formulare.fh-rosenheim.de/de
- After receiving the required approval, students can start preparing their thesis. The thesis must be completed by the deadline specified on the approval notification. A final presentation is usually made.
- The finished thesis, together with the completed "Record form for theses" and a "Declaration of your own work" (both of which can be found here: (https://www.th-rosenheim.de/home/infos-fuer/studierende/studienorganisation/abschlussarbeiten/) must be submitted to the Examinations Office on time. A cover sheet according to Appendix 5 to the General Examination Regulations must be used when compiling final theses. Spiral binding is not permitted for final theses. In addition, the thesis must be submitted in the form of a single PDF file on a data carrier. This data carrier must be a CD/DVD in ISO-9660 format.
- If a change of topic is necessary, this can be applied for in the DMS for theses. A deadline extension for submitting the paper can also be applied for. Extending the time limit may only be approved due to circumstances beyond the student's control, and must be applied for in a timely manner.

2.1.2 Legal regulations that are relevant to conducting examinations

There are requirements prescribed by examination law for theses. They specify the criteria for conducting and writing a thesis, and they must be met in order for the thesis to be accepted and evaluated as a final thesis for a degree programme. Table 1 contains a summary of these requirements.

Table 1 Specific legal requirements for final theses

Regulation	**Section**	**Contents**
Bavarian Higher Education Act (Bayerisches Hochschulgesetz, BayHSchG)[1])	Section 61	General information about examinations and examination regulations
ditto	Section 62	Approved examiners
General Examination Regulations (Rahmenprüfungsordnung, RaPO) for universities of applied sciences in Bavaria from 17 October 2001, in the formally amended version from 06 August 2010[2]	Section 3	Duties of the Examination Committee: appointing examiners, assigning students to examiners; monitoring the legality of the examination; making decisions on applications for granting an extension to the deadline; specifying authorised examiners: retired professors, assistant lecturers, teaching staff for special duties, research assistants
ditto	Section 7	Final grades for Bachelor's and Master's theses
ditto	Section 8	Bachelor's and Master's theses should be completed within the standard period of study
ditto	Section 10	Deadlines for retaking Bachelor's and Master's theses
General Examination Regulations for Rosenheim Technical University of Applied Sciences, in the version from 29.10.2020[3]	Section 21	Stating the purpose (Section 21 (1)) Wording of the declaration which students must submit with the Bachelor's and Master's theses (Section 21 (3)) Time limits and deadlines (Section 21 (4) and (5)) Registration procedure (Section 21 (6) and (7)) Type and number of compulsory copies (Section 21 (6) Item 3)
ditto	Section 9 (3)	The faculties regulate their registration dates by themselves
ditto	Appendix 5	Designing the cover sheet for the final thesis in accordance with the provisions of Section 21 (6) Item 3 Sentence 2 APO
Study and examination regulations for the individual degree programmes		

2.1.3 Copyright law, confidentiality, publication and blocking

Copyrights for a final thesis lie primarily with the author. These include decisions on the right to publish, legal protection and economic exploitation of the thesis.

Final theses do not have to be published. However, the author of a thesis generally has the option to publish and commercially exploit this thesis (via thesis agencies, for example). In accordance with the German Act on Copyright and Related Rights (Urheberrechtsgesetz, UrhG[4]), the author of a final thesis, upon completion of his/her thesis, acquires sole copyright and generally the resulting rights of use, such as publication (Section 12, UrhG), distribution (Section 17, UrhG), reproduction (Section 16, UrhG), online use, and so on - i.e. all rights that affect non-commercial or commercial use.

The final thesis is simultaneously part of a degree programme. The requirements for such a thesis which are set out in the Bavarian Higher Education Act and in the examination regulations must be fulfilled if the thesis is to be recognised as an examination. This especially includes the right and obligation of the university that the thesis is viewed, treated and stored by examiners and administrative offices for examination and documentation purposes.

In the case of theses which are brought in by industry (“external theses”), the companies sometimes demand confidentiality agreements from the university or the examiners. Neither the university nor the examiners are obliged to conclude these agreements. These agreements are generally rejected because confirmation is often demanded from examiners which clashes with their work obligations or which the examiners cannot guarantee because it concerns areas of the university that are not within the examiner’s field of expertise (e.g. university administration).

2.2 Information on conducting a thesis

2.2.1 Finding a topic

In general, every student can propose his/her own topic. The university’s “Application for the Issue of a Thesis Topic” form must be used for this. The student is responsible for finding an examiner who is prepared to supervise this topic. Neither the examination candidate nor the industrial company has a right to be issued with a certain topic.

The thesis is always completed in an institute at the university. In exceptional cases, the thesis may be completed outside the university if it is assured that the thesis can be supervised there by the examiners from the university and if the Examination Committee has given its approval. While the final thesis is being completed, neither an industrial company nor any other external institute/person can be granted the right to influence the topic or contents of the thesis. In terms of examination law, proposals and initiatives in this direction are considered to be non-binding suggestions for the university supervisors or the examination candidates.

2.2.2 Finding an examiner

In cases where students choose their own topic, they are responsible for finding two examiners for the "first review" and the "second review" (Section 19 RaPo) for the topic formulation and supervision of their thesis. The examiners are formally approved upon application by the student, through their respective Examination Committee ("registration").

Only those people authorised in terms of Section 62 of the Bavarian Higher Education Act (BayHSchG) or Section 3 of the General Examination Regulations (Rahmenprüfungsordnung, RaPO) may serve as examiners (professors, university lecturers, as well those permitted by the relevant regulations of the State Ministry for Science.

Under the current legislation, contact persons for the students in companies ("company supervisors") are not examiners and are not entitled to influence the evaluation of the thesis.

2.2.3 Processing

2.2.3.1 Comments about the scientific character

Final theses should

> "show that the student is capable of independently processing an issue in their field of study on a scientific basis" (Section 21 (1) APO).

Similar requirements for Bachelor's and Master's theses are prescribed by the university's basic regulations:

> "The final thesis should demonstrate that students are capable of independently processing an issue in their field of study on a scientific and/or artistic basis." [5]

In this context, the scientific character means creating new knowledge, or systematically applying existing knowledge.

New knowledge is created by formulating a hypothesis (plausible statement) regarding an unresolved question, and examining its accuracy during the course of the thesis[6].

Existing knowledge is applied by systematically using current knowledge to tackle a scientific question. In particular, this requires careful research of the relevant literature for usable findings, as well as systematic, well-planned investigation using verified methods and equipment.

In contrast, the following do not constitute scientific work:

- working through specified instructions, even if these arose due to labour-law hierarchies, popular opinion, consensus processes or majority decisions;
- random experiments, on the off chance of finding something out.

Scientific work is also characterised by reproducibility. This requires careful documentation of the work carried out, which enables subsequent researchers or sceptics to repeat the process. If the same results are achieved, this is considered to be scientific confirmation. Written theses which, for confidentiality purposes, summarise the description of the work carried out to such an extent that the investigations cannot be reproduced, are unable to meet the criterion of reproducibility, and thus do not meet the criterion of scientific character. They are not suitable as final theses.

2.2.3.2 Researching the state of science and technology

Which usable findings that are relevant to the task are already available in science and technology? This requires a literature review of specialist books and scientific journals, for example with the help of a database.

This can prevent the later - unknowing - rediscovery of existing knowledge from laborious experimental work (*"reinventing the wheel"*). It can also prevent following paths that others have already identified as futile.

Conventional literature research requires carefully combing through relevant scientific journals and books, which can be best accomplished in good libraries. They contain the individual volumes of scientific journals in bound form. They usually include a keyword index, which is helpful for quickly finding articles which are relevant to the topic. Thorough research, the old-fashioned way, usually requires several working days.

Database-driven literature research is faster. Using a database system (such as STN via www.fiz-karlsruhe.de) can search the entire scientific literature of the last few decades for certain keywords within minutes. The results are summaries of the books and journals discovered (author, title, brief overview of contents (abstract), specific sources, details of the language of the publication). For normal users, the cost of database research like this is around

several hundred Euros, depending on the volume of data downloaded. This may seem expensive, but appears less expensive if you consider that comparably-thorough conventional literature research requires a week's work, which may easily amount to several thousand Euros, including labour costs.

TH Rosenheim has reduced-rate academic access to databases, so that no research costs arise for final theses or project work. The university's library offers online access for conducting research in specialist literature. The library shows you how to successfully conduct such research in an online course in the learning campus: "Structured research", https://learning-campus.th-rosenheim.de/course/view.php?id=2489).

Sources which prove to be interesting on closer examination can be obtained as an inter-library loan (books) or as a copy (journal articles) through the library at Rosenheim University of Applied Sciences.

Journal articles can also be obtained very quickly via the online service Subito (http://www.subito-doc.de). This is subject to a charge. Typical costs are in the range of a few Euros per journal article. The requested articles are delivered by e-mail as a PDF document.

The resulting texts can then be read and searched for usable findings.

2.2.3.3 Planning your own work

The topic is set, the current state of science and technology has been determined: now you can plan the work to be carried out.

Using project management methods is recommended for the planning[7]. They enable you to estimate whether the objective can be achieved with the available resources (especially time, possibly also money, availability of machines/etc., support by qualified staff).

When conducting experiments, an experimental design is a good idea. If the effect of various parameters, possibly also in different quantitative increments, is to be investigated, it is easy for conflicts to arise between accuracy and reliability on the one hand, and the necessary time and effort on the other. This not only applies to practical experiments, but also to computer simulations. One particular scientific field provides practical methods for achieving the highest possible amount of results with as little effort as possible. This is known as Design of Experiment, or DoE. For more information on this topic, please see the section on Further Literature [8, 9, 10].

Example: A complete experimental design for six factors at two levels, for example, would require $2^6 = 64$ trial runs. For economic reasons in cases like this, fractional factorial designs like 2^{6-3} or 2^{7-4} are often used. The formula 2^{6-3} used here signifies that out of the total possible number of 2^6 trial runs, only a fraction will be performed, so 1/8 (= 2–3) (64 / 8 = 8). Orthogonal array testing is often used to select the eight trial runs in the fractional factorial design.

2.2.3.4 Conducting your own work

Your own work is conducted according to the plan.

When carrying out experimental work, complying with the relevant safety regulations is advisable.

Likewise, it is also advisable to thoroughly document the work, in order to later be able to understand what has been done and achieved, and under which conditions. A good example can be found in the test reports in accordance with the testing norms, for which all test norms include requirements.

2.2.3.5 Evaluating your own work

At the end, you must evaluate your own work, in order to obtain statements related to the objective of the thesis. What, for example, do the experimental results say regarding the objective?

Measurements typically require subsequent processing or analysis with statistical methods. In general, measurements are investigations of representative samples, in which systematic trends are mixed with random influences, for example through the selection of the individual samples. Statistical methods enable us to verify which significant conclusions can be made. From a professional point of view, it is negligent to declare that two batches or two procedures are different, simply because random samples taken from them exhibit different average values. A good introduction to the methods of statistics is provided by Lehn and Wegmann[11], for example.

2.2.4 Drafting the written documentation

2.2.4.1 Proposals for structures

A distinction has to be made between the work mentioned above and the written documentation, even though both are often referred to by the same name, e.g. "*Diplom* thesis" or "Bachelor's thesis". This section deals with writing the thesis, which is then formally submitted to the university for evaluation, for example as a "*Diplom* thesis" or "Master's thesis".

A final thesis should always contain the following elements:

- a clearly formulated objective;
- an overview of the current state of science and technology regarding this objective, documented with systematic, careful notes on the cited literature;
- a description of the own work conducted, with sufficient details so that it can be reproduced by others (reproducibility is a key characteristic of scientific work);
- a description of the results from the work you conducted;
- a discussion of your results, regarding the question of whether - or to what extent - the objective could be achieved;
- an introduction explaining the significance of the topic and a summary round the thesis off.

Appendix A contains an example of a suitable structure.

The individual points of the structure can be further subdivided if necessary. Complementary subdivisions are ideal, because they completely cover the aspect being investigated in a logical manner, for example:

3.1 Existing knowledge of joining processes
3.1.1 Processes **with** heating
3.1.2 Processes **without** heating

Formal guidance on the structure of texts is provided in the standard DIN 1421 "Documentation - numbering of divisions and subdivisions in written documents"[12].

There is no need to include a chapter presenting companies which may have suggested the topic

of the thesis (e.g. details of the company history, profile of the company founder, market position), unless there is a factual necessity to do so. Just as the companies don't adorn their own technical publications (e.g. operating instructions, technical manuals) with this prose, so too has it no place in the final thesis for a scientific engineering degree.

Use of company logos should also be avoided, to prevent suspicion that the final thesis is a company document.

In contrast, a mandatory component of *Diplom* theses is a declaration by the student, in accordance with Section 35 (7) of the General Examination Regulations (RaPO), "that he/she wrote the thesis independently, has not submitted it elsewhere for examination purposes, has not used any sources or assistance other than that specified, and that literal and analogous quotations have been attributed as such."

2.2.4.2 Layout

2.2.4.2.1 General notes

The number and type of copies of the thesis to be submitted is specified in the General Examination Regulations of Rosenheim University of Applied Sciences (Section 19 (7) Item 3, Allgemeine Prüfungsordnung der Hochschule Rosenheim): "Two printed and bound copies of the completed final thesis must be submitted to the Examinations Office. Spiral binding is not permitted for final theses. In addition, the thesis must be submitted in the form of a single PDF file on a data carrier. This data carrier must be a CD/DVD in ISO-9660 format."

In addition, many examiners also appreciate an electronically-readable copy of your thesis.

Final theses must be written on white A4 paper.

The text must be in block letters. As an exception, mathematical formulas can also be written by hand.

The individual sheets of paper must be numbered consecutively in the header or footer. The page numbering only begins with the text of the first chapter of the thesis. It is carried out with ascending whole numbers (1, 2, 3, etc.). The preceding pages, which include the table of contents or the list of symbols, abbreviations and indexes used, may be numbered with Roman numerals (I, II, III, etc.).

The text margins should be as follows from the edge of the page:

from the left edge	approx. 30 mm (from edge of binding)
from the right edge	approx. 20 mm
from the top edge	approx. 30 mm (due to the header)
from the bottom edge	approx. 20 mm (approx. 30 mm if there is a footer)
header to the top edge	approx. 15 mm

To achieve a uniform format throughout the text body (of the thesis) without any special effort, the most practical method is essentially to set everything aligned to the left, i.e. everything starts uniformly at a distance of 30 mm from the left edge of the page. Different indentations are much more difficult to apply consistently over longer text passages; in addition, the effort required for major indentations is unnecessarily extensive.

Depending on the individual preference, the thesis can be partly or wholly printed in block style

(justification).

A sensible font size for standard text is 10 pt to 12 pt.

The format of the written version of the thesis (for example, the type of binding), as well as the number of copies to be submitted, is stipulated by the respective Study and Examination Regulations.

2.2.4.2.2 Title page

The title page must include the following information

- Name of the author;
- Topic of the thesis;
- Designation of the type of thesis (e.g. "Bachelor's thesis for the degree programme in Production Engineering at Rosenheim University of Applied Sciences");
- The date of submission;
- The names of the two examiners appointed by the faculty's Examination Committee for this thesis (examiner, not supervisor, is the correct term, see chapter 2.1.1)

2.2.4.2.3 Dealing with images and tables

Good images or schematic diagrams are often far more efficient than verbal descriptions. If possible, numerical results should also be translated into images.

There are two possibilities for arranging images and tables:

- they can either be placed in close proximity to the passage of text, in which reference is made to them, similar to in a textbook; or
- they can be grouped together in a separate chapter, "Images and Tables", in which first all the images and then all the tables are presented, sorted according to their respective numbers. This option is recommended if the same images or tables are referred to at several points in the text, to minimise the search effort.

Tables are labelled above, images below, always with a system of continuous numbering. The numbering either runs consistently through the whole thesis (e.g. Image 1, Image 2, etc.), or chapter-by-chapter (e.g. for Chapter 3: Image 3.1, Image 3.2, Image 3.3, etc. or Image 3-1, Image 3-2, etc.).

Examples:

Image 1 View of the component from above

Table 1 Results of the tensile test

If images or tables are taken from literature, then the image or table labels must contain a reference to the literature source (see below).

2.2.4.2.4 Guidelines for citing literature

Everything incorporated in the written documentation that is acquired from other works, including text passages, images, tables or ideas, must be marked with a reference to the source. In extreme cases, not citing external knowledge may constitute an act of deception in terms of the General Examination Regulations[13] . The consequence would then be evaluation of the thesis as "not sufficient".

Source references (also known as literature references) must only be listed for the text passages, images, tables or ideas that are included in the written version. An extremely short list of literature leads to suspicion that the thesis was prepared without considering the existing knowledge contained in scientific literature, and that the thesis may have "reinvented the wheel".

The citations must be numbered sequentially throughout the text, for example using the reference function of the word-processing programme (Insert/Reference/Footnote/Endnote). Whole numbers must be used.

Examples for including the source references (= literature references) in the main text:

> "According to Martens /14/, structural steel is a ferromagnetic material ..." or
>
> "Shelton and Ashby[14] reported that they had developed low melting point, lead-free solders, which meet the requirements of the electronics industry." or
>
> "Technical approaches for wireless communication have been known for a long time. Marconi already reported about experiments in 1895, in which he could transmit signals over a distance of 1.5 km [14]."

Examples of references:

Book (author):
Author: Title incl. edition number if necessary Publisher, Place of publication Year of publication, Page
Neamen, D.: Microelectronic Circuit Analysis and Design.McGraw-Hill, New York 2006, Page 76

Book (compilation):
Author: Individual title In: Name (ed.): Full title, additional information as above, page number if necessary
Huster, F. J.: Harnstoffharz-(UF)-Formmassen-Aufbau, Verarbeitungs- und Werkstoffeigenschaften, Anwendung. In: Becker, G. W.; Braun, D. (ed.): Kunststoff Handbuch. 2nd edition Vol. 10. Hanser, Munich 1988, P.275-287

Journal articles:
Author: Title of the article Journal Year (year of publication) Issue number, Page number
Six, J.: Homogenizing and Shearing Elements in Single-screw Extruders (Misch- und Scherteile in Einschneckenextrudern). Plast. Technol. 27 (1981) 9, P. 981-985

Pamphlets / company publications
Author: Title Company publication by ..., Place Year
Meyer, K.: Die Profis in Verschleißfragen. Company publication by Reiloy GmbH, Troisdorf 1983

Patents:
State - Type of property right Patent number: Patent title (year of publication) Patent holder
US-PS 4.588.538: Process for Preparing Tapes from Thermoplastic Polymers and Carbon Fibres (1986) Chung, T.S. u.a. D-OS 2448217: Verfahren zur Herstellung von faserverstärkten thermoplastischen Materialien (1973) Davis, J.H.

Standards:
Standard: Title Publisher, Place, Year
DIN 7728 T.l: Plastics; symbols and codes for polymers and their special characteristics Beuth, Berlin 1988

Theses/ Dissertations:
Author: Title Thesis/ Dissertation University Place Year, Page
Hinkelmann, B.: Zum Füllstoffeinfluß auf das rheologische Verhalten von Thermoplastschmelzen. Dissertation TH Darmstadt 1985, Page 64

Presentations
Author: Title Presentation Event, Place Year
Visser, R.: Engineering Plastics. PRI Conference, Plastics on the Road, London 1984 (with textbook)
Deibel, S. R.: Die Philosophie des fit for use/ just in time. Presentation, Qualität sichern im Blasformbetrieb. VDI-Verlag, Düsseldorf 1988

Internet (only as an emergency measure, because the permanent availability of the contents of a link is dubious):
Author: Title Internet link (URL), Date, Time

Müller, P.: Autorenrichtlinien.
http://files.hanser.de/zeitschriften/docs/251214122553-117_Autorenrichtlinien_mp_deutsch.pdf 25.07.2006, 11am

If the author is not known, their name in the source is generally replaced by the abbreviation

"N. N.".

2.2.4.2.5 Appropriate language and writing

The text should be formally correct, as short as possible, but nevertheless detailed and clear enough so that typically-educated professionals can follow the discourse.

In scientific literature, the first-person “I” and the “we” forms are not generally used. It is customary to use the passive form (e.g.: "The machine was used at an ambient temperature of 23°C." or: “Three samples were investigated from each item.")

In scientific texts, technical terms which are already defined or generally established should be used consistently in the same context. The beautiful variations of expression found in literary prose texts complicate the understanding of scientific and technical texts, especially for translations.

Terms or abbreviations that are not generally known should be explained in the initial introduction to the thesis. No abbreviations should be used in titles or headings.

2.2.4.2.6 The purpose and design of appendices

Appendices are generally unnecessary. Important contents belong in the main text of the actual thesis. Unimportant contents have no place in the final thesis at all. Appendices usually arise from a problem distinguishing between what is important and what is not.

If appendices appear unavoidable, they must be attached to the actual thesis. A separate appendix is used for each individual aspect. Each appendix must be labelled with its own letter.

Examples:

> Appendix A: Compilation of all photos that were taken in the framework of this thesis
>
> Appendix B: Collection of safety data sheets of all substances handled during the course of this thesis.

As described above, appendixes are often actually dispensable. Instead of including all photos in Appendix A, a selection of photos could be presented at a suitable point in the main body of the thesis which are typically representative of all the other images. - Instead of including all the safety data sheets in Appendix B, the literature list could include the correct reference to the place of discovery, e.g. page on the Internet. The interested reader can then obtain this information themselves, if necessary.

3 Keyword index

4 Further literature

Please note the attached list of literature references.

[1] Bavarian Higher Education Act (Bayerisches Hochschulgesetz, BayHSchG)
https://www.gesetze-bayern.de/Content/Document/BayHSchG?AspxAutoDetectCookieSupport=1 on 13.11.2020 at 11.43 am

[2] General Examination Regulations for universities of applied sciences in Bavaria from 17 October 2001, in the formally amended version from 06.08.2010,
https://www.gesetze-bayern.de/Content/Document/BayRaPO/true?AspxAutoDetectCookieSupport=1 on 13.11.2020

[3] General Examination Regulations for Rosenheim Technical University of Applied Sciences from 29.10.2020, https://www.th-rosenheim.de/fileadmin/user_upload/Dokumente_und_Merkblaette/SPOs/APO/APO_4AEnderung_konsolidierteFassung_20202.pdf on 13.10.2020 at 11:55 am

[4] TH Rosenheim's collected study and examination regulations can be found here:
https://www.th-rosenheim.de/index.php?id=9417 (on 12.11.2020 at 12:09)

- [5]German Act on Copyright and Related Rights (Urheberrechtsgesetz)
http://bundesrecht.juris.de/bundesrecht/urhg/gesamt.pdf on 12.11.2020 at 12.11 am

[5]

[6] Popper, K.: Alles Leben ist Problemlösen. Piper Verlag, Munich, 2003

[7] Litke, H.: Projektmanagement. Methoden, Techniken, Verhaltensweisen. Hanser, Munich 2006

[8] Kleppmann, W.: Taschenbuch Versuchsplanung - Produkte und Prozesse optimieren. 6th edition, Hanser, Munich 2009

[9] Klein, B.: Versuchsplanung - DoE - Einführung in die Taguchi/Shainin-Methodik. Oldenbourg, Munich 2007

[10] Montgomery, Douglas C.: Design and Analysis of Experiments. John Wiley and Sons, New York 1991

[11] Lehn, J., Wegmann, H.: Einführung in die Statistik. 5th edition. Teubner, Wiesbaden 2006

[12] DIN 1421: Gliederung und Benummerung in Texten. Beuth: Berlin 1983

[13] General Examination Regulations for universities of applied sciences in Bavaria from 17 October 2001, in the formally amended version from 20 July 2007, Section 6 "Verstöße gegen Prüfungsvorschriften" (violations of examination regulations)
http://www.fh-rosenheim.de/fileadmin/inhalte/Studium/Regelungen/Verordnungen/AEnderung_RaPO/RaPo_20072.pdf on 13.11.2020 at 12.43 am

Appendix A

Sample structure

1. Introduction

Overall context, containing the subject. Introduction to the objective; what makes the topic a problem? What are the benefits of solving the problem?

2. Objective of the thesis

Short and precise specification of the objective (task formulation) of the thesis.
"The objective of this thesis is to find out/ resolve ..... ." Possibly a short (!) description of the ways and means to be used in order to

achieve the objective of the thesis.

3. The state of science and technology

Which usable findings that are relevant to the task are already available in science and technology? Including literature analysis from relevant books and scientific journals, possibly with the help of a database; chapters should be sub-divided into important individual aspects; when describing facts, specify their sources; quotes must be consecutively numbered; related literature references are in Chapter 9. Not usable: verbal tips from 'old-timers', claims not supported by sources.

4. Own research conducted

This chapter contains a description of the work carried out to achieve the objective. The purpose of providing this information is traceability and reproducibility of the experiments. Reproducibility is a criterion of scientific work. It must therefore always be possible to repeat the experiments at a later point in time, using the descriptions here of the work carried out.
The typical contents of this chapter are: a description of substances and devices used (names of materials, trade name, manufacturer, location / device type, trade name, manufacturer, location); sample preparation; experimental setups, description of the investigation methods (norms?) and test equipment (type, trade name, manufacturer, location, accuracy).
A description of the experiments conducted on the basis of a predetermined plan (design) of experiments (experimental matrix, possibly in the form of a table); where applicable, explanation of the reasons why limiting to certain selected experiments was necessary.

5. Results of the own research

Specifying the results of the experiments with a brief description; where possible, numerical values summarised in tables, with important results also reflected in images; no discussion or evaluation of the results, as a clear distinction must be made between objective measurements and subjective interpretations; where there are a large number of similar images, include only one representative example - the rest can be included in an appendix, if at all.

6. Discussion of the results and outlook

Interpretation of the results based on aspects of the objective; what can be ascertained from the results with regard to the objective? How do the results fit in with the established body of knowledge reflected in the literature? How reliable are the conclusions? What remains unresolved? Do the results give rise to new questions?

7. Summary

Brief overview of the whole thesis (one to two pages): What is the higher-level context? What is the problem and how significant is it? What is the precise objective? What are the ways and means of investigation? What are the results in relation to the objective?

8...Images and Tables

Good pictures or schematic diagrams are often far more efficient than verbal descriptions; extensive numerical results should also be translated into images, as far as possible.

There are two basic alternatives for arranging images and tables:

- Images and tables can be grouped together in a separate chapter: first the images, then the tables, presented in numerical order. This is helpful if the same images and tables are referred to in several different parts of the text (for example, in Chapters 5 and 6), because it makes searching for the images easier.
- Alternatively: images and tables can be inserted directly into the main text, at the point where they are referenced for the first time. This method is helpful because of the close proximity between image and text, but only if the majority of the images and/or tables are just referred to once in the text.

9. Literature

Systematic list of literature cited in the text - especially in Chapter 3; only literature actually cited in the text should be included here; an extremely short list of literature leads to suspicion that the thesis was prepared without considering the existing knowledge contained in scientific literature, and that the thesis may have "reinvented the wheel".