

# Guidelines for writing scientific paper

At the Institute of Machine Tools and Production Processes

## Professorship for Forming and Joining





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## 1 Introduction

Students at the Chemnitz University of Technology must complete at least one academic work during their studies. Regardless of their field of study, this includes, for example:

- Bachelor's, Master's, and diploma theses (hereinafter referred to as "final theses")
- Study and project assignments
- · Coursework, case studies, laboratory internships, or other scientific projects

The goal of these guidelines is to provide a structured and correct approach to handling scientific topics, as well as to present the obtained results in an appealing and stylistically appropriate manner. This assists the student or researcher, primarily in presenting their approach, thoughts, and results to their supervisor or evaluator for an objective assessment of the work. Additionally, it aims to help the reader easily follow the author's train of thought and utilize the acquired knowledge/results for further research. What may seem self-evident to the author during the task's completion may not be apparent to the supervisor or the initial reader. Consequently, the reader must be led step by step, statement by statement, logically and coherently towards the results. If the reader cannot follow the thought process at any point, they may not fully comprehend the result as a whole.

Just as with a product, the "packaging" of a scientific work is of great importance and is particularly crucial for the final grading. This includes an appealing yet still straightforward and strictly factual presentation using modern word processing tools. The software courses offered by the university's computing center can be quite helpful in this regard. Advantages of using automation include:

- Automated generation of indexes (table of contents, list of figures and tables, etc.) through established links
- Auto-correction
- Consistent and visually appealing formatting using predefined style templates

Essential skills, such as structured approaches and proper documentation, are learned in various academic works during the course of study to then successfully complete this with the respective final thesis.

Based on many years of experience, the last chapter summarizes numerous tips on planning and preparing the work, its implementation and the final defense. The suggestions and instructions in these working instructions must be used when preparing scientific work at the Chair of Forming and Joining.



## 2 Structure of the work

The order of the points listed one after the other in this chapter also corresponds to the recommended arrangement in a scientific paper. These are explanations and instructions in detail

- Cover Page
- Task Description
- Bibliographic Description\*\* and Abstract
- Table of Contents
- List of Abbreviations and Symbols
- List of Images/Tables/Diagrams
- Acknowledgments\*
- Introduction
- Literature Analysis (State of Research and Development)
- Specification of the Task
- Main Section (Headings can be freely defined; pay attention to the "common thread")
- Summary
- Outlook
- List of References
- List of Appendices\*
- Appendices\*
- Theses\*\*
- Declaration of Independence

\* optional \*\* only for master's thesis



## 3 Contents of the individual bullet points

## 3.1 Cover Page

A cover page in accordance with Appendix 1 (adapt the title according to the respective work) must be used for all scientific work.

<u>Note:</u> The signed assignment handed out by the Central Examination Office for final theses should not be used as a cover sheet, but should be integrated into the work after it.

## 3.2 Task Description

The task description is usually written by the university supervisor. In the case of a final thesis, this is officially applied for and issued to the Central Examination Office. For coursework and project work, the task is printed on a header form from the professorship and handed out by the supervisor. The original signed assignment must be included in the paper copy of the work, which will be archived at the end.

<u>Note</u>: Additional copies contain duplicates.

The title of the task should be short and reflect it succinctly. After an introductory section on the topic to be covered, the objective and the desired approach are formulated. The main points of the work can then be listed in bullet points. In addition to a final wording on possible adjustments to the task during processing, it also contains the processing period and a list of the supervising scientists.

## 3.3 Bibliographic Description and Abstract

In scientific papers, a bibliographic description of the work must be included on one page before the abstract.

Example
Mustermann, Max:
Forming hybrid material composites
Master's thesis at the Faculty of Mechanical Engineering at Chemnitz University of Technology, Professorship of
Forming and Joining, Chemnitz, 2016
105 pages, 40 figures, 10 tables, 3 appendices, 47 sources
Abstract

The abstract should be viewed as an informative and indicative presentation. It must be written in German and English. It should each have a maximum of 13 lines. The content of the document should be presented briefly and clearly, without judgment or interpretation, in the following order

- Topic area covered
- Objective of the work
- Solution path
- Important results
- Conclusions

The few lines should be written as interesting and informative as possible so that the reader can see whether it is worth reading the work more intensively.

## 3.4 Table of Contents

The structuring of the work is done logically and meaningfully, following the approach used in addressing the task. The structure must be proposed to the supervisor approximately one month after starting to work on the topic and discussed and determined with him. The chapter and section headings should have the following characteristics

- short and meaningful
- starting with a noun or adjective (no articles or prepositions)



#### • no shortcuts

Subdividing a chapter only makes sense if it contains at least two sections. A section is only useful - regardless of the structure level - if it is followed by at least half a page of text. The smooth transition between the chapters, with a few introductory sentences and the summary of important findings at the end, promotes coherent understanding and is to be strived for. Basically, a maximum of four, preferably three, structure levels should be used. If the content cannot be represented in any other way, five levels are the absolute limit. In addition, when subdividing, attention must be paid to the same hierarchy levels.

Example	
3 Forming Processes	
3.1 Sheet Metal Forming	
3.1.1 Deep Drawing	
3.1.2 Stretch Forming	
3.1.3 Bending	
3.2 Bulk Deformation	
3.2.1 Forging	ightarrow wrong, because only one section in this level
4 Rolling	ightarrow conditionally incorrect; incorrect content, belongs under 3.2

The table of contents provides an overview of the thematic division of the work and contains all section numbers, headings and their page numbers. Repetitions of content and wording must be avoided. All chapters and subchapters must be listed. Each hierarchy level has its own escape line in the directory, which must be indented starting from the left. It is recommended to let the word processing program you use create the table of contents automatically.

### 3.5 List of Figures and Tables

When using images (including diagrams) and tables, a directory of the respective objects must be created. This includes the image or table number, the name and, separated by an alignment line, the page number. Here too, it is advisable to use the automatic creation of the word processing program. It is advisable to use a pair of numbers for the assignment, which is separated by a period. The first number corresponds to the chapter number and the second is assigned consecutively according to the object used in the chapter.

## 3.6 List of Abbreviations and Symbols

#### List of Abbreviations

All abbreviations used in the text that are not listed in the last edition of the Duden must be listed here alphabetically and explained. When they first appear in the text, they must be spelled out and the abbreviation must be added in parentheses after them. Only technical abbreviations apply, not "convenience abbreviations".

Example	
Abbreviation TTT-Diagram	<b>Designation</b> Time-Temperature-Transformation Diagram
TTA-Schaubild	Time-Temperature-Austenization Diagram

#### List of Symbols

If calculation formulas are used in the text part of the work, a list of abbreviations with a separate list of indices must always be created, regardless of the list of abbreviations. The formula symbols and abbreviations used must be listed alphabetically with a description and a clear unit of measurement. SI units are preferred. Furthermore, lowercase letters have priority over capital letters, non-indexed letters over indexed letters and Latin letters over



Greek letters.

## 3.7 Acknowledgments (optional)

If necessary, an individual foreword can be used to thank companies, institutions and people. In this case it receives the outline point 0 and the page number 1.

	small	without Index	Abbreviation	Unit	Designation
latin		with Index	-   S	mm	Sheet thickness
aun		with index	<b>U</b> 1,2	mm	Undercut
		without Index	A	m²	Area
	big		- Pd	kW	Continuous power
		with Index	α	0	Angle
	small big	without Index	δ <sub>ges</sub>	0	Total angle
			- Ω	-	Coefficient
greek		with Index	Σ <sub>ges</sub>	-	Total sum
gicck		without Index	Indices	Unit	Designation
		itle Leeders	— dyn	-	dynamic
		with Index	eff	-	effective
	small	without Index	r	-	radial
		with Index	—   t	-	translational
other		with index	WZ	-	Tool
	big	without Index	zul	-	allowed
		with Index	-		

## 3.8 Introduction

The first part of the text does not necessarily have to be called "Introduction", but this section is intended to arouse the reader's interest. The introduction to the work must be ensured by providing informative explanations of the goal, the topic environment and the basic solution. In addition, questions and problems related to the topic must be raised. The introduction should be a maximum of two pages.

## 3.9 Literature Analysis (State of Research and Development)

Literature, i.e., books, specialist journals, conference proceedings, patents, standards and internet publications must be analyzed with regard to the representation of the current state of knowledge in the area of the task. This section should be structured according to the main focus of the task, should summarize and generalize the statements from the sources, and present the contradictions or binding statements. Topics not covered should be mentioned. The effects of the knowledge gained on the processing of the task must be made clear. A pure internet search is not sufficient; i.e., a visit to the library is mandatory. The sources used consecutively are to be numbered continuously within the text. The sources used one after the other must be numbered consecutively in the text.

## 3.10 Specification of the Task

In the case of final theses, after analyzing the current state of knowledge in science and technology in the subject area, the task with its sub-tasks must be specified under the influence of the literature conclusions obtained.

## 3.11 Main Section

The actual task is dealt with its main focus in the main part and represents the most extensive part of the work. This



is divided into sections according to the individual topic - e.g. in an experimental work, this can be "test planning and execution", "measurement results" and "discussion of the results" - to be structured. In terms of content, the focus should be on the newly gained knowledge. Detailed proof calculations can be found in the appendix.

## 3.12 Summary

The results achieved (e.g., connections found, properties, influencing variables, correlations), devices or procedures developed must be presented in a concentrated manner in the summary. The conclusions are intended to provide a quick overview of the most important results of the work. There must be no new findings not mentioned in the main part. The scope should be limited to two pages. The summary only serves its purpose imperfectly if parts of the work must first be viewed in order to understand it.

## 3.13 Outlook

Apart from the author, no one else - not even the supervisor - has explored the topic in such depth. Ideas that arise during processing and documentation should therefore not be lost and should remain available for future thinking. For this reason, knowledge gained, devices or procedures for further fields of application and tasks must be presented in this part of the work in the form of ideas and suggestions.

## 3.14 List of References

The numbering should be arranged according to the occurrence of the sources in the text. The source number must be given in the format [#]. "#" stands for an Arabic numeral without a leading zero. The authors' first names are always abbreviated with the first letter. The source citation must be written in the following format:

Name1, V.; Name2, V.: Title. Place of Publication: Publisher, Year of Publication

If there are more than three authors, the first three must be mentioned, with others using their abbreviations "et al." (and others) are indicated.

Name1, V.; Name2, V.; Name3, V. et al.: Title. Place of Publication: Publisher, Year of Publication

If the author is unknown, the author is referred to as "N. N." (nomen nescio).

Internet documents are specified by specifying the URL (without hyperlink) and the date of the last access.

Authors, Organization or Company Name: Title. Date, URL

The specification of academic qualification work

Authors: Title. Type of work, Institution, Location, Year of Publication

The specification of articles from specialist magazines or anthologies

Authors: Title. Journal, Year, Issue, Pages.

The specification of conference proceedings:

Authors: Title. Conference Proceedings, Conference Name, Location, Date, Pages.

The specification of patents and disclosure documents:

Authors: Title. Type of Document with Registration Number, Publication Date



For English-language sources, all information should be consistently maintained in English.

Exam	ple
[1]	Weck, M.: Werkzeugmaschinen – Messtechnische Untersuchung und Beurteilung, Band 5, Berlin, Heidelberg, New York: Springer Verlag, 2001
[2]	Klotz, M.: Topologieoptimierung eines Spannfutter, Diplomarbeit, Technische Universität Chemnitz, 2005, (unveröffentlicht)
[3]	Neugebauer, R. et al.: Technologische Innovationen für die Antriebs- und Bewegungstechnik. Tagungsband, 4. Chemnitzer Produktions- technisches Kolloquium, Chemnitz, 21./22.09.2004, S. 75-100
[4]	Neugebauer, R.; Mahn, U.; Weidlich, D.: Berücksichtigung von Maschinen-elementen in komplexen FE-Modellen. Konstruktion, 2001, Heft 9, Seite 55-58
[5]	Mahn, U.; Thomas, V.; Weidlich, D.: Spannfutter. Patentschrift Nr. DE 10245174, 27.09.2003
[6]	Wessel, N. et al.: Modeling Thermal Displacements in modular Tool Systems. Int. Journal of Bifurcation & Chaos, 2004, Vol. 14, pp. 2125-2132
[7]	VDI/DGQ 3441: Statistische Prüfung der Arbeits- und Positionsgenauigkeit von Werkzeugmaschinen. Düsseldorf: VDI-Verlag, 1977
[8]	N.N.: Dehnungsmessstreifen und Zubehör. Firmenschrift, Hottinger Baldwin Messtechnik, Darmstadt, 2001
[9]	N.N.: MathCad Nutzerhandbuch – MathCad 8.0 – MathCad 8.0 Professional. MathSoft, Inc., Bonn: MITP-Verlag, 1998

## 3.15 List of Appendices

In the appendix list, the individual appendices are listed. It is considered part of the actual work, meaning it has an Arabic page number and must be integrated into the main text.

## 3.16 Appendices

Appendices are additional information that contributes to the understanding of the work, but would, due to their size, disrupt the central theme of the text. These include, for example, technical drawings, extensive test results, tables of measured values, detailed proof calculations and the like. They must be inserted directly after the list of appendices. If the appendices are very extensive, a separate attachment volume can be created. This must also be preceded by the list of appendices. The appendix volume has the same cover page as the text volume (see appendix 1), only with the addition "Appendices". In the main text, references to the attachments must be made at the appropriate points.



## 3.17 Theses

In the case of master's theses, the theses are to be listed on a single page before the appendices. The primary sources of a student's scientific work are their own investigations, findings, observations, and calculations. From these, some fundamental statements (theses) on the scientific topic should be formulated with the broadest possible meaning. The accuracy of these statements must be verifiable, confirmable, or likely to be true. The proof, evidence, or confirmation of the correctness of the statements is not provided in the theses. These theses can serve as the central theme of the final defense.

#### **Example**

The topology optimization of an assembly with contact definition subject to friction requires five times more computing time compared to an individual part without contact with the same FE mesh density and only produces negligible differences in the design proposal.

- When deep drawing with a hydroelastic hold-down device, an 80 percent reduction in sheet thickness can be achieved compared to deep drawing with a rigid hold-down device.

## 3.18 Declaration of Independence

see Appendix 2



## 4 Layout

## 4.1 Formatting

#### Paper

- DIN A4, white, 80 to 100 g/m2
- Printed on one side

#### Margins

Left	3,0 cm
Right	2,5 cm (for comments)
Тор	3,0 cm (including header)
Bottom	2,5 cm (including footer)

#### Page numbers

Cover Page	keine	
Task description, brief summary, table of contents, list of figures and tables, list of abbreviations and symbols, index directory	Continuously in Roman numerals	I, II, III,
Main Text, List of References, List of Appendices, Appendices (if included in the main text volume)	Continuously in Arabic numerals	1, 2, 3,
Separate Appendices Volume (if necessary)	Continuously in Arabic numerals	1, 2, 3,

#### Header

- Font as in the text part, but size 9 pt (Times) or 8 pt (Arial)
- left: title of the work (possibly shortened)
- right: name of the current chapter (possibly shortened)
- Distance from edge: 2.0 cm

#### Footer

- Font as in the text part, but size 9 pt (Times) or 8 pt (Arial)
- left: last name, first name of the author
- right: page numbering
- Distance from edge: 2.0 cm

### 4.2 Font

With regard to good readability and interchangeability between different software and hardware systems, "exotic" fonts are unsuitable. The fonts to be used should be limited to the standard fonts, as summarized in the following table.



Font	Size	Line Spacing
Arial	11 pt	1,5-lines
Times New Roman	12 pt	1,5-lines

justified alignment with hyphenation should always be used. Highlights in the case of headings can be achieved by using bold letters and a maximum font size of 18 pt (never underlined). In the body text, highlights are shown in italics, preferably not in bold and never underlined.

## 4.3 Objects

When it comes to images, diagrams, tables, and other graphics, it is essential to ensure that colors, shading, and symbols are chosen and configured in a way that does not hinder readability and recognition in black and white printing and copying. In principle, these objects should be integrated into the text. The sole naming of the content should be avoided. Instead, statements about the object, reasons for trends, and the like should be formulated, and their impact on the topic should be discussed and justified. Statements such as

"Figure 3.15 shows the force-strain curve of a sample."

are unnecessary without additional information.

#### Pictures/sketches/graphics

The label must be arranged left-aligned under the object in the selected font. The formatting of the word processing program should be used as an "image caption" in order to be able to automatically create a list of figures. The first number of the numbering is the chapter number, the second is a consecutive number, corresponding to the illustration in the chapter. The text assigned to the image must be arranged so that both can be viewed at the same time.

Example	
Figure 3.10: Image name [possibly. Source]	

#### Diagramms



#### Tabels

The table caption should be positioned above the object in a standard font and left-aligned. Similarly, the formatting provided by the word processing program should be utilized as 'table caption' to facilitate the automatic generation of the table of contents. The first number in the numbering represents the chapter number, and the second represents a consecutive number, corresponding to the table's position within the chapter. The text associated with the table should be arranged in a way that allows both the table and its caption to be viewed simultaneously.

#### Formulas

Formulas must be identified across chapters by consecutive numbering in round brackets on the right-hand edge of the text.

Example	
F <sub>S</sub> =I·s·k <sub>S</sub>	(8)

The formula creation feature provided by the chosen word processing program should be utilized. When employing customized dimension equations, the units to be used should be indicated in a table adjacent to the formula. Reference can then be made to the respective numbers of these objects in subsequent chapters.

## 4.4 Signed Copy

In principle, two copies with a fixed-bound spine (perfect binding) in black with a transparent cover that allows for the view of the cover page are to be submitted. In the case of thesis works, these two copies must be stamped at the Central Examination Office on the day of submission at the latest and subsequently handed over to the supervisor or the department's office. Prior to submission, it should be ensured that the Central Examination Office is open on the day of submission. The submission of additional copies, such as those with spiral binding for easier proofreading, should be coordinated with the supervisor. Each of the two mandatory copies also includes a digital data carrier, i.e., a CD or DVD. This data carrier contains the main text in \*.pdf or .docx format, as well as folders with all the images used, created sketches, diagrams, tables, calculations in standard file formats (.xlsx, \*.mcd, \*.jpg, \*.tif, \*.gif, \*.cdr). The data carrier is to be affixed inside the back cover in a paper sleeve. A content overview for the data carrier is to be inserted as the last page and should follow the format below.

#### Folder Description

Work		textual work
Notice		notice according to template (for final theses)
Multimed	dia	
0	Images	Illustrations from the master's thesis
0	Videos	Videos of the experimental setup
Konstruktion		ProE model of the main spindle
Calcula	ition	
0	Auslegung	Spindle design in MathCAD
0	Simulation	Static ANSYS spindle model

If designed and/or simulated, the resulting components, assemblies, drawings and simulation models (e.g. \*.prt, \*.asm, \*.drw, \*.stp, \*.cdb, \*.db, \*.rst , \*.m) should also be saved on the data carrier. In addition, for final theses, a form according to Appendix 3 must be prepared in digital form (\*.docx, \*.pdf) and made available for display in the professorship's showcase.



## 5 Additional Notes

## 5.1 Writing Style

In general, German spelling should follow the latest edition of the Duden. The work should be written in a factual, objective, and understandable manner. Technical and scientific texts should be written in the present tense. The passive voice should be used, meaning the use of "I" or "we" is not allowed. Technical terms and expressions should be used, but without delving into technical jargon. Long and convoluted sentences should be avoided to maintain clarity. Even though it is a scientific topic, the report should not be boring. The accuracy of statements in the technical sense is paramount, while maintaining good expression. The use of technical terms is explicitly required, with literary, colloquial, and slang expressions to be avoided. Abbreviations should be spelled out upon their first use, with the corresponding abbreviation provided in parentheses. In the text, forward references to later sections must be strictly avoided.

Examples of references to literature sources ...(see Sect. 3.2, p. 37). ...[11, 24]. ...[25, p. 17]. ...MÜLLER [12, p. 23] found that....

In enumerations, it's important to use clear and distinct symbols. Additionally, the variety of bullet points or enumeration markers should be kept to a minimum. Regarding hyphens in the text, distinctions should be made for the word division hyphen (using automatic hyphenation), en dash, hyphen, and em dash.

#### Examples of using hyphens

Werkzeugmaschinen-Mechatronik Werkzeug- und Vorrichtungsbau	no space before and after the hyphen Spaces only after the hyphen	
Werkzeugkonstruktion und -fertigung	Space only before the hyphen	
– zusammen betrachtet –	For textual insertions, add one space before and after the hyphen	
6stufig, 4spindelig, 8fach	without hyphen	
n-stufig	with hyphen	

Assertions made in the text that are not directly logically derived, decisions made, for example when determining factors or methods, must be justified or must be supported with references to sources.

A few weeks before submission, the paper work should be proofread by one or more uninvolved people, if possible, in order to eliminate your own "operational blindness" to spelling and grammatical errors and to receive timely feedback as to whether the work contains a common thread.



## 5.2 Sources

Sources are classified according to their origin as described in Table 4.1 into primary, secondary, and tertiary sources.

 Table 4.1 Classification of sources according to their origin

Primary Sources	Secondary Sources	Tertiary sources
own sources	foreign sources	foreign sources
"first-hand"	"secondhand"	"third hand"
<ul> <li>own experiments</li> <li>own calculations</li> <li>Own simulation results</li> </ul>	<ul> <li>Literature</li> <li>Survey of "experts"</li> <li>Information from the Internet</li> </ul>	<ul> <li>Quotations from literature (not the secondary sources themselves, but a source that cites another source)</li> </ul>

Furthermore, the sources can be classified according to the type of publication.

Table 4.2 Classification of sources by type	of publication
---	----------------

Primary literature	Secondary literature	Gray literature
Monographs (books) Articles in Edited Volumes Articles in Scholarly Journals Articles in Conference Proceedings Dissertations (Theses) Standards	Magazine Articles Newspaper Articles Research Reports	Scripts Bachelor Theses Master Theses Diploma Theses Company Publications
Laws, Regulations		Company Brochures

The following points should be taken into account when choosing sources

- In student academic work, the focus is on the students' own sources (primary sources) (except for purely literature work)
- Critical examination of secondary sources and comparison with your own results
- Tertiary sources should be avoided
- Primary literature should be preferred when citing

## 5.3 Preparation and Implementation

The prerequisite for proposing a topic for the final thesis is the successful completion of all required study achievements. According to the study and examination regulations of the respective program, these achievements can include modules, exams, assignments, and study or project work, for example. The chosen topic should have a scientific character and the potential to contribute to novel insights in the field of mechanical engineering. Topics for student academic works can be found through the offerings on the department's website, announcements, personal inquiries with department staff, or independent searches with companies. In all cases, a university supervisor is necessary, meaning that topics formulated by companies always require an additional supervisor from the department. The task should be discussed in advance with the supervisor, and a release date should be determined. Based on the preliminary information provided by the supervisor, one should start familiarizing themselves with the subject area several weeks before the official start of the work (the date mentioned in the task description). Official issuance of the task description for final theses should be requested from the Central Examination Office.



From the beginning, a structured approach should be pursued. To gain an initial overview, it's necessary to define subtasks for the work. This allows for the planning of both the time and material resources from the outset and the development of an initial outline. The outline should be established after one month of work and discussion with the supervisor, and it should only be adjusted, if necessary, in the form of sub-points during the course of the work. Throughout the process, notes on the progress and interim findings should be made, and the supervisor should be contacted independently (not only in case of problems). At least four weeks should be allocated for the final drafting of the textual part of the work and for the creation of graphics and illustrations. Especially in the case of 3D design work, ample time is required for the derivation and development of production-ready drawings. If the supervisor offers to review the work before submission, this review should not be left until the week of the deadline.

## 5.4 Processing time/returns/extension

Depending on the study or examination regulations, final theses require a certain processing time (usually 4 months), which is noted on the assignment. Study and project work should have a workload of 300 - 400 hours within one semester of lectures. Before officially applying, the student should have informed themselves about the scope and required activities in order to be able to estimate the effort. Depending on your individual study situation, a processing period will be agreed with your supervisor.

A one-time return of the assignment is possible within the first two months after the official start of processing. It is also possible to repeat the student's scientific work once if the examination is not passed successfully. If it becomes apparent during processing that the work cannot be completed by the deadline, an extension must be requested. For coursework and project work, an informal, signed application with the desired new submission deadline must be submitted to the supervisor in good time (at least four weeks before submission). The supervisor then decides depending on the situation. For final theses, an extension must be applied for via the Central Examination Office after consultation with the supervisor. The new deadline will be noted on the assignment. An extension can only be granted once for a maximum period of two months.

### 5.5 Defense

All student scientific work is defended in the form of a colloquium. This consists of a presentation and a discussion part. All available media can be used, such as a projector, overhead projector, blackboard and flipchart. Presentation in electronic form – for example using Microsoft PowerPoint – is preferred. The slide template in accordance with Appendix 4 must be used. Experience has shown that it is best to start creating the presentation immediately after submitting the work, as all the findings are still in your memory. It is recommended to rehearse the presentation with the supervisor in advance. The presentation must be given to the supervisor in electronic form after the defense. As a rule, the defense takes place within six weeks of submission. Formal clothing must be worn. The presentation should show the essential steps according to the principle "Task – Path – Results – Summary – Outlook". The duration of the free lecture is 20 minutes for final theses and 15 minutes for coursework and project work. Other academic papers will be defended in accordance with the regulations in the respective study and examination regulations. The challenge is to reduce the extensive content and results of the work to the essentials, to show the common thread in the engineering processing of the task and to present it in an understandable way. After the presentation part has been completed, the supervisor's reports will be read out for final theses without the grades being announced. The student can particularly comment on critical points. This is followed by an open discussion in which everyone present can ask the speaker questions. The quality of the answers and the correctness of the questions are taken into account when grading the defense.

### 5.6 Grading

For all student academic work, separate grades are awarded for the written work and for the defense. From both, the Central Examination Office creates an overall grade for the work in accordance with the respective study and examination regulations.

The work is graded according to the following criteria, for example



- Complete and accurate presentation of the state of knowledge on the topic
- Consistent derivation of one's own task and division into sub-tasks
- Complete derivation and presentation of solution variants for the subtasks
- Evaluation of the solution approaches according to applicable criteria
- Logically comprehensible presentation of the solution (even a negative result)
- Deriving additional tasks
- Form of the work (external form, image-text ratio, spelling, expression)

The defense will be graded according to the following criteria

- Content, form and manner of presentation
- Targeted and correct answers to questions in the discussion

## 5.7 Common Errors

In principle, a negative result can also be a scientific achievement on the topic if it has been logically derived and justified. Defects that are used to determine grades can be of a content or formal nature.

In terms of content

- Unjustified decisions, choices, or approaches
- Reference to supervisor
- lack of logical structure (common thread)
- Illustrations without information
- missing or incorrect interpretation of diagrams or data tables
- Violation of the principles of scientific work (copyright)

#### In terms of formal

- Missing numbering and labeling for pictures, tables, equations and appendices
- incomplete literature references, list of abbreviations
- Spelling, grammar and expression



## 6 Literature used

[1] Scholz, D.: Diplomarbeiten normgerecht verfassen – Schreibtipps zur Gestaltung von Studien-, Diplom- und Doktorarbeiten. Würzburg: Vogel Verlag, 2006, 2. Aufl.

[2] Nicol, N.; Albrecht, R.: Wissenschaftliche Arbeiten schreiben mit Word 2010. München: Addison-Wesley Verlag, 2011, 7., akt. Aufl.

[3] DIN 1421: Gliederung und Benummerung in Texten – Abschnitte, Absätze, Aufzählungen, Berlin: Beuth Verlag, 1983

- [4] DIN 1426: Inhaltsangaben von Dokumenten Kurzreferate, Literaturberichte, Berlin: Beuth Verlag, 1988
- [5] DIN 1505 Teil 3: Titelangaben von Dokumenten Verzeichnis zitierter Dokumente. Berlin: Beuth Verlag, 1995

[6] DIN 5008: Schreib- und Gestaltungsregeln für die Textverarbeitung. Berlin: Beuth Verlag, 2011

## 7 List of Appendices

- Appendix 1: Cover Page (LINK)
- Appendix 2: Declaration of Independence (LINK)
- Appendix 3: Form for Posting on the Notice Board
- Appendix 4: Slide Template for the Presentation (LINK)