technische universität dortmund

Guidelines for the preparation of scientific papers at the Chair of Material Handling and Warehousing (FLW)

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This document serves as a guide for writing academic papers at the FLW. It answers questions that typically arise when supervising academic papers. This document **does not claim to be accurate or complete**, nor does it specify evaluation criteria or a template for academic papers. The applicable examination regulations of the Faculty of Mechanical Engineering remain binding for all supervision. Changes to the organizational process for scientific papers may be made at any time by the faculty or the examination office, regardless of this document. Students are still required to inform themselves about organizational, scientific, and formal aspects on their own responsibility. Current information from the FLW can be found on the FLW-Website[1].

Further information on bachelor's and master's theses can be found on the Faculty of Mechanical Engineering website[2]:

- Guidelines
- Digital submission of theses via ExaBase
- Affidavit
- Moodle-Course „Better Research - Einstieg ins wissenschaftliche Arbeiten“[3]

1 https://flw.mb.tu-dortmund.de/teaching/theses/
2 https://mb.tu-dortmund.de/en/study/bachelor-and-master-thesis/
3 https://moodle.tu-dortmund.de/course/view.php?id=24482

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1 Organization

The following section provides an overview of selected organizational aspects that need to be considered when working on an academic paper. The following description begins after the student has expressed interest in a topic.

1.1 Overview of the Work Steps in a Scientific Paper at FLW

The steps involved in writing an academic paper, whether it is a project, bachelor's or master's thesis, can be summarized as follows:

- Initial meeting with the supervisor
- Specify the topic
  - Develop an exposé and discuss it with the supervisor
- Assess the state of research
  - Literature research: Identify relevant literature → analyse → document → summarize
- Develop a method
  - Develop a procedure for the main part
  - Determine criteria for validating the main part
- Develop a solution approach for the problem posed by the topic
  - Develop initial approaches: e.g., model, investigation, programming, concept, analysis, simulation, or a combination of the above approaches
- Write initial draft
  (1) Introduction
  (2) State of the Art
  (3) Methodology
  (4) Results (initial approaches)
- Write a revised draft
  (1) Introduction
  (2) State of the Art
  (3) Methodology
  (4) Results
  (5) Verification / Validation / Interpretation
  (6) Conclusion and outlook
- Review and final version
  - Technical and factual accuracy
  - Consistency
  - Spelling and grammar
  - Comprehensibility of content
  - Uniform structure and stylistically consistent presentations and tables

- Submission
  - Final proofreading
  - Compile data storage media
  - Printing and binding
- Colloquium (presentation and discussion)

Interim progress reviews are conducted individually and by mutual agreement between the student and the supervisor.

1.2 Schedule

To plan the work and monitor its progress, it is recommended that students create an individual schedule. Based on the division into individual work steps and set milestones, students agree on specific interim targets with their supervisors. Milestones can include meeting dates at which important work points are discussed. An example of a schedule can be found in *Table 1*.

Table 1: Sample schedule including milestones

Project duration [%]	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Topic										
State of the Art										
Methodology										
Proposed solution										
Initial draft										
Revised draft										
Review and final version										
Submission										
Milestones			◆		◆		◆		◆	

1.3 Exposé and Specification of Topics

Note: The FLW provides an exposé template on its Website[4].

Before beginning work on academic papers, students should have at least one meeting with their supervisor. During this meeting, the goals and procedure for writing the paper will be outlined. In preparation for or following the meeting, the student will write a first draft of the exposé (maximum length: 3 pages), which should include the following points:

- Title
- Initial situation and problem definition
- Objectives
- Methodology and approach
- Preliminary table of contents and bibliography

4 https://flw.mb.tu-dortmund.de/teaching/theses/thesis-documents/

It should be clear what the problem is and what means will be used to achieve the goal. The exposé serves several purposes:

- It serves as a basis for discussion and as proof that the student has already dealt with the topic.
- For the student, the exposé is an opportunity to clarify the structure and goals of the thesis. After registering the thesis, the exposé provides the student with guidance during the writing process.
- The written form of the exposé ensures that the student and supervisor have the same understanding of the thesis's objectives.

The creation of the exposé may involve several rounds of corrections following the initial discussion. **Once the exposé has been completed, the thesis is registered with the Examination Office.**

1.4 Registration of Bachelor's and Master's Theses

The Examination Office provides up-to-date information on the registration procedure for academic theses. This is based on the respective examination regulations. A date for the colloquium is reserved in the FLW calendar when the thesis is registered.

1.5 Project Work

The preparation of a project also requires an exposé. However, registration with the Examination Office is not necessary. As soon as the exposé is at a stage that allows the topic to be worked on, the supervisor will set a submission deadline. As a rule, the deadline is no later than 6 months after the initial meeting. The project work must clearly indicate which part of the work was done by which student. As a guideline, each participant should produce a 20-page paper. This guideline may be deviated from in consultation with the supervisor.

Once the students have completed their work, they submit it to their supervisor either in one printed copy and electronically (PDF) or only electronically (PDF), depending on the agreement with the supervisor. The colloquium follows in the course of the next four weeks.

1.6 External Work

External work that merely constitutes a project report will not be accepted. This means that it must always contain a scientific concept developed by the student themselves.

Normally, this concept is then validated through application in the company. If a confidentiality agreement or non-disclosure agreement is required by the company, all necessary steps must be clarified with the FLW secretariat. As a rule, the FLW does not accept non-university confidentiality agreements and only uses the TU's own template. Work supervised at the FLW is not and will not be made publicly available. The supervisor of the work from the company may participate in the colloquium. Prior notification is requested.

1.7 Colloquium (Presentation and Discussion)

Students should bring their own laptop to the colloquium. Upon request, the chair can provide a laptop. A presenter can be provided by the supervisor. The colloquium takes place in the presence of the first and second examiners. The time for a presentation is limited to 20 minutes for bachelor's and master's theses. These time limits must be adhered to. For project work, individual arrangements should be made in this regard. Students present without interruption from the examiners. Following the presentation, students are asked questions about their presentation. For bachelor's and master's theses, students receive their oral exam grade immediately after the exam. The grades (written and oral) are forwarded to the examination office by the FLW. For project work, there is an overall grade for the presentation and the written work. The presentation slides must be sent to the supervisor by email after the presentation.

1.8 Tips for the Presentation

Experience shows that each slide can be presented in approximately 1 to 2 minutes. For a 20-minute presentation, this means a total of approximately 10-20 slides. These are rough guidelines, which can vary depending on various factors, such as personal presentation style, integrated videos and animations, or model demonstrations.

The following aspects are important when presenting scientific work:

- The motivation behind the work must be clear.
- Slide numbers in the presentation are essential.
- The focus should be on the main part of the work.
- The presentation must be clearly structured.
- The slides should be clearly laid out.
- The slides should contain bullet points rather than sentences. Overall, the amount of text on the slides should be kept to a minimum.
- Illustrations must be clearly recognizable (not too small or blurred).

2 Literature

Literature is the foundation of good scientific work. The following section describes the basics of literature research and management.

2.1 Literature Research

Note: How to conduct a scientific literature review can be learned in a regularly offered course at the TU Dortmund University Library.

Literature research can be divided into three categories:

- Bibliographies of survey works
- Expert search
- Datebases

Recent survey works in the form of books, surveys, or literature reviews provide information on research trends. The expert search includes, among other things, identifying key researchers via websites or conference author lists. In addition to interdisciplinary sources, searching subject-specific (logistics-related) databases is recommended. Examples of such databases are listed in **Table 2**.

Table 2: Examples of relevant databases

Databases	**Link**
TU Bibliothek	https://www.ub.tu-dortmund.de
ResearchGate	https://www.researchgate.net/
ScienceDirect	http://www.sciencedirect.com/
Google Scholar	https://scholar.google.de/
Scopus	https://www.scopus.com
Logistics Journal	https://www.logistics-journal.de/
Logistics Research	https://link.springer.com
International Journal of Logistics Research and Applications	http://www.tandfonline.com
International Journal of Logistics Management	http://www.emeraldinsight.com
Naval Research Logistics	https://onlinelibrary.wiley.com
Nautos	https://nautos.de/
Statista	https://de.statista.com/
Database of the Federal Statistical Office	https://www.destatis.de/DE/Home/_inhalt.html

Many sources are freely accessible from within the TU Dortmund University network; however, this requires a connection to the university's Wi-Fi or an active VPN connection. For certain databases, such as Scopus or ScienceDirect, the university network provides extended access. In addition, TU Dortmund University has access to the Nautos database, which offers a wide range of current standards and guidelines (e.g., VDI, DIN), as well as to Statista, an online statistics portal. International literature is of great importance. Therefore, it is advisable to consult not only German-language literature but also English-language literature. Literature that is not available in the TU Dortmund University Library can, in some cases, be obtained free of charge via interlibrary loan.

As part of good scientific practice, references to general internet sources (e.g., websites) should be avoided. Exceptions must be discussed with the supervisor. Websites such as Wikipedia are not suitable for citation.

Tip: Always cite the primary source. In many cases, it can be traced back through secondary sources.

2.2 Managing Literature

Zotero is recommended as the tool for literature management. During the working process, Zotero allows an easy exchange of academic input between the supervisor and the student. If required, the student may grant the supervisor access to the contents of their Zotero folder after submission of the thesis.

By agreement with the supervisor, literature management software other than Zotero may also be used, such as:

- Mendeley
- Citavi
- Jabref (Only with LaTeX)

The use of Citavi requires a license, which students can obtain free of charge using their university email address. Further information is available from the ITMC. JabRef is a simple open-source software that can be used with LaTeX, but it is not recommended for users of MS Word.

All the programs listed above include plugins that allow literature references to be integrated into Word.

2.3 Citation

In scientific work at the FLW, the IEEE citation style[5] is used. Deviations from this standard are possible by agreement with the supervisor. All citations in the text are numbered consecutively in ascending order. The creation of bibliographies and in-text citations in IEEE style is performed automatically using the literature management systems mentioned in Section 2.2.

5 https://ieee-dataport.org/sites/default/files/analysis/27/IEEE%20Citation%20Guidelines.pdf

3 Content-related Guidelines

The content of a thesis varies greatly depending on the topic; however, the following general statements regarding the content of an academic work can be made.

3.1 Ten Questions That Scientific Texts Should Answer

A scientific paper at the FLW should address the following ten questions:

(I) What topic does the paper address? How is it distinguished from related topics?

(II) Why is this topic being addressed? (thematic relevance)

(III) What are the objectives of the thesis?

(IV) What previous research exists on the topic and the research question?

(V) Which research questions and research gaps can be derived from the state of the art?

(VI) How does the thesis differ from previous work?

(VII) Which methods can be used to address the topic, and which methods are applied?

(VIII) How were the results obtained? (methodological approach)

(IX) What new findings were achieved?

(X) Which further research questions or gaps can be derived from the results?

When structured by chapters, the ten questions provide content-related guidance for writing the academic thesis. At the same time, they serve as a content checklist.

(1)	Introduction	Questions (I) + (II) + (III)
(2)	State of the Art	Questions (IV) + (V) + (VI)
(3)	Methodology	Question (VII)
(4)	Results	Question (VIII)
(5)	Interpretation / Validation	Question (IX)
(6)	Conclusion and Outlook	Question (X)

By adhering to the proposed structure, the line of argument becomes clearer for the reader, and redundancies are avoided.

3.2 Structure and Focus of a Scientific Thesis

There is no mandatory specification for the structure of a written thesis. However, based on experience, the following approximate guidelines can be defined, which may serve as orientation for students. The focus of each thesis, both qualitatively and quantitatively, lies in the main part (Chapters 3–5)

(1)	Introduction	(5–10 %)
(2)	State of the Art	(20–30 %)
(3)	Methodology	(10–15 %)
(4)	Results	(30–40 %)
(5)	Interpretation / Validation	(10–20 %)
(6)	Conclusion and Outlook	(3–5 %)

4 Tips and Checklist

In addition to the ten questions that *scientific texts should address*, structural, formal, linguistic, and stylistic aspects must also be considered. The following tips and checklists can serve as guidance for reflecting on one's own thesis.

4.1 General Tips and Best Practices

- The three pillars of an academic thesis are:
  - **Content**
  - **Style**
  - **Format**
- Spelling and grammar should be reviewed by a qualified person before submission.
- Whenever possible, data should be presented in tables.
- PowerPoint may be used to create figures and illustrations.
- Formatting templates for Word, LaTeX, and PowerPoint can be obtained from the FLW Website[6]
- Chapters from the introduction to the conclusion are numbered using Arabic numerals, pages before and after these chapters are numbered using Roman numerals.
- A non-breaking space should be used between a number and its unit (e.g., 12.5 m). In Word, this can be inserted using Ctrl + Alt + Space.
- If a (sub)section is shorter than one page, it should be considered whether a separate chapter is necessary. This explicitly does not apply to text between two heading levels.

4.2 Structure of the Thesis and Outline

- Do the chapters build upon each other?
- Is a clear line of argument maintained throughout the entire thesis?
- Is the thesis structured into 5 to 6 chapters?
- Are no more than 3 levels of headings used in the table of contents (additional levels within chapters are possible)?
- Are either no subsections or at least two subsections used per chapter?
- Do all paragraphs consist of more than one sentence?
- Is there always text between two headings?
- Does the scope of the structure correspond to the type of thesis (project thesis / bachelor's thesis / master's thesis)?
- Are lists of figures, tables, and abbreviations included and up to date?

6 https://flw.mb.tu-dortmund.de/teaching/theses/thesis-documents/

4.3 Literature and References

- Are the sources up to date?
- Has a diverse range of sources been used (including different authors)?
- Are the topics and research questions supported by references to relevant research work?
- Have the sources been cited in accordance with the specified citation style?
- Are the contents of other authors clearly and unambiguously identified in the thesis?
- Have the sources been critically reviewed?
- Have primary sources been used predominantly?
- Are all quotations accompanied by page numbers? (Exceptions apply to sources without page numbers, such as websites.)

4.4 Language and Style

- Are the chapters written consistently in terms of wording and style, and are they coherent and easy to understand in terms of content?
- Is the thesis written in a fluent and readable manner?
- Are the formulations factual, objective, scientific, and appropriately detached?
- Is subject-specific terminology used?
- Are the text and the choice of expressions precise?
- Are relevant technical terms defined and used consistently (no use of synonyms for key terms)
- Are clear sentences used (no longer than three lines)?
- Are all sentences logically structured and consistent with preceding and subsequent sentences?
- Are tables, figures, and direct quotations not placed at the beginning or end of a chapter or subsection?
- Is the use of first-person forms (“we” / “I”) and past tense avoided?
- Are grammar, spelling, and punctuation correct?

4.5 Formatting and Layout

- Is the overall length appropriate for the type of thesis (project thesis / bachelor’s thesis / master’s thesis)?
- Is the statutory declaration of the TU Dortmund University included?
- Are all chapters and subchapters numbered?
- Is the header on the first page of each top-level chapter left blank?
- Are all lists and indexes up to date and complete?
- Are there no reference or cross-referencing errors in the thesis?
- Are all sources fully listed in the bibliography?

- Are all formatting elements consistent, such as.
  - font sizes,
  - italics,
  - bold formatting,
  - spacing,
  - etc.
- Are tables and figures correctly labelled and, if necessary, properly cited?
- Is the font size within tables and figures sufficiently large to ensure readability?
- Are all tables in the main part placed on a single page without page breaks?
- Have all double spaces been removed?

4.6 Common Mistakes

- The thesis lacks a clear line of argument. The contents do not build upon each other, and it is not clear why certain aspects are described or what their purpose is.
- Claims are made without being supported by sources or logical reasoning.
- Methods are described, but no critical discussion or reflection is provided.
- Overly long and complex sentences should be avoided.
- Instead of clearly defining terms, colloquial and thus non-academic or vague formulations are used, such as.
  - *The method is **relatively expensive / new**.*
  - *This thesis **aims** to develop...*
  - ***One could** define […] as follow...*
  - *…*
- Excessive use of filler words occurs throughout the thesis.
- Absolute statements are made, such as:
  - *The model used is **the best**.*
  - *There is **no study** addressing this topic.*
  - *This has **not been investigated by anyone** before.*
  - …
- Extensive historical background (e.g., the history of logistics) is presented even though it does not contribute to the understanding of the thesis.
- In theses written in cooperation with a company, the company is described in great detail without relevance to the thesis.
- No critical reflection of the author's own results is provided.
- The state of the art is largely based on outdated sources (e.g., books from the 1980s).
- Secondary sources are used instead of primary sources.