![C:\Dropbox\[KIT] HiWi IISM\Abschlussarbeit Word Vorlage\Rahmen.png]()

**[Title of your thesis at the Institute for Water and Environment (IWU-WB)]**

[Bachelor’s Thesis / Study Project / Master’s Thesis]

**[First name Family name]**

[Matriculation number]

At the Department of Civil Engineering, Geo and Environmental Sciences,

Institute for Water and Environment – Hydraulic Engineering and Water Resources Management (IWU)

Submitted on [date]

Reviewer: Prof. Dr. Mário Franca

Second Reviewer: [full name if applicable]

Advising scientists: [full name advising scientist 1]

 [full name advising scientist 2]

This thesis was developed as part of a cooperation with:

This page is a place holder for the task description of your thesis. Insert page 1 of the task description here instead of this page.

**IMPORTANT NOTE:**

This document provides the general layout and structure of a thesis at IWU-WB. For uniformity at our institute and maintaining high academic standards, please use this template as a basis to elaborate your thesis. Of course, you may make single modifications to ensure your work is presented in a clear and effective way.

A thesis document typically includes a *frame structure* (title page, task description, affirmation, acknowledgements [not mandatory], contents, abstract, Kurzfassung, lists of figures and tables, used abbreviations and symbols, appendix) and a *main part* (indicated by numbered chapters).

Layout and content requirements of the *frame structure* parts are given in this document exemplary and must only be adapted to your individual thesis.

For requirements and hints to set up the *main part* of your thesis (structure, content, layout, writing, etc.) please check the numbered chapters of this document.

Besides this template, please also follow the instructions of the thesis guidelines on <https://www.iwu.kit.edu/wb/education.php?tab=%5B2379%5D#tabpanel-2379>.

This page is a place holder for the task description of your thesis. Insert page 2 of the task description here instead of this page.

**Affirmation**

I, [student’s name], hereby certify that I have developed and written this [Master’s / Bachelor’s Thesis / Study Project] independently and that I have not used any auxiliary materials or sources other than those indicated. I have marked as such any passages taken over verbatim or in terms of content. This also applies to figures, sketches, images and similar depictions, as well as sources from the internet.

I declare that I have respected the Karlsruhe Institute of Technology (KIT) Statutes for Safeguarding Good Research Practice in the currently valid version and that I have not submitted my [Master’s / Bachelor’s Thesis / Study Project] or parts of it to any other examination.

I agree that my [Master’s / Bachelor’s Thesis / Study Project] may be copied and placed in a library.

Karlsruhe, [date]

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[Student’s name and signature]

Contents

[Contents V](#_Toc201911796)

[Abstract VI](#_Toc201911797)

[Kurzfassung VII](#_Toc201911798)

[List of Figures VIII](#_Toc201911799)

[List of Tables IX](#_Toc201911800)

[Abbreviations X](#_Toc201911801)

[Symbols XI](#_Toc201911802)

[1 Structure of the main part 1](#_Toc201911803)

[2 Format and layout 5](#_Toc201911804)

[2.1 Format elements 5](#_Toc201911805)

[2.1.1 Figures, tables, and equations 5](#_Toc201911806)

[2.1.2 Sub-chapters and listing 6](#_Toc201911807)

[2.1.3 Further layout and style tips 7](#_Toc201911808)

[2.2 Citation style and handling 8](#_Toc201911809)

[2.3 Use of generative artificial intelligence 8](#_Toc201911810)

[3 Tips for thesis writing 9](#_Toc201911811)

[3.1 General tips 9](#_Toc201911812)

[3.2 Writing and language 9](#_Toc201911813)

[3.2.1 Scientific writing 10](#_Toc201911814)

[3.2.2 Proofreading checklist 11](#_Toc201911815)

[3.3 Literature research 12](#_Toc201911816)

[3.4 Time management 13](#_Toc201911817)

[4 References 15](#_Toc201911818)

[Appendix 16](#_Toc201911819)

[A.1 Appendix content 16](#_Toc201911820)

[A.2 Exemplary appendix data 17](#_Toc201911821)

Abstract

Guidelines for the abstract:

The abstract – in English and in German – is meant to provide possible readers with a quick overview on the thesis content. It should include motivation, statement of the problem, methods used / procedure and main results achieved. It is a brief introduction to the problem and how you solved it which must be readable completely independently. The abstract should not be longer than 300 words.

It makes sense to write the abstract at the very end when you have already completed the actual work.

Kurzfassung

Deutsche Fassung des Abstracts; die obigen Leitlinien gelten entsprechend auch für die Kurzfassung.

List of Figures

[Figure 2.1: The figure description goes below the image and contains a reference of the primary source if the figure was taken or modified from another resource. 5](#_Toc201911822)

[Figure 3.1: Quotable and non-quotable references. 13](#_Toc201911823)

[Figure A.1: Exemplary appendix figure of mean reference vorticity fields for a) condition 1 and b) condition 2. The black patches indicate shadowed free surface areas. Flow is from left to right. 17](#_Toc201911824)

List of Tables

[Table 2.1: Caption for the table below which contains exemplary data. 6](#_Toc201911828)

[Table A.1: Exemplary appendix table. 17](#_Toc201911829)

Abbreviations

[These are exemplary abbreviations to propose a possible layout:]

ADCP **A**coustic **D**oppler **C**urrent **P**rofiler

LES **l**arge-**e**ddy **s**imulation

RMSE **r**oot-**m**ean-**s**quare **e**rror

Symbols

[These are exemplary symbols to propose a possible layout:]

Roman symbols

Fr [-] Froude number

g [m/s²] gravitational acceleration (g = 9.81 m/s²)

u [m/s] streamwise flow velocity

z0 [m] roughness distance

Greek symbols

ν [m²/s] kinematic viscosity

Π [-] wake parameter

ρ [kg/m³] density

Subscripts and superscripts

 turbulent fluctuation

crit critical

max maximum

# Structure of the main part

Starting your thesis by structuring it is important because it helps to ensure that the document is complete, well-organized and easy to navigate. The main part of a thesis typically includes the following chapters which are further split up into sub-chapters:

1. Introduction
2. Literature review
3. Methodology
4. Results
5. Discussion
6. Conclusions
7. References

It may be suitable to change this structure in terms of a clearer presentation of your work. When deviating from this framework, make sure that all topics are still treated in a clear way. The sections below give an idea of what is expected in terms of content in each chapter:

Introduction (chapter 1)

The introduction sets the stage for the rest of the thesis and should have the following main structure: framework and background + scope + objectives and research questions + brief reference to methods + general reference to the type of expected results + work organization and structure.

It should contain an introduction to the main problem, the motivation and goals, indication of the main methods, boundary conditions and an overview of the structure of the document. In many cases it has proven to be useful to insert a figure at the end of the section, from which the structure, the argumentative process or important core statements of the work emerge. One to three pages are enough with no need of further subdivision. Experience shows that the introduction should be formulated at the end of the work to avoid repeated changes to the text.

Literature review (chapter 2)

In this chapter (alternatively termed “Fundamentals and state of the art” or similar) the student presents the state of the art regarding the topic of the research, based on a critical and complete literature survey of scientific articles, technical reports, credible websites, etc. (for appropriate referencing see chapter 2.2 and for surveying literature sources see chapter 3.3). Here, introduction and explanation of theories and key technical terms relevant to the work are expected as well. Note that, when introducing a theoretical framework and literature survey, only the information which is relevant to the work should be included to which reference will be made again in the course of the thesis.

In this chapter, the student needs to show that she/he is able to understand the relevant fundamentals carefully and reproduce them in a short and concise form, deriving the consequences for one's own work.

The chapter is to be divided into meaningful sub-chapters and sections in order to facilitate the flow of reading and separate subject areas from one another. A final sub-chapter or section should contain the main knowledge gaps or technical needs identified in the literature review, from which the problem statement and the research questions are elaborated. The literature review chapter sets the basis where the thesis starts from.

Methodology (chapter 3)

This chapter (alternatively termed “Investigation approach and methods” or similar) is where the presentation and justification of the methods chosen to develop the research are made. The investigation is typically based on physical modeling, numerical modeling, data-driven models or field work. Other methods may include artificial intelligence algorithms, citizen science, remote sensing, etc.

In case of physical experimentation, include: choice of materials, experimental setup and instrumentation, measurements methods (water level, flow velocities, altimetry, pressure, etc.), structure and functionality of the model, theoretical analysis of the model, application of the similitude laws, dimensional analysis when applied, boundary conditions, processes of models, etc.

In case of numerically-based work, include: numerical software or algorithms, implementation of the numerical model (grid, time step, etc.), analytical base equations and respective numerical schemes and closures, assumptions and parameterization, initial and boundary conditions, and variables to be extracted from the simulation (water levels, velocities, sediment transport, geomorphological changes, etc.).

In the case of data-driven and machine learning models, include: data acquisition and preprocessing (e.g., outlier detection, missing value treatment, data transformation, and data fusion), feature selection and justification of input-output parameters. Specify the model architecture, hyperparameter tuning process, performance metrics (e.g., RMSE, R²), and any sensitivity or uncertainty analyses. Include methods for model explainability (e.g., SHAP, LIME) and deployment (if applicable). Clearly state the source (software or developed code) and version of the machine learning algorithm used.

In case of field work, include: measuring instrumentation and setups (velocity, discharge, water level, sediment concentration, etc.), description of the study area, hydraulic characterization, physiography of the catchment area or river reach, period when the tests were carried out (time of the hydrological year), hydrology, and hydraulic boundary conditions.

Use as much as possible diagrams, figures and graphs. If the data acquisition, treatment, and analysis is non-trivial, these processes should be here described. Finally, when applied, a final sub-section should contain a table with the planning of experiments / simulations / measurements, e.g. with the several combinations of variables. Note: A transparent and detailed description of the methodology can build confidence in the reliability and validity of the results and findings.

Results (chapter 4)

The results need to be presented in graphical and tabular form, as much as possible, and in a logically organized way (e.g. by sub-chapters). The text should describe the results; however, it is not necessary to describe every single experiment. When having multiple similar repeated results, consider presenting one in detail as example and leave the remaining in the appendix. The section should also provide appropriate context and explanation for the results, while avoiding any personal opinions or interpretations. The results which are presented here should allow the reader to understand the type of data and its quality, and they should convey to the reader the central statements of the work.

Discussion (chapter 5)

In the discussion, the results should be evaluated, interpreted, and discussed internally (among themselves) and externally (with research work from others which should be referred to in the literature review).

The following should be considered: boundary conditions, sensitivity and error analysis; relation to existing theories mentioning and providing a justification for similarities and differences; use of cross references; how to derive consequences from the results; analysis of their implications in the broader context of the field of study; and a critical consideration of the student’s own work (including also limitations of the study). It is in the discussion, where the conclusions from the results are drawn.

Conclusions (chapter 6)

The final chapter of the report should be brief and precise, describing the main results and conclusions in face of the goals set earlier in the introduction (research questions should be revisited). It provides a short evaluation of the implementation and the entire work including the limitations of the results and conclusions drawn and evaluates one’s own work with a view to possible further research which should conduct to an identification of unsolved questions and needs for further research. In the conclusions section a mention to the practical relevance of the work, highlight its scientific / technical novelty and how it contributed to advance the present knowledge, should be made. It offers a final perspective on the work’s potential impact on the broader field of study and ties together the entire work.

By naming this chapter as "Summary and Outlook", one indicates that the section will be structure in two parts. The first sub-chapter summarizes the main findings of the study, reviewing the research questions or objectives that were addressed, and discussing the significance and implications of the findings, which is equivalent to a conclusion. The outlook sub-chapter typically focuses on future research directions, proposing new research questions or hypotheses, outlining potential new methods or techniques that could be used, or suggesting new avenues of investigation.

References (chapter 7; before appendix)

Alphabetically ordered overview (by author last name) of the cited resources according to the citation style (compare chapters 2.2 and 4).

# Format and layout

This chapter introduces the general format and layout elements of your report.

Text itself (see Word style sheet *Standard*) is written using Calibri font in size 12 pt and justify style with a line spacing of 1.3. Paragraphs are separated by a spacing of 6 pt.

Headings structure the text in up to three levels (chapter and two sub-chapter levels). If necessary, non-numbered sub-headings can be used sparingly (!) to create a fourth level maximum. The headings are bold, left-justified, decrease in size 18-16-14-12 pt from level one to four, and have sufficient blank space on top and below (see style sheets *Heading\_[…]*). A new chapter (heading level 1) starts on a new page.

Figure and table captions (style sheets *Figure\_caption* and *Table\_caption*) are in font size 10 pt and include the chapter number like in Figure 2.1 (chapter 2, first figure). Header and footer must be used according to this template document.

Note that you can find proposals for all text format styles (text, headings, figure and table descriptions, bullet points, etc.) in the Word style sheet of this document.

## Format elements

### Figures, tables, and equations

Any figure, table, or equation of the report must be cross-referenced and linked in the text close before its actual position but in any case, before the next section. For example, Figure 2.1 shows the KIT logo. For connecting your report, references to other sections using links in the text also are highly recommended. This link for example goes back to chapter 1.



Figure 2.1: The figure description goes below the image and contains a reference of the primary source if the figure was taken or modified from another resource.

For the spacing of figures and tables you can use the style sheets *Figure* and *Table*. The following Table 2.1 shows an exemplary table layout. The white line of additional explanations below the table is not mandatory. Note that a table caption goes on top.

Table 2.1: Caption for the table below which contains exemplary data.

|  |  |  |  |
| --- | --- | --- | --- |
| **boundary** | **inlet area BC** | **experiment area BC** | **outlet area BC** |
| **xmin**  | flow rate = 0.9∙Qin1), hMTS,in2) | grid overlay with inlet xmax | grid overlay with exp. xmax |
| **xmax** | grid overlay with inlet xmin | grid overlay with xmin | pressure = hMTS,out2) |
| **zmin** | wall (no-slip) | wall (no-slip) | wall (no-slip) |
| **zmax** | pressure = 0 (free surface) | pressure = 0 (free surface) | pressure = 0 (free surface) |
| **global initial BC** | hydrostatic pressure, hMTS,out2) |
| 1) Qin is the mean flume inflow during the experiment. |
| 2) hMTS,in and hMTS,out are the experiment mean flow depths at the inlet and outlet MTS water level sensors, respectively. |

You might also use equations like equation (1) for local bed shear stress τ0 [N/m²] as a function of the shear velocity u\* [m/s] and the fluid density ρW [kg/m³]:

|  |  |  |
| --- | --- | --- |
|  |  | (1) |

Note that the equation is located centrally in a three-column, non-visible table and the equation number in round brackets right-justified in the right column.

Another possibility to describe the variables and units of an equation is exemplarily shown by the log-law of the wall in equation (2)

|  |  |  |
| --- | --- | --- |
|  |  | (2) |

where u(z) [m/s] is the streamwise velocity at z [m] above the level of zero velocity,
κ = 0.4 [-] the Kármán constant, ks [m] the equivalent sand grain roughness, and B [-] a constant depending on the bed nature.

### Sub-chapters and listing

Use sub-chapters (maximum three numbered levels in the list of contents) and sections to structure your report. If you use a first sub-section 2.1.1, you should also have a second one 2.1.2. If necessary, you might use sub-headings sparingly (!) for a fourth level of your text:

Sub-heading 1

Text text text

Sub-heading 2

For concise and clear listing, you can use bullet points:

* Bullet point 1
* Bullet point 2
* Bullet point 3

Alternatively, numbered listing is also possible:

1. List point 1
2. List point 2
3. List point 3

### Further layout and style tips

Numbers

* Make sure to use the equal decimal separator (comma / point) in the whole document, depending on the text language.
* Units are separated from a numerical value by a space character.
* The table of contents, abstracts, lists of figures and tables, abbreviations and symbols have consecutive Roman page numbering. The main part (chapters 1 - 7) and the appendix have consecutive Arabic page numbering. The title page does not have a page number.

Figures

* Only insert relevant figures (photos, diagrams, sketches, …) into the main part, for additional information the appendix can be used (e.g. additional graphs).
* Images larger than DIN A4 belong in the appendix, folding in the paper version of the thesis according to DIN 824. Figures have their own consecutive numbering in the caption also in the appendix.
* Secure a good figure quality (not blurry, no shadows). Use vector graphics if possible.
* Label figures sufficiently large (readability!).
* Coding languages for creating graphs and diagrams: e.g. Python, Matlab, R.
* Programs for creating diagrams: e.g. Excel, Origin.
* Program for graphics and sketches: e.g. Inkscape (CorelDraw is a handy alternative but not for free), PowerPoint.
* Use colours that are distinguishable also in black-and-white.
* For similar graphics, you might use subplots with alphabetical labelling making up one total figure (example see in Figure A.1).

Tables

* Make tables as simple and as clear as possible.
* Only insert relevant data into the main part, for additional information the appendix can be used (e.g. pure data tables)
* Tables larger than DIN A4 belong in the appendix where they also have their own consecutive numbering in the caption.

## Citation style and handling

Every type and part of content taken from other materials must be referenced to the respective resource.

For handling publications, citations and references the use of one of the databases listed below is highly recommended. This software allows to easily store and manage intrinsic information about each publication as well as to create citations and bibliography in your report. Please note that intrinsic publication information automatically transferred into the database needs to be checked by the user in any case!

* For Word: Zotero, Citavi, Mendeley, EndNote
* For Latex: JabRef (bibteX)

For consistency at our institute, please follow the citation style of the American Psychological Association (APA) 7th Edition (APA, 2020). It basically includes short references in the text (author, publication year) and a full bibliography at the end of the main part. A good overview of the most important aspects can be found in a short manual of the Johannes Gutenberg University Mainz (Institut für Publizistik, 2020) which may help you. More information about working with scientific literature can be found in chapter 3.3.

## Use of generative artificial intelligence

In regard to the use of generative artificial intelligence for your thesis, the Faculty of Civil Engineering, Geo- and Environmental Sciences at KIT has published a guideline (<https://www.bgu.kit.edu/english/2808.php>). In the case of doubt, please consult your supervisory team.

# Tips for thesis writing

## General tips

The aim is a text that is coherent, comprehensible, and clearly structured in terms of content, so that not only the direct supervisor understands the work. Take care to follow the general requirements of scientific work: confirmability and accuracy of data, objectivity and logic of the analysis, and reproducibility.

When creating the report, balance the individual chapters and sub-chapters. The length of a chapter should primarily reflect its importance for answering the research questions and secondarily also the amount of work that was spent into it. As rough guidelines, the following scopes can be assumed for theses:

* B.Sc. thesis, Study Project: ≈ 50 pages (pure text; without appendix, directories, etc.)
* M.Sc. thesis: ≈ 70 pages (pure text; without appendix, directories, etc.)

Make sure a logical transition between the chapters by taking on the content again in the end and showing how two subsequent chapters built on one another. (Sub-)chapters should not be shorter than a half page and have a clear, individual, and objective heading (no citations, questions, whole sentences, abbreviations, symbols, etc.; no repetition of the heading from chapter to sub-chapter). Text within a (sub-)chapter is divided into paragraphs. Each paragraph consists of one separate idea; they should not consist of just one sentence.

By mentioning them in the introduction, results / discussion, and conclusion, the central outcomes emerge at least three times in the report. First, a result is promised then it is derived or the promise is redeemed and finally it becomes evaluated and summarized.

## Writing and language

The work should be written in an academic style (no colloquial language) i.e., avoiding personal pronouns by using the passive, using short and understandable sentences, and no euphemistic adjectives (more see section 3.2.1).

Possible thesis languages depend on your study program:

* B.Sc. Civil Engineering: German or English
* M.Sc. Civil Engineering: German or English
* M.Sc. Water Science and Engineering: English, other languages only on request

### Scientific writing

This chapter gives a brief introduction in requirements and principles of scientific writing. For more information we recommend the websites of the KIT HoC for courses on scientific writing (<https://studium.hoc.kit.edu/hocampus/index.php/beratung/schreibberatung/>) and references to relevant literature (<https://www.hoc.kit.edu/192.php>).

Principles for scientific work, writing, and to question results

* Perspective: From which perspective do I write? Who am I writing for?
* Confirmability: Is my text clear and understandable (syntax and line of reasoning)?
* Plausibility: Is the text plausible?
* Truthfulness: Is everything correct? Is there any wiggle room? If yes, is it justified?
* Verifiability: Can the content be verified?
* Phrasing and correction: Does the text meet stylistic and formal requirements?

Sentence structure

* Use short sentences and main clauses with only few subordinate clauses.
* Write complete sentences.
* Use lists and bullet points sparingly and only at selected positions.
* Separate subordinate clauses with commas and make clear relationships between partial sentences.

Active and passive voice

* Favor writing in active voice (someone / something does / causes something).
* Use passive voice to avoid personal pronouns.
* Consider variety in your word choice, especially for verbs.
* Avoid personal views and opinions (unscientific!). Exceptional case: justified statements in argumentative sections. However, avoid terms like “I”, “we”, or “one”.
* Do not address the reader directly (e.g. now we discuss, rhetorical questions).

Tense

* Write in present tense.
* Your work itself does not have a history that needs to be indicated by a change of the tense. Things done in the past or previous chapters are still valid now.
* Past tense is allowed for anteriority. But, try to avoid it since it poses a risk for tale style.

Modal verbs and subjunctive

* Modal verbs are for example: shall, can, must, may, need.
* Subjunctive is for example: might, would, could.
* Only use it very selective and check each use since it changes statements subjectively.

Formulations

* Generalizations (e.g. generally, fundamentally, worldwide) and modifying filling words (e.g. actually, to a certain extent, so to speak) lead to ambiguity of statements. This also applies for words like “traditional” or “classic”.
* Avoid pleonasm or duplication of meanings. Examples: “the possibility of being able to do something”, “further improve”.

Text flow

* Goal is readability and that each chapter can stand on its own.
* Avoid colloquial language, idioms, and judgmental statements / sensational press style.
* Exception for word variation: Do not replace established technical terms with synonyms
* Create transitions through content, not or hardly through language.
* Connective words and connective passages between paragraphs make additions and modifications to the raw version difficult. Add them later sparingly.

### Proofreading checklist

First proofreading cycle – checking the content:

* Correctness of statements and declarations
* Literature (references)
* Thread and reading flow (number and length of paragraphs, structure /outline)
* Logic of argumentation
* Are all research questions answered? Take on aspects from the introduction in the summary. Thoroughly formulate the central statements / results of your work.

Further proofreading cycles – checking style and language:

* Check compliance with the remarks given in section 3.2.1.
* Grammar and spelling (typos ⇨ Word assistance, syntax, comma placement)
* Layout (figures, tables, formulas, units, abbreviations, font, spacings, (cross-) references, links, citations, lists, …)
* Uniformity

Use the help of fellow students, friends, or family members. Give the thesis to someone who is not as deep in the topic as you for proofreading.

## Literature research

Including the findings from previous studies related to your thesis topic is obligatory. Every part of content taken from another resource must be referenced appropriately (cf. chapter 2.2). Note that 1 to 1 copies of text passages in the final written version without reference to the author(s) will be rated as an attempt of deception with a 5.0!

Steps before and during your literature research

1. Which information do I need exactly? Think about relevant keywords.
2. Choice of data base (search engines see below).
3. Formulation and entry of the query.
4. Check out the results. Possibly re-formulate the query.
5. Processing of search results (saving papers, reading + marking relevant information, …)

Search Methods

*Citation Pearl Growing Approach*: Take one relevant document (e.g. from the thesis announcement or based on a first literature research) and proceed with the literature research using the references of this publication.

*Successive Fractions Approach*: Start with a general literature research and limit the number of results step by step.

Search engines

Scientific publications can be searched using Google Scholar, Science Direct, Researchgate, Web of Science, Scopus, or the KIT library. Further, water-related publication bases are for example US Corps of Engineers, ASCE, or the IAHR library.

The KIT library offers courses for literature research. Note that for access to many publications, you must be connected with the KIT network via VPN (check the SCC webpage).

Quotable and non-quotable sources

Note that not every source of information is quotable and hence usable for developing your thesis. The following Figure 3.1 gives an overview of quotable and non-quotable sources:



Figure 3.1: Quotable and non-quotable references.

## Time management

It is highly recommended and also required in the inception meeting to develop a timeline for the thesis work, containing milestones and goals. Make sure to update this timeline regularly to get an overview of remaining work as well as possible delays and their consequences. It is expected to inform the supervisors regularly about the progress and possible delays.

The following list of typical steps in the thesis development can help you to set up your timeline. Note that every thesis may include individual further points to consider.

1. Assessing the state of research
* Surveying scientific and technical literature (see chapter 3.3)
* Reading and systematic organization of literature
1. Setting and preparing the investigation approach
* Methodology
* Investigation material / numerical model
* Availability (material, devices, lab, computational resources, …)
1. Investigation
* Execution of experiments / numerical simulations / field measurements
* Documentation of investigation steps, changes between steps, and results: protocols are the basis for describing the methodology and interpreting the results
1. Results and development of statements
* Write down partial results as text or save them in tables / graphics
1. Adaptation / finalization of the thesis structure
2. Raw version
* First coherent version of the thesis in a document (use this template!)
* Set up the raw version from previously written text blocks / elements from previous steps
1. Revising the text
* Structure, order, content
* Technical, scientific, and factual correctness
* Spelling and grammar
* Layout
1. Correction / proofreading
* Self-correction and proofreading
* Correction and proofreading by others (fellow students, friends, family). The advisors do not read the full thesis before submission. For possible feedback on single parts (typically the literature review chapter) or the general writing style contact your advisor. All advisors have a different handling of this procedure.
* Compiling the appendix
1. Submission
* Checking formal requirements
* Printing and binding for physical submission; e-mail with attachment for electronic submission
* Clarification of the date for the final exam

# References

APA. (2020). *Style and Grammar Guidelines 7th Edition*. Https://Apastyle.Apa.Org. https://apastyle.apa.org/style-grammar-guidelines

Institut für Publizistik. (2020). *Zitieren gemäß APA (7th Edition)—Kurz-Manual*. Johannes Gutenberg-Universität Mainz. https://www.studium.ifp.uni-mainz.de/files/2020/12/APA7\_Kurz-Manual.pdf

Appendix

1. Appendix content

The appendix of a thesis typically contains supplementary material that is not included in the main text but is relevant to the study. This material can vary depending on the nature of the study, but examples include raw data, normalization data, data tables, transcripts of interviews or surveys, test protocols, detailed calculations or statistical analyses, maps, photographs, or other relevant documents.

The purpose of the appendix is to provide supplementary information that supports the arguments presented in the main body of the thesis or offers additional detail that may be of interest to the reader. Examples for data presentation in the appendix can be found in the appendix chapter A.2.

1. Exemplary appendix data



b)

a)

Figure A.1: Exemplary appendix figure of mean reference vorticity fields for a) condition 1 and b) condition 2. The black patches indicate shadowed free surface areas. Flow is from left to right.

Table A.1: Exemplary appendix table.

|  |  |  |  |
| --- | --- | --- | --- |
| **normalization parameter** | **symbol** | **value for condition 1** | **value for condition 2** |
| **pier diameter** | D | 0.16 m | 0.16 m |
| **equilibrium scour depth** | ds,e | 0.197 m | 0.074 m |
| **reference flow depth** | h0 | 0.069 m | 0.048 m |
| **reference bulk velocity** | U0,b | 0.56 m/s | 0.47 m/s |