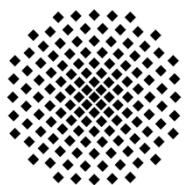


Guidelines for Writing a Thesis at Faculty 2

November 2017



University of Stuttgart

Faculty 2: Civil and Environmental Engineering

Abstract

These guidelines are intended to help students in writing their final Thesis. They detail the individual steps to be taken and include the most important legal principles of the examination regulations of the various study programs, as well as recommendations by the Faculty of Civil and Environmental Engineering on the structure and format of a written report. These guidelines are presented in the form of a student Thesis.

Kurzfassung

Diese Anleitung soll Studenten bei der Erstellung ihrer Abschlussarbeit unterstützen. Sie enthält Hinweise zum Ablauf einer studentischen Arbeit, die wichtigsten, rechtlichen Grundlagen der Prüfungsordnung der einzelnen Studiengänge und Empfehlungen der Fakultät Bau- und Umweltingenieurwissenschaften zur Struktur und zum Format einer schriftlichen Ausarbeitung. Diese Anleitung ist wie eine studentische Arbeit aufgebaut.

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1 Introduction

During the final dissertation (master's thesis) students should demonstrate their ability to independently resolve a subject-related problem by applying scientific research methods within a given time frame. The results must be presented in written and oral form to show that new applications, theories or ideas have been developed by the student.

The objective of the following guidelines for completing a master's thesis is to inform the students about the formal procedure and to provide binding rules and non-binding recommendations regarding the preparation of the Thesis. The guidelines are as follows:

- Chapter 2 describes the formal steps from registration to grading.
- Chapter 3 summarizes the main points of the examination regulations.
- Chapter 4 provides an overview of the contents of scientific work and outlines the key elements.
- Chapter 5 describes recommendations and specifications for formatting the work.
- Chapter 6 deals with the topic of literature research and the correct usage of references.
- Chapter 7 provides tips on how to conduct a presentation or speech

There are binding rules and non-binding recommendations for both the structure and the form of a Thesis:

- Binding rules:
Binding rules must be fulfilled by all students. These are the guidelines of the examination rules, rules for specifying sources, and all rules defined as binding rules in this compendium guide.
- Non-binding recommendations:
It is not always possible or reasonable to define rules for everything. Often there are more possibilities (e.g. citing style) or individual preferences (e.g. font). Here, non-binding recommendations should provide additional information to the students. Chairs may deviate from these recommendations or declare certain recommendations binding (for example, a font or a citing style). In this case, it is the task (responsibility) of the chair to point out these rules before starting the work.

2 Process of Writing a Thesis

2.1 Registration at the Exam Office

The thesis topic is to be issued only after having completed

- 72 ECTS-Credits during the master program.

The existing examination regulations of the respective programs of study are binding: <http://www.uni-stuttgart.de/studieren/studium/admin/po/index.html>. The registration office confirms the thesis topic to the students with the form “Registration for Master’s thesis”. This form must be signed by the supervising professor. In this form, the beginning and the end of the working period is defined. Finally, the registration is handed out to the exam office. Registration forms are found at: <http://www.uni-stuttgart.de/pruefungsamts/formulare/anmeldung/index.html>. Figure 1 shows an example of the registration of a master’s thesis.

2.2 Selection of a Topic or a Supervisor

Master’s thesis topics are given to the students by professors of their respective programs. They are the examiner of the thesis as well. Possible topics are published on the webpages of the Institutes or on the notice board of the Institute. In principal, students can suggest their own ideas and topics/assignments. Contact to the Institute is made by the student. The tasks are defined in a consultation with the professor. As soon as a topic is fixed, the registration form will be filled out. The processing time must start as soon as the topic has been defined.

2.3 Processing Period

The processing time for the master’s thesis is 6 months. The type and extent of the task/assignment must be limited by the examiner to 30 ECTS credits (or 900 working hours).


Anmeldung der Masterarbeit		 Universität Stuttgart
_____ Nachname	_____ Vorname	_____ E-Mail-Adresse
_____ Matrikelnummer	_____ Studiengang	
Bescheinigung zur Zulassung der Masterarbeit (auszufüllen vom Prüfungsamt)		
Hiermit wird bestätigt, dass der/die Studierende _____ LP vorweisen kann und somit die Voraussetzungen zur Anmeldung bzw. zur Ausgabe des Themas der Masterarbeit gemäß Prüfungsordnungsversion _____ erfüllt.		
_____ Datum	_____ Unterschrift und Stempel Prüfungsamt	
Vergabe und Bestätigung des Themas der Masterarbeit (auszufüllen von Student(in) nach/in Absprache mit Prüfer(in) bzw. Vorsitzende(r) Prüfungsausschuss)		
<div style="border: 1px solid black; min-height: 100px; padding: 5px;"> Thema der Arbeit (in Originalsprache der Arbeit): Thema der Arbeit (englischer Titel): </div>		
Prüfer/in (nicht Betreuer/in): (BITTE LESERLICH)	Prüfer-Nr. _____	_____ Nachname, Vorname (des Prüfers!)
_____ Datum und Unterschrift Student/in		
Bestätigung der Vergabe des Themas der Masterarbeit (auszufüllen von Prüfer(in) bzw. Vorsitzende(r) Prüfungsausschuss)		
<div style="border: 2px solid black; width: 150px; height: 50px; margin-bottom: 5px;"></div> <div style="border: 1px solid black; width: 150px; height: 20px; padding: 2px;"> Datum der Vergabe des Themas* </div>	_____ Datum, Unterschrift und Stempel Prüfer/in	
_____ ggf. (falls PO dies vorsieht) Datum, Unterschrift und Stempel Prüfungsausschussvorsitzende(r)		
*Hinweis: Mit dem Datum der Vergabe des Themas beginnt die Bearbeitungsfrist! Sofern gemäß PO der Prüfer das Thema vergibt, trägt auch der Prüfer hier das Datum ein, sofern gemäß PO der Prüfungsausschussvorsitzende das Thema vergibt, trägt auch der Prüfungsausschussvorsitzende hier das Datum ein		
Vom Prüfungsamt auszufüllen		
Die Masterarbeit wurde beim Prüfungsamt angemeldet am	<div style="border: 2px solid black; padding: 5px; text-align: center;"> Fristgerechte Abgabe der Masterarbeit gemäß PO am </div>	
_____ Datum	_____ Unterschrift und Stempel Prüfungsamt	

Figure 1: Registration form for a master's thesis

Both the beginning and the end of the processing period are defined in the application form. The examiner cannot extend the deadline. The processing period may be

extended by the examination board only after a hearing/consultation with the examiner, by a maximum period of one month for reasons which the examinee is not responsible for.

2.4 Presentation and Submission

The following tasks must be performed within the scope/framework of the master's thesis:

- A presentation during the processing period (about 20 minutes of presentation and 10 minutes of discussion). It is the responsibility of the student to ask for a date for a speech at least 6 weeks before the end of the processing period. The supervisor suggests a defined appointment.
- Three bound copies of the work.
- An electronic version (PDF-document) and a poster.

Further information on the presentation can be found in chapter 7.

2.5 Grading

The grades will be given after submission and presentation. The examiner can issue a 4.0 confirmation as soon as these activities have been completed. The declaration of the 4.0 confirmation is issued through the CAMPUS. The assessment procedure should be finalized after two months, at the latest. The grade will be announced via the LSF.

The assessment of the work is based on the following criteria. The exact criteria and their weighting can be obtained from the examiner:

Method of Operation

- Did the student develop the thesis independently?
- Was the approach structured and appropriate?
- Does the invested workload meet the expectations?
- Did the student avoid unnecessary content?

Content

- Is the task addressed completely?
- Are the objectives / main statements of the work clearly represented?
- Is the scope of the work adequate?
- Is the structure logical? Is a central theme recognizable?

- Does the literature analysis meet the expectations?
- Is the content edited in a proper scientific manner?
- Does the work contain contributions made up by the author on the state of the art?
- Does the work contain well-built-up solutions and a well formulated conclusion?

Layout

- Does the thesis contain a table of content, lists of tables, figures, formula and abbreviation as well as references?
- Are figures and tables integrated according to the requirements of the text?
- Do the titles suit the content of the paragraphs?

Representation, Style and Expression

- Language, orthography
- Visual representations, diagrams, charts.
- Optics of layout
- Correct citation mode

3 Examination Regulations

The examination regulations regulate the admission and the processing of the Master's thesis. The most important points concerning the students' work can be found in the above chapters 2.2, 2.3 and 2.4. The complete examination regulations are available on the homepage of the University of Stuttgart: <https://www.student.uni-stuttgart.de/en/exams/exam-regulation/index.html>.

In case of further questions, the Course Directors or the head of the examination board of the respective subject may be contacted.

4 Content of a Master's Thesis

4.1 Components of the Thesis

As any scientific work a master's thesis must include the following elements:

- Title page (usually in accordance with the template of an Institute or chair)
- Declaration on Autonomy of work
- Scope of work
- Summary (German)
- Summary (English)
- Table of contents
- Main body of the thesis
- References

In addition, the following components can be added by the author as needed and as desired:

- Acknowledgement
- List of abbreviations and symbols
- List of figures, list of tables (at the beginning or at the end of the work)
- Glossary (explanation of basic terms)
- Annexes (if necessary with list of attachments)
- Index

The compulsory elements of the written work are described in the following chapters.

4.2 Title Page

The title page must contain the following information:

- Title of thesis
- Date of submission
- Author
- Supervisors of thesis
- If required, indication of a number given by the supervising Chair or Institute.
- Logo of the University and/or the supervising Institute.

In addition, a picture suitable for the work, according to the author's preference, can be chosen. The supervising Institute or the chair can set specific requirements for the design.

4.3 Declaration of Authorship

The declaration of authorship is as follows:

„Hiermit erkläre ich, dass ich die vorliegende Arbeit (bzw. bei einer Gruppenarbeit meine entsprechend gekennzeichneten Anteil der Arbeit) selbständig verfasst habe, dass ich keine anderen als die angegebenen Quellen benutzt und alle wörtlich oder sinngemäß aus anderen Werken übernommenen Aussagen als solche gekennzeichnet habe, dass die eingereichte Arbeit weder vollständig noch in wesentlichen Teilen Gegenstand eines anderen Prüfungsverfahrens gewesen ist, dass ich die Arbeit weder vollständig noch in Teilen bereits veröffentlicht habe und dass das elektronische Exemplar mit den anderen Exemplaren übereinstimmt.“

The declaration on authorship has to be written in German and signed in the original thesis. An English translation can be additionally added.

"I hereby declare that I have written the present work independently (or, in the case of a group work, my correspondingly marked portion of the work), that I have not used any sources other than those specified and that all statements taken verbatim or meaningfully from other works have been marked as such, that the submitted work has not been completely or partially the subject of another examination procedure, that I have not published the work either completely or in part, and that the electronic copy coincides exactly with the other copies."

4.4 Summary / Abstract

The abstract at the beginning of the Thesis will summarize the essential elements of the complete work. The results of the work should also be described. Thus, the reader will get broad description of the work.

The abstract is typically about 10-15 lines, a maximum of one page, and does not include any figures, tables or literature sources.

A translation of the summary under the heading "abstract" also allows English-speaking readers to get an overview of the work. Furthermore, it is desirable nowadays as publications are frequently accessible on internet.

4.5 Main Body of the Thesis

The main part of a thesis is structured as follows:

- **Introduction, problem description, motivation, overview**

This part introduces the reader to the problem addressed in the thesis. At the end of this chapter the reader should have information on the objectives of the work, the benefits resulting from the achievement of the objectives, and about the procedures adopted in order to achieve the objectives. One chapter, if necessary with some subchapters, is sufficient for this part of the paper.

- **Basic elements: literature review, available data sources**

There is no scientific work starting from scratch. Most subjects are based on preliminary work, which is intended to be commented in in this part of the work. Not a complete enumeration of all available literature sources is required but a summary of the relevant methods and results reported in existing papers. The data sources (e.g. a Model) provided by an Institute or a Chair should be explained in this part. One to two chapters should be designated for this part.

- **Own calculations, analyses, research**

This is the main part of the thesis. Depending on the type of the thesis in this part own calculations, analyses and research are described, discussed and evaluated.

- A scientific work is not an advertising brochure. Therefore, not all objectives of the assignment must be achieved. A thesis delivering a good analysis on why the objectives could not be achieved is a better thesis than the one that presents dubious results uncritically and in a too positive light.
- A scientific work should avoid displaying any subjective evaluations. Statements that results are “amazingly good” should be avoided, and if unavoidable require further explanation on what makes them so “amazing”. However, this does not mean that the own work cannot be assessed positively. The statements about this assessment should be as precise as possible.
- A scientific work is not an adventure report. Sentences starting with “I think (...)” or “afterwards I did (...)” are not appropriate. The student should decide which of the calculations and analyses will be mentioned in this part of the thesis. If for instance in a first step data was imported with software A, but afterwards software B was used due to shortcomings in software A or due to lack of programming skills, this aspect should not be mentioned in the thesis. But, if a set of methods described in literature are implemented and analysed, this aspect should be described in detail, even if one of the methods finally turned out to be rather unsuitable.
- It is not the length that makes a scientific thesis a good scientific thesis. Whereas a complete description of the methods is generally indispensable, it is often sufficient to explain the results of the calculations on selected, specific examples

instead of overloading the thesis with a variety of tables and figures displaying results.

This main part can cover several chapters.

- **Conclusion, discussion, outlook**

Together with the introduction this part frames the thesis. The relevant results are summarized here and - with respect to the objective formulated in the introduction - discussed and assessed. If objectives are not being achieved, the reasons for this should be explained and possibilities for improvement should be suggested. Even if the objectives have been achieved, it may be suggested that further investigations and research is required (e.g. extension of the survey area, long-term analyses).

A division into chapters and subchapters is only recommendable, if at least two subsequent points can be listed in the subchapter. The title of chapters and subchapters should enable the reader to deduce the contents of the chapter or subchapter. All titles of one level of a chapter should display the same grammatical structure.

Terms should be clearly defined in a thesis and should be used subsequently in the work according to this definition. Thus, it should be avoided for interchange the terms “travel time” and “trip time” for one and the same parameter.

4.6 List of Figures and Tables

Analogous to the contents, these lists contain the figures and tables of a thesis. Before handing in the thesis the formatting should be checked and eventually corrected as automatically generated lists might display unfavourable formatting.

5 Layout of Thesis

5.1 Introduction

Principally, any formatting can be used if it is readable and applied consistently throughout the entire thesis. Experience has shown that students have less work and are more successful with formatting their work when using a template. Many Institutes offer examples of templates for Word or LaTeX.

5.2 Guidelines Formatting

The following formatting is recommended:

- Paper DIN A4
 - Gutter margin: 2,0 cm
 - Head margin: min. 2.0 cm
 - Tail margin: min. 2.0 cm
 - Outside margin: min. 2.0 cm
- The font must be readable, e.g. Arial, Helvetica or Times New Roman.
- The Font Size for Arial should be between 11 and 12.
- Spacing should be between 1.15 and 1.6.

5.3 Figures

Figures must be numbered consecutively. Every figure is labelled with a title. Automatic numbering (word: insert references and labels) and cross-references (word: insert references and cross references) should be used for this. The Source of the figure must be indicated. The following Figure 2 shows an example:

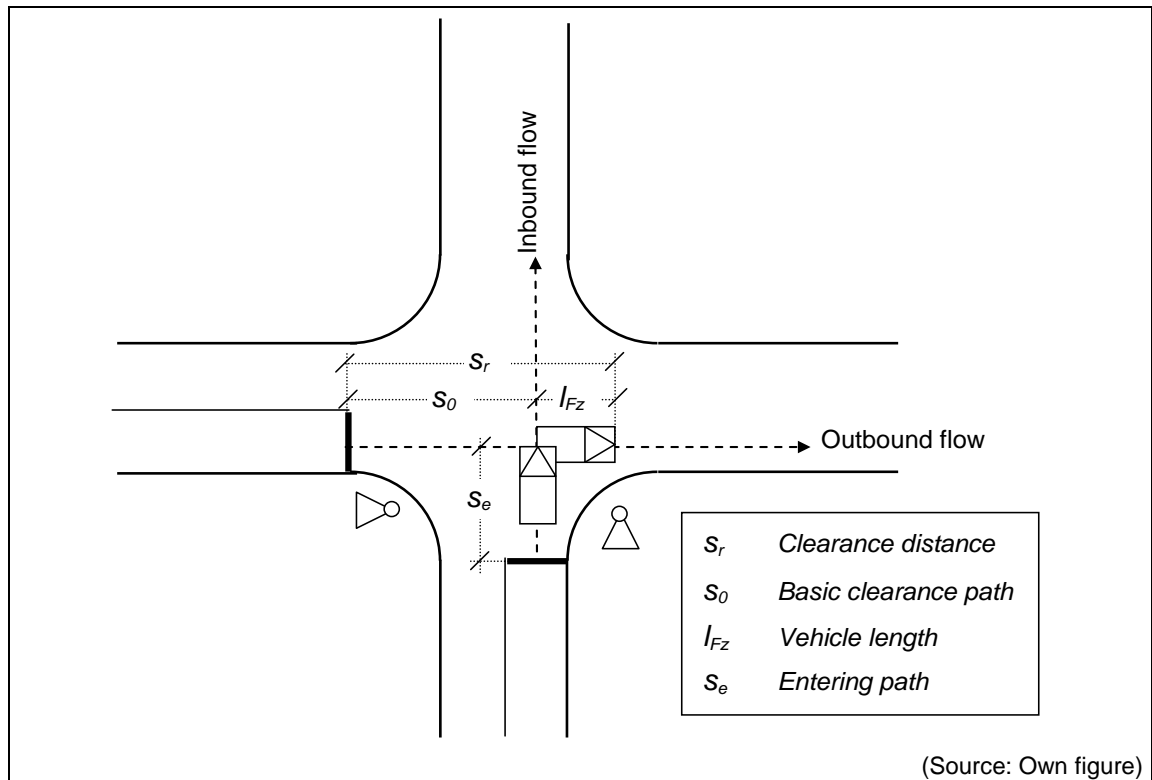


Figure 2: Clearance path and retraction path at a node with light signal control.

Figures, along with the corresponding labelling, should be self-explanatory independent from the text. Despite this, every figure should be implemented into the text and there should be at least one reference to every figure within the text.

When selecting the colours of your figures, please keep in mind that the colours must be distinguishable even in a black-and-white printout of your thesis. The size of the texts within a figure should be selected in such a way as to be readable even on half-size printouts.

5.4 Tables

Tables should also display a uniform formatting. As a rule, the following details should be observed:

- A table should cover the entire paper width.
- The columns of a table should have the same width.
- Numbers should be right-aligned. Appropriate rounding options should be examined.

Even if tables and figures do not require any text-explanation, the text should contain a reference to the tables and figures. If the author finds that a reference is dispensable, the entire table might be dispensable.

5.5 Footnotes

Footnotes can be inserted if they contain material that cannot be included in the text at this specific position but if it is of importance. As a rule, however, all important material must be directly integrated into the text for easier readability.

5.6 Checks before Handing in the Thesis

Before handing in a scientific work it should be checked intensively by the author and at least by one other native speaker to detect spelling, grammar and formatting errors.

6 Use of Literature References

6.1 Introduction

Literature references are of major importance for a scientific work. Without the knowledge about the relevant literature, it is not possible to be aware of the current state of the subject area of the respective work, and to process it. The correct indication of literature references makes it possible for the author to support statements made in the text with the help of references from literature without having to bring in new proofs for every statement made.

6.2 Search of Appropriate Literature

6.2.1 General

The supervisor and the lecturer are the first contact persons concerning the search for the appropriate literature. The work is often preceded by bachelor's, master's, diploma theses or Doctorates from the respective institutes.

6.2.2 Books, Journals and Publications

Both Institutes and Chairs have small libraries containing the most important books on their subject.

Books can be searched via the homepage of the Library of the University of Stuttgart. The books available in the Chair library are listed there too:

<http://www.ub.uni-stuttgart.de/index.en.html>

Some books or abstracts can be read via Google's book search:

<http://www.google.com/books>

6.2.3 Online Publications

An increasing number of publications of all named categories are published on the websites of companies and universities. Via suitable search engines, these websites can be found easily. Google has developed a search engine explicitly targeted for scientific literature:

<http://scholar.google.com/>

Also useful are websites that allow browsing in the sources of an article (so-called citation databases). A provider in this respect is citeseerx of the Penn State University:

<http://citeseerx.ist.psu.edu>

It is worth doing online search via a University Internet PC, as the University has contracts with many publishers for cost free online access to articles.

In order to indicate the sources of the references, it should be kept in mind from the very beginning to document all sources that might be used in the thesis correctly, with source, data on download, etc. (see chapter 6.3.3).

6.3 Correct Citation

6.3.1 General

For each scientific work, the sources must be named correctly and completely. For this purpose, there exists a variety of citation styles, e.g. The Harvard style, the Chicago style, etc. The chosen style is up to the author. However, the chosen style has to be followed consistently. The correct citation style allows the reader to understand or verify the information. The clear demarcation between own work and adopted texts is part of the scientific process. Incorrect or incomplete quotations can also be interpreted as attempts of deception.

The following is a description of a correct citation based on the Harvard style.

6.3.2 Literature References in the Text

In case of direct quotations, the sequence cited must be clearly identified by using quotation marks and indicating the page number.

According to Müller (1993, p. 34), "the utmost accuracy should be taken when using direct citation"

If parts in a direct quotation are to be omitted, this must be indicated by "(.)":

However, "this statement cannot be valid basically due to weather, time of day (...)" (Müller, 1988, p. 34).

For direct reproduction of figures and tables from a literature reference, the indication of the number of the page or the number of figure/table is also required. If a figure or only parts of a figure are based on a literature reference, this aspect must be marked accordingly (for instance, "in accordance with/based on").

If a source is cited indirectly in the text, meaning that essential content is not reproduced literally, this aspect must be indicated by stating the author and the year of publication:

According to Müller (1992), there occurs a correlation between (...)

(...) and thus corresponds to results of other publications (see among others Schmidt et al., 2002).

If a source has two authors, both authors must be named:

According to Müller and Schmitz (1992) there is a correlation to (...)

(...) and thus corresponds to the results of other publications (Schmidt & Meier, 2002).

For more than two authors, only the first author is listed, joined by the abbreviation "et al." (Latin for "and others"). The author listed in the first place in the original source should be listed first in the citation and not the one according to alphabetical arrangement.

According to Müller et al. (1992) there occurs a correlation between (...).

(...) and thus, corresponds to results of other publications (see among others Schmidt et al., 2002).

If more than one publication of one author or a group of authors is cited of the same year of publication, these publications will bear a letter next to the year of publication.

This corresponds to the results of Müller (1992a, 1992b).

6.3.3 References

The references are intended to help the reader find the mentioned literature sources. To this aim, the data on the sources must be as accurate as possible. Depending on the type of literature, the following information should be given:

- Name and initials of authors (name of company, if required)
- Year of publication (respectively year of download)
- Title (often italic, title of a website if required)
- Name and initials of editors
- Name of publication (often italic, for instance name of journal)
- Name of volume
- Year
- Number of issue

- Number of page
- Name of publishing house
- Location of publishing house
- Link to website
- Date of download
- Name of conference (in case of proceedings)
- Location of conference (for proceedings)
- Year of conference (for proceedings)

If available, for printed sources, a link for download can also be listed. This can simplify the search for the source.

The following examples cover most of the possible types of literature references:

Book with four authors:

Backhaus, K., Erichson, B., Plinke, W., Weiber, R. (2006), *Multivariate Analysemethoden*, 11. Edition, Springer Publishing House, Berlin/Heidelberg.

- Book with two authors and additional information of website:

Domencich, T., McFadden, D.L. (1975), *Urban Travel Demand: A Behavioral Analysis*, North-Holland Publishing Co., Niederlande, available online under <http://www.econ.berkeley.edu/~mcfadden/travel.html>, downloaded on March 15th.2009.

Article from journal:

Frank, P., Friedrich, M., Schlaich, J. (2008), Betriebskosten von Busverkehren schnell und genau ermitteln, *Der Nahverkehr*, Volume 11, S. 15-22, Alba Fachverlag, Düsseldorf.

Article from Proceedings of a conference:

Friedrich, M., Jehlicka, P., Otterstätter, T., Schlaich, J. (2008), Mobile Phone Data for Telematic Applications, Proceedings of International Multi-Conference on Engineering and Technological Innovation: IMETI 2008: International Institute of Informatics and Systemics (IIIS), Orlando, Florida, USA.

Pure online source:

Fastenrath, U. (2009), *TMCpro: Presence and Future of Real Time Traffic Information*, available online at SlideShare Inc. under www.slideshare.net/TMCpro/tmcpro-ii-presentation, downloaded May 25th 2009.

Manual of a Software:

PTV Planung Transport Verkehr AG (PTV, 2006), *VISUM Manual Version 9.4*, Karlsruhe.

Two legal texts on the Internet:

Federal Ministry of Justice (BMJ, 2009a), Verordnung zur Erleichterung des Ferienreiseverkehrs auf der Straße (Ferienreiseverordnung), last

modification via V v. dated June 13th 2008 available online under www.gesetze-im-internet.de/ferreisev_1985/, downloaded April 17th 2009.

Federal Ministry of Justice (BMJ, 2009b), Straßenverkehrs-Ordnung (StVO), last modification via Art-1 V I 734 dated March 26th 2009, available online under <http://www.gesetze-im-internet.de/stvo/>, downloaded April 17th 2009.

If there exist several publications of one text, the best available and highest quality publication should be chosen. If, for instance, an article was first published in the proceedings of a conference to be published later in a reputable professional journal, the professional journal should be selected as source for the reference..

6.4 Copyright

The widespread opinion that a clear identification of a reference is sufficient to be permitted to use foreign material (pictures, figures, charts) is wrong. Also, the frequently used "©" is not sufficient.

The author does not abandon the rights of his work by publishing it in an article or on the Internet. Therefore, it is imperative to work carefully if one uses foreign material, as an illegal use can trigger high claims from the author.

This is not the place to offer extensive information on this complex subject. The following link provides a detailed discussion on copyright law in Germany with special emphasis on copyright in science and research along with a comprehensive bibliography:

[http://de.wikipedia.org/wiki/Urheberrecht_\(Deutschland\)](http://de.wikipedia.org/wiki/Urheberrecht_(Deutschland))

There are various providers on the Internet that permit the downloading of pictures which can be used cost-free, when complying with the respective terms of use. Three of these providers are available at the following links:

<http://www.aboutpixel.de>

<http://www.pixelio.de>

<http://www.google.de>

Google offers a filter under search options and usage rights which only shows reusable images. In order to integrate maps and city maps free of charge, OpenStreetMap cards are available. But these maps must also be indicated correctly:

http://wiki.openstreetmap.org/wiki/DE:Datenherkunft_richtig_angeben

6.5 Ensuring the Integrity of Scientific Practice

The "Statutes of the University of Stuttgart to ensure the integrity of scientific practice and to deal with misconduct in science" document the principles of good scientific practice (http://www.uni-stuttgart.de/zv/bekanntmachungen/bekanntm_62_2013.pdf).

These principles are binding for all members of the University and, thus also, for students preparing a thesis. The following statements are found in § 1 "General principles" e.g.:

"All members of the University of Stuttgart in research, teaching and studies (...) are obliged,

- to work according to the recognized rules of the respective scientific subject,
- to document results,
- to consistently double check all results,
- to be strictly honest regarding the contributions of partners, competitors, and predecessors,
- to avoid and prevent scientific misconduct, and
- to respect the principles of good scientific practice described in the Statutes."

7 Presentation of Paper

The presentation of a student's paper usually takes 20 minutes. Subsequently, 10 minutes are provided for questions and discussion on the subject. Speech and slides for the speech can be designed individually. However, there are several recommendations which only should be neglected with good reasons:

- The number of slides should comply with the duration of the speech. As a rule of thumb, two minutes per slide are appropriate, but this is highly dependent on the design of the slides. If one has only little experience in delivering speeches, it is worthwhile to practice the speech under real conditions and to stop the time needed for the delivery.
- The number of words per slide should be reduced to the minimum (approx. 20-30 words). Complete sentences should be avoided as they distract the attention of the audience.
- Figures used in the slides should be simplified to the essential. Curves that are not subject of the presentation should be removed. The Font Size (labelling of axis, etc.) must usually be increased in comparison to the written report.
- Tables from the report often comprise too much information. Therefore, the audience won't be able to gather all the details. Due to this aspect, the integration of tables into the speech must be done very carefully.
- Clip art and sumptuous animations should be avoided as they distract the attention of the audience. Furthermore they are not professional.
- All elements (text, photos, graphics, tables), should be sufficiently large so that they can be easily made out by the audience in the last row. The minimum font size for Arial in a text should be 18 pt.

Before delivering the speech, all technical details should be clarified: Which notebook and which beamer will be used? Are the required software versions available? How do the remote control and laser pointer function? Are the necessary boards ready for use?

Ideally the presentation technology should be tested beforehand to avoid unpleasant surprises. Sentences such as "now a figure is supposed to pop up " or " unfortunately the video does not work at the moment" should be avoided. Even if the speaker cannot be blamed for these problems, they worsen the impression delivered by the speech.

An important note: The information on copyright in section 6.4 applies to presentations as well.

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