Writing Scientific Theses at the Magdeburg Research and Competence Cluster (MRCC)

Guidelines for Students at the Faculty of Computer Science

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Content

1. Preliminary Remarks

The Magdeburg Research and Competence Cluster Very Large Business Applications (MRCC) is the umbrella organization of the working groups Wirtschaftsinformatik (Business Informatics) I (AG WI) and Very Large Business Applications Lab (VLBA Lab) as well as the SAP University Competence Center (SAP UCC). At MRCC, students (of the Faculty of Computer Science) have the opportunity to scientifically reflect and thematically apply their acquired knowledge and technical skills within the scope of their thesis. Academic theses at MRCC follow contemporary research and development projects, while an interdisciplinary team provides innovative, practice-oriented topics to deal with. Thereby, MRCC is bridging the gap between latest scientific questions and topics of particular practical relevance. At the same time, this promotes the vital transfer of knowledge and science between industry and academic research giving students the possibility to work on externally driven topics. Nevertheless, a thesis should be primarily seen as a scientific treatise and university examination that requires prior coordination of the respective topic between the student, external supervisor and university assessor.

2. Aim of the Guideline

The present guideline was developed in collaboration with VLBA-Lab, AG WI, BICC and SAP UCC to provide students at the Faculty of Computer Science a general framework within the highly complex, yet vague field of scientific writing. Even though scientific writing follows some generally acknowledged rules, it is subject to discipline-specific emphases and provisions. The overall objective of the guideline is to create a cross-organisational, homogeneous basis for writing theses at MRCC. However, it does not claim to set universal, obligatory rules, it is rather intended to be a guidance to assist students with the process of preparing and dealing with a scientific topic as well as the written and oral presentation of their outcomes and findings. Academic theses at MRCC are subject to the respective latest version of the study and examination regulations of the Faculty of Computer Science (or the faculty of the student) and students themselves are responsible for their compliance. Thus, the guideline shall complement but not replace the decisive university regulations.

3. On the importance of scientific standards

Within the scope of their thesis, students can dedicate themselves to new fields of interest or deepen already existing points of focus. The overall objective is to gain new scientific insights through critical reflection. The broad field of Business Informatics covers many different types of possible topics for theses with emphasis on application and development-oriented practical theses, empirical research or case studies. Although these research projects are of a different nature, their common feature is the discussion of a topic from a *scientific point of view*. But what does scientific writing actually mean? Scientificity is a comprehensive, yet vague term that unites a multitude of definitional approaches. These approaches shall not be the focus of this guideline, but reference is hereby made to Umberto Eco (1991, 40-45) who summarises the main features of scientific writing as follows:

- The starting point of any thesis is a *clearly defined research subject* framed in a research question or a hypothesis.
- The investigation should provide *new insights* or open up *new perspectives on existing research.*
- The thesis must provide *an added value within the scientific debate.*
- The investigation should be comprehensible and reproducible in order to achieve *verifiable statements.*

Scientific writing largely equates a problem-solving process which requires a systematic approach. This starts with a precise depiction and limitation of the research subject, over the recourse to relevant literature and preliminary work, followed by a *consistent and conclusive line of argument*, to *the critical appraisal of the chosen approach* and the *achieved outcomes*. Scientificity thus means to find a balance between autonomous thinking and the appraisal of existing literature and research. From this process, five major quality criteria for scientific writing can be deduced:

1. **Structured approach:** The thesis should follow a compelling structure as well as an adequate and consistent scientific method.

2. Scientific quality criteria:	The four aspects *originality, objectivity, reliability* and *validity* are vital with a view to scientific rigour. *Originality* stands for the unique feature of both the research subject and the chosen approach indicating the novelty. *Objectivity* requires a matter-of-fact argumentation that is comprehensible, free of subjective assessments or valuation. *Reliability* relates to the procedure of a measurement or investigation. *Validity* describes the level of accuracy of the respective measurement and survey method.
3. Scientific foundation:	The argumentation should be adequately conducted in both breadth and depth drawing upon relevant preliminary work.
4. Writing style:	The presentation of the facts has to be accompanied by a comprehensible, objective and concise argumentation together with a proper spelling.
5. Clarification of terminology:	Key terms and concepts in the thesis are to define at the beginning thus providing a uniform basis for discussion.

A few words on scientific methods

The scientific analysis of a problem requires a deliberate and reasonable choice of the respective methodological approaches to make the course of investigation transparent and comprehensible. The approaches, be they empirical, systematical, analytical or comparative, may vary from thesis to thesis according to the problem and thus can be adapted, combined or refined. The pivotal question is, to what extent the chosen method is expedient for addressing the research question. Hence, the method forms the backbone of any thesis, on the basis of which research, evaluation and processing of data and achieved outcomes can be made transparent.

4. Types of theses

Final theses may be of a varying nature and come along with different requirements that have to be agreed on with the respective supervisor in advance. While the main focus of a term paper is on the techniques of scientific writing, the requirements for autonomous thinking and gaining knowledge constantly increase up to the master thesis. Whether it be a project thesis, bachelor thesis or master thesis – all types of theses should be convincing by their scientific nature. While, on the one hand, there are scientific latitudes, on the other hand, university guidelines need to be considered as defined in the corresponding study and examination regulations for bachelor and master programmes being available on the website of the Faculty of Computer Science.
The following statements shall provide a brief overview of the specific requirements which the different types of theses are based on.

4.1. Bachelor thesis

The bachelor thesis is the first conclusive academic achievement in the course of studying. Here, students should demonstrate that they are able to autonomously and scientifically deal with a chosen problem by using the methodological competences acquired during their studies. Concerning this, the latest version of the study and examination regulations of the Faculty of Computer Science states the following:

> „Die Bachelorarbeit ist eine selbstständige wissenschaftliche Arbeit, die in schriftlicher Form einzureichen und mündlich zu verteidigen ist. Dabei soll der oder die Studierende zeigen, dass er oder sie innerhalb einer vorgegebenen Frist eine Aufgabenstellung aus dem Fachgebiet selbstständig mit wissenschaftlichen Methoden bearbeiten kann.“ (SPO 2017, §6 (9), p. 6).[1]

Objective and scope

First and foremost, the bachelor thesis requires to delve into a complex task. It can be written either in combination with the bachelor internship or separately. Students should be able to deal with a practical problem or a basic research issue in form and content on the basis of their acquired scientific knowledge. The scientific novelty is not compulso-

[1] The bachelor thesis is an independent scientific achievement which has to be submitted in written form followed by an oral defence. Students should demonstrate that they are able to autonomously deal with a subject-specific topic within a limited timeframe using sound scientific methods (Translation of the author).

ry here, but students should generate and document knowledge by means of a critical analysis of selected specialist literature.
The scope of the bachelor thesis depends on the respective main focus chosen by the student and should be appropritate with respect to the thesis tasks. Normally, bachelor theses do not exceed 20,000 words for 20-week theses and 12,500 words for 10-week theses.

4.2. Master thesis

The master thesis can be considered as the final scientific maturity examination for an academic career. It is the outcome of a subject-centred learning process during the master programme and the proof of the students' own ambitious research achievements. With the preparation of the master thesis, students proof that, during their academic career, they have learnt to deal with a problem on an advanced scientific level by using appropriate methodological approaches. The master thesis can also be processed in the context of a practical work. In this regard, the latest version of the study and examination regulations of the Faculty of Computer Science states the following:

> „Die Masterarbeit soll zeigen, dass die Studierenden in der Lage sind, innerhalb einer vorgegebenen Frist ein Problem selbstständig mit wissenschaftlichen Methoden zu bearbeiten. Das Thema und die Aufgabenstellung der Masterarbeit müssen dem Prüfungszweck und der Bearbeitungszeit entsprechen." (SPO 2017, §22 (1), p. 18)[2]

Objective and scope

For many students, the preparation of the master thesis often means a scientific challenge. Compared to a bachelor thesis, not only the scope is greater but also the scientific standard when it comes to originality, quality and autonomy. Here, the aim is to discuss a complex problem which can be dealt with either theoretically or practically in a methodologically sound way. Regarding this, the tools and methods applied should cope with the complexity of the research subject. For this, reference to associated research areas has to be made including a comprehensive follow-up and critical reflection of relevant literature as well as the evaluation of outcomes and the representation of their implications for science and practice. The scope of the thesis is determined by a refer-

[2] The master thesis should demonstrate that students are capable of dealing autonomously with a defined problem within a limited timeframe by using sound scientific methods. Both the subject and the concrete task have to comply with the examination purpose and the processing time (Translation of the author).

ence value of about 25,000 words but has to be balanced again the respective research subject and the workload involved.

4.3. Scientific project

A scientific project can be carried out either as an individual project or by a team of up to six persons and can be considered as a small bachelor or master thesis in a broader sense. Both the content-related and methodological requirements are equivalent to those of a bachelor and master thesis, only the emphasis is different here.
The objective is to use scientific fundamentals in a specific thematic context, whereby the evaluation of outcomes is a key element. The focus here is on the scientific output that should be documented in the form of a scientific article comprising 10 to 15 pages being presented in the course of a defence later on. Depending on the quality of the article, a publication and presentation on a conference by the student can be considered.

4.4. Software project

The focus of a software project, which can be carried out by a team of up to six persons, lies on the development of prototypes being instantly implementable. Even though the technical aspects are subordinate to the scientific ones, the professional development of software has to be followed by the documentation of the process and the artifacts as part of project management procedures. The concluding project report ranging from 10 to 15 pages should include the project description and the problem definition as well as statements on the requirements analysis, the design and the testing. Beyond that, the project approach and the distribution of responsibilities within the team have to be determined in advance, so that the process and the quality of the project can be monitored continuously.

5. From choosing a topic to the registration of the thesis

5.1. Choice of the topic

The process of autonomous working does not start with writing but with the choice of a suitable topic. Independent research as well as reading and questioning relevant literature is essential for the process of focussing. Along with an epistemic interest, content-related proximity to and familiarity with the chosen topic should prevail. What is deci-

sive here, is the motivation to intensively deal with the chosen topic over a longer period of time. Students should make sure in advance that their chosen topic is relevant and of current importance with corresponding literature being sufficiently available. The intensive analysis of current debates on the chosen topic is a prerequisite for students to develop their own thoughts, approaches and questions. Students will be given the necessary flexibility to find a topic corresponding to their individual interests and ideas. However, they should discuss with their supervisors, whether the topic is suitable regarding the requirements and the scope of the thesis. Alternatively, relevant topics are assigned by research assistants and can be viewed on the notice boards in the building G29-117 as well as on the website of the AG WI.

5.2. Exposé

Writing an exposé is a major challenge for a great number of students. The aim is not only to make transparent the planned research project including all the necessary work steps, but also to convince the potential supervisor and win backing for the project. The exposé serves, so to speak, as a personal business card. While it helps students to outline the relevant processes and steps to be taken for their theses, thus making them feel more confident, it also allows to get targeted assistance of the supervisor. At the same time, the exposé does not claim to set up an irrevocable concept. The preparation of a thesis is a dynamic process with adjustments and changes being an essential part of scientific writing. For instance, the underlying structure and individual bullet points might change, the initially used literature will prove insufficient or newly won insights shall be included in the analysis. The exposé provides guidance for both the students and the supervisors und shall provide information (on max. five pages) on the following aspects:

- Name of the author and the responsible supervisor
- Working title of the thesis
- Topical introduction and definition of the problem
- Scientific perspective and state of the art
- Research question(s)
- Epistemic interest of the author
- Methodological approach
- Literature and material
- Preliminary structure
- Time schedule

5.3. Registration

If the exposé is approved by the supervisor, formal registration at the examination office can be made marking the actual start of the writing process. The completion time for the separately written *bachelor thesis* without the accompanying 12-week internship usually takes 10 weeks (**Repealed with the examination regulations from 24 September 2015**). In the course of the integrated internship, the bachelor thesis will be written parallel (with a maximum of six weeks difference). Since the entry into force of the examination regulations on 24 September 2015, the completion time is, in any case, 20 weeks. Upon request, the completion time may be extended up to two months in both cases. The preparation of the *master thesis* means to write full-time. The completion time is 20 weeks and may also be extended up to two months upon request.

5.4. Supervision and communication

In contrast to oral or written exams, the supversion of a thesis is a largely open and unbiased process lasting over a longer period of time. Hence, the assessment of a thesis proves to be rather complex, because it does not follow a rigid scheme. Against this background, the requirements in terms of quality of the thesis as well as the assessment criteria should be discussed and agreed upon to set out the expectations on both sides in advance. The exposé as a target agreement between supervisor and student is an initial step to specify both the guiding question as well as the aim of the thesis which should be reflected in defined milestones and a realistic time schedule. The students will be expected to prepare meetings in a structured manner while following a deadline-oriented way of working on the basis of self-responsibility. Regarding this, thorough reading and questioning of the respective literature are crucial. In agreement with the respective supervisor, students can document their progress by means of a worksheet, so that the supervisor can provide a timely feedback when it comes to challenges or time and content-related deviations.

6. Content-related and formal requirements of a thesis

With a view to the structure and design of a thesis, there are numerous different conventions that may vary depending on the respective university or working group. Since there are no mandatory guidelines, students should follow the principle of a systematic and consistent approach. The thesis should be clear, comprehensible and free of contradictions and uneccessary redundancies in both content-related and formal terms.

6.1. Content and structure

A thesis can be subdivided into multiple sections. While the table of contents and the list of references serve to provide an overview of the structure of the thesis, the discussion of the key problem is being conducted in the text section. A clear structuring of the thesis and the conclusive link between the several chapters are crucial to guide the readers effectively through the discussion. Although the structuring of a thesis essentially depends on content-related requirements, the following regulatory scheme can be taken as a basis:

- Cover page
- Abstract
- Table of contents
- List of abbreviations, figures and tables
- Introduction
- Main section
- Conclusion
- List of references
- Appendices
- Declaration of originality

6.1.1. Cover page

The cover page provides a first impression of the thesis. It should be clearly laid out and comprise the following aspects:

- Name of the university
- Faculty
- Course of study
- Type of thesis
- Topic/ title
- Name of the author
- Name of the supervisor (additional supervisors can be listed)
- Date of submission

6.1.2. Abstract

The abstract is intended as a summary and should reflect the essential points briefly and concisely. With a maximum length of 250 words it should give the readers a brief but

precise overview without having to read the entire thesis. For theses written in English, the abstract has to be drawn up in English.

6.1.3. Table of contents

The table of contents reflects the conceptual structure of the thesis. Here, the bullet points, the numbering and the page numbers have to be congruent with the titles of the respective chapters. These chapters are to be numbered consecutively with Arabic numerals (1, 2, 3,...) while lists and appendices are indicated with Roman numerals (I, I, III, ...). For reasons of clarity, the author should avoid more than three hierarchical levels (i.e. 1.1.3). As a general rule: If a bullet point is divided, at least two subitems have to follow. These subitems may be further divided into unnumbered paragraphs which are not listed in the table of contents.

6.1.4. List of abbreviations, figures and tables

A list of abbreviations is required if abbreviations used in the thesis are not mentioned in the Duden Spelling Dictionary. They have to be listed with their corresponding meaning in alphabetical order. A list of figures comprises all the illustrations used in the thesis. They have to be listed with their full title according to their numbering. Analogous to the list of figures, the list of tables comprises all tables used in the text. The lists appear consecutively following the the table of contents. Where appropriate, a symbol directory for mathematical notations or a directory for algorithms can be added.

6.1.5. Introduction

The introduction should get the readers acquainted with the topic of the thesis while arousing their interest for the following pages. It is supposed to reflect not only the relevance of the chosen problem but also to contextualise it within the respective discipline. Moreover, the introduction provides an overview of the objective, structure and approach of the thesis hence reflecting the exposé. As a guidance for the readers, the introduction should cover the following aspects:

- Relevance of the topic
- Research question/ hypothesis
- Delimitation of the topic
- Literature and sources used

- Method
- Structure of the thesis

6.1.6. Main section

The main section of the thesis allows to deal with the research question or hypothesis depicted in the introduction in a structured and systematic manner. The argumentation should follow a coherent and comprehensible train of thoughts being inhrerently consistent. It is crucial to contionously refer to the research question within each chapter and to sensibly link the individual text sections. Depending on the type of thesis, different aspects have to be considered within the main section. Generally, the own contribution relevant for answering the research question is followed by an evaluation of that contribution and its suitability for solving the research question. Here, the following items can provide guidance:

- State of the art
- Contextualisation of the literature and the underlying data
- Research design and possible approaches
- Presentation and evaluation of the outcomes

6.1.7. Conclusion

The conclusion of the thesis is meant to trace back a conceptual arc to the introduction. At this point, the initially raised research question as well as key statements should be answered followed by a trenchant presentation of the outcomes. Beyond that, the insights gained should be critically reflected. An outlook can illustrate which issues remain unsolved or which research areas may become relevant in the future. With this, the conclusion demonstrates the ability of the author to understand the topic from a broader scientific perspective. The following aspects should be reflected in the conclusion of a thesis:

- Brief summary of the outcomes and findings
- Contextualisation of the outcomes considering prior research
- Discussion and critical reflection of the outcomes
- Perspective on future developments and deduction of new research questions

6.1.8. List of references

Generally, it is recommended to use a literature management system, such as Endnote or Citavi[3], particularly to maintain the consistency of the list of references. The list of references at the end of the thesis features all quoted titles referred to in the text (Monographs, serial publications, journal articles, internet sources). Literature that is not referred to in the text is not listed. Basically, all soruces and references should follow a consistent and approved citation style. References should be listed alphabetically starting with the last name and first name of the respective authors or referring to their appearance in the text. Here, the first names are either systematically shortened or written out in full. Academic or professional titles are not mentioned. If several works of one author are mentioned, they have to be listed in ascending order of the year of publication. The listing of several authors is indicated by commas, semicolons or slashes. Authors who did not write but publish a work are listed under the abbreviation "ed./eds." If some information required can not be determined, this is labelled as follows: „s.n." (sine nomine), „n.d." (no date), „s. l." (sine loco). Depending on the work in question, the following information must be provided in the list of references:

Monographs

Last name, First name (year of publication): Title of the monograph. Subtitle (edition if required). Publishing place: Publisher.

Serial publications

Last name, First name (year of publication): Title of the work. Subtitle. In: Last name, First name (ed.): Title of the serial publication. Subtitle (edition if required). Publishing place: Publisher, page(s).

Journal articles

Last name, First name (year of publication): Title of the article. Subtitle. In: Title of the journal (edition number), page(s).

Internet sources

[3] For students at the OVGU there is a full version of Citavi available on https://www.urz.ovgu.de/Mitarbeitende/Campuslizenzen/Citavi.html

Last name, First name (year of publication): Title. Subtitle URL: Website (date of request of the website).

6.2. Formal requirements

Along with the relevance of the content, writing a thesis also requires to take into account certain formal criteria. Depending on the subject area, different standards for the formal structure of a thesis are set. However, in general, theses should follow a consistent and clear formal structure. The following hints and recommendations exemplarily summarise the most important formal criteria without claiming to be exhaustive:

Font type:	common, legible fonts (e.g. Times New Roman, Arial)
Font size:	11 pt or 12 pt
Line spacing:	1,5 line spacing
Page margins:	top**:** 2 cm; bottom**:** 3 cm; left: 3 cm; right: 3 cm
Page numbering:	table of contents and preceding lists in Roman numerals, text sections in Arabic numerals
Page numbers:	insertion at the top or bottom margin of the page
Text alignment:	justification and automatic hyphenation
Emphases:	consistent style for emphases, i.e. *italic*
Endnotes:	10 pt; single line spacing

In line with this, the AG WI provides a template for theses which can be downloaded either for LaTeX or for Microsoft Word.

6.3. Citation rules

As a general rule, the use of ideas and thoughts of another author's work has to be systematically proven. Irrespective of whether they are recourses to individual ideas or to an entire line of argument of another author – the source has to be verifiable and clearly marked for the readers. Whenever possible, primary sources should be quoted. If the

information is extracted from a secondary source, because the original source is not available, it has to be marked accordingly.
Generally, quotable literature comprises scientific reference books and manuals, monographs, scientific jounals, material from archives, published doctoral theses or private surveys. Here, it is essential to take into account the validity of the publications quoted. For theses at MRCC, three citation styles are recommended:

For the so-called **Harvard style,** a partial reference to the sources referred to in the text is used. The in-text citation immediately follows the quoted source and is enclosed in brackets: (last name, year of publication, page number). In case of multiple authorship, the last names are separated by a slash. In case of more than three authors, only the first-mentioned author is listed followed by the abbreviation “et al.” (“et alii” - “and others”). The full reference of in-text citations appears in the list of references.

References in the text can be indicated by an **author index** in square brackets comprising two or three characters for the name and two numbers for the year of publication. In case of a single author, the first two initial letters of the last name are listed [AB01]. If there is more than one author, the initial letters of the last names of the first three authors are listed. In the list of references, the indices used are arranged alphabetically indicating the complete source information.

Alternativel, **references in the text** can be indicated by **numbers** in square brackets. The numbers are used in the physical order that they appear in the text: [1], [2]. In the list of references, the references including the complete source information are sorted in ascending order: 1. author A & author B; 2. author B & author C…
Endnotes should be used only for references to additional information or for weblinks to products or services.
An overview of corresponding guidelines and templates can be found, e.g., on University of Western Australia, Gesellschaft für Informatik and IEEE.

6.3.1. Direct quotation

A direct quotation requires the verbatim transfer of a text including an incorrect or outdated spelling. The quoted text is always enclosed by quotation marks “…“. Direct quotations are to be used sparingly. However, they are useful, if a fact is meaningfully phrased in the original text or a definition or standard is referred to. Extensive quotations exceeding three lines should be indented by one centimetre and set off against the rest of the text to facilitate legibility. Here, a single line spacing and a font size of 10 pt

should be used. If a quotation is integrated in the text, the punctuation mark follows the the partial reference in brackets:

"However, cloud services usually come with various levels of services and performance characteristics which complicate the chances for precise classifications" (Pavlik/Sobeslav/Komarekt 2015, 191).

Changes in the verbatim transfer of an original text have to be marked as follows:

Omissions and additions:

The omission of individual words or phrases is indicated with three points […] at the corresponding section:

"Availability valuation of Web services is a method to investigate, analyze and evaluate computer network services, which aims at ensuring availabilit characteristics of Web services […]" (He et al. 2015, 300).

If words are added to the quotation, e.g, to embed the original text into the own sentence, the added text is enclosed in square brackets followd by a comma and the abbreviation "author's note":

"They [architecture styles, author's note] define how units of work are managed, e.g., whether or not they are transactional (n-phase commit)" (Winans/Brown, n.d., 5).

Modifications

A correction of contentual or orthographical mistakes in the original text is prohibited, but the author can point to the transfer of an outdated or incorrect spelling by inserting [sic!] immediately after the incorrect word.

Emphases

Emphases in the original text have to be maintained and endorsed by the term “emphasis in original“ in the partial reference. Own emphases have to be indicated by the term ”emphasis added“ in the partial reference:

„We speculate that for most services, the path to high end-to-end availability most likely runs through a *combination of approaches*“ (Dahlin et al. 2003, 312, emphasis added).

Quotations within quotations

If the quoted text already includes a quotation, this has to be enclosed within single quotation marks (‘…’).

Quotations from secondary sources

If the original source is not available requiring the quotation of a secondary source, this has to be indicated by the term “quoted from” in the partial reference.

6.3.2. Indirect quotations

If thoughts and ideas of another author are not transferred verbatim but paraphrased, this is known as an indirect quotation. However, also in this case, reference to the original texts used for paraphrasing has to be made. Generally, paraphrases may be indicated by a preceding “see” in the partial reference. As there are no quotation marks needed for indirect quotations, the use of another author’s intellectual property may be underlined by using introductory expressions, such as “according to XY”, “as XY describes” or “XY states, that” or by using the subjunctive. If the original source covers two pages, the corresponding page number has to be complemented by a following “ff.” (“and the following”). If the respective text covers more than three pages, the initial and the final page are listed:

Despite the rapid digitalisation affecting society, there are some industry sectors lagging behind. The health information sector faces major challenges, especially when it comes to sensitive data of patients. Here, privacy and data sharing oppose each other such that data integrity cannot be guaranteed (see Ackerman Shrier et al. 2016, 1-3).

6.3.3. Translated quotations

If the original quotation exist in a language different to those of the thesis, a translation should be given. In any case, a translation is to be handled as an indirect quotation.
Principally, there are two ways for this: the source can either be directly translated (quotation with prefix “translation from <source> from <source language>”) or it can be quoted directly in the original language followed by a translation (with prefix “roughly translated: ”). The latter is to be recommended especially if no claim of a correct translation is to be made.

7. Submission and defence

In general, theses at MRCC have to be in accordance with the provisions of the respective examination regulations being timely submitted to the examination office. The *bachelor thesis* has to be printed and stamped by the examination office before handing it over to the respective assessor. Furthermore, the assessor and the supervisor have to be given an electronic version of the thesis (PDF) which can be attached as a CD. The *master thesis* has to be printed and stamped *in duplicate* before handing both copies over to the respective assessors. Also, in this case, the assessor and the supervisor have to be given an electronic version of the thesis (PDF) which can be attached as a CD.[4]
After submission of the thesis, a date for the defence will be scheduled. Here, the student starts with a 20-minute presentation of the thesis followd by the reading of the assessment and a discussion forum. Afterwards, the board will consult about the final grade that will then be told to the student.

8. Characteristics of a successful thesis

Although there are no common standards to assess a thesis, the following criteria provide a basis to make the assessment criteria prevailing at MRCC transparent for the students. These criteria do not intend to represent a comprehensive list and may vary depending on the respective supervisor. Depending on the scope of the thesis, the criteria may also vary with a view to their weighting. Hence, they are intended as a guidance und offer students the opportunity of self-monitoring:

[4] The printed copies of the bachelor or master thesis can alternatively be handed over to Christian Knopke (G29-117) or Annika Baum (G58-14).

Content

- Relevance and originality of the choosen topic
- Coherent structure and scientific rigour
- Breadth and depth of the discussion
- Quality and discussion of the outcomes

Organisation and implementation

- Systematic and comprehensible approach
- Degree of autnomoy regarding the train of thoughts and its representation
- Critical thinking

Scientific techniques

- Reasonable and methodologically correct approach
- Contextualisation of the literature used
- Consistency and transparence of the citation style

Formal requirements

- Consistency of the structure
- Style of writing (orthography, linguistic expression, legibility)
- Layout (consistent, clear und comprehensible)

Presentation of the thesis

- Structure of the presentation (clarification of complex correlations, highlighting the essentials)
- Presentation skills (volume and speaking pace, rhetoric, adherence to the timeframe, design of the slides)
- discussion (quality of responses, expertise beyond the core topic)

9. Frequent mistakes and potential problems

Writing a thesis is often accompanied by recurring mistakes which, in the end, will have a negative impact on its assessment. The following list shows typical, recurring mistakes concerning the content, systematics and structure:

Content-related mistakes

- Superficial and uncritical revision of the state of the art
- Poor elaboration and presentation of content-related references
- Lack of differentiation between relevant and irrelevant information
- Overly broad ideas and thoughts make it difficult to focus on the research question
- Meaningless concluding chapter without a systematic summary of the outcomes and findings
- Missing concluding evaluation of the artefact or concept
- Lack of critical distance towards the literature used

Systematic mistakes

- Lack of motivation to scrutinize background literature or gather feedback
- Missing structured and systematic approach
- Lack of focus without a clear definition of the aim (the central idea is not clear)
- Inadequate methodological approach

Formal mistakes

- Orthography, grammar and punctuation are not checked
- Linguistic expression and style do not meet the requirements of scientific writing
- The line of argument is not convincing

10. Checklist

The following list pools central criteria which should be taken into account while writing a thesis. The prioritization of the individual criteria may vary, hence this list does not claim to be exhaustive or to represent a weighting. Nevertheless, students should make sure to carefully check if they have sufficiently considered the following items:

Structure

- Is the structure consistent and formally correct?
- Do the chapter titles reflect the overall structure?
- Are figures and tables numbered, clearly legible and comprehensible?

Method

- Is the methodological approach explained and reasoned?
- Is the applied method appropriate with a view to the research question?

Content

- Are the choice and the relevance of the topic sufficiently reasoned?
- Is the research question clearly and concisely defined?
- Is the topic adequately dealth with in depth and breadth?
- Is the line of argument conclusive and convincing?
- Are statements made in the thesis proved?
- Are outcomes and findings clearly stated?
- Do the outcomes match the research question?
- Does the thesis reflect the own perspectives and ideas?
- Are the outcomes critically reflected?
- Do the outcomes allow for a deduction of implications for theory and practice?

Language

- Are technical terms being used correctly and key terms defined?
- Have orthography, grammar and punctuation been sufficiently checked?
- Do the style of writing and the mode of expression follow a concise, objective and scientific language?

Sources and list of references

- Have primary and secondary literature been sufficiently used?
- Is the citation style consistent and correct?
- Are sources and literature references listed completely and consistently?
- Is the information in the list of references reasonably structured and alphabetically listed?

Form

- Does the cover page contain all the necessary information?
- Does the table of contents match the titles of the chapters and the page numbers?
- Were the formal requirements, such as font type, font size, page numbering, page margins and line spacing met?
- Has the automatic hyphenation been considered?
- Has the declaration of originality been signed?