Montanuniversität
Leoben

Bachelor‘s/Master‘s Thesis

Guidelines

Department of Materials Science

April 2026

Materials Science

Introductory remarks

A Bachelor's or Master's Thesis should demonstrate the student's ability to apply scientific methods to solve materials science problems. The student must demonstrate his or her ability to work scientifically and in an organized manner under supervision, to present the results obtained in a good literary style appropriate to the field of work, and to defend them. The results should enrich the current state-of-the-art in the respective field of research.

To identify a suitable topic for a Bachelor's or Master's Thesis, the following three-step procedure is recommended:

- First, students should make themselves familiar with the materials science-related research topics explored at Montanuniversität Leoben. Relevant information can be found on the websites of Chairs of interest, within the profile modules of the Master's Study Programs in Materials Science and Advanced Materials Science and Engineering, and in recent publications. Additionally, exchanging ideas with fellow students already working at different Chairs can provide valuable insights.
- Based on their interests and strengths, students should then identify a general research area and gradually narrow it down to a more specific topic.
- Finally, students are encouraged to approach potential supervisors to discuss and refine suitable Thesis topics, taking into account feasibility, available resources, and time constraints.

In order to ensure that the Bachelor's or Master's Thesis runs smoothly, students must name a university supervisor (Docent or Professor) before beginning their work. For theses done at external collaboration partners, also a contact person from the respective institution/company has to be named. The topic of the Thesis is determined in consultation with the supervisor and, if applicable, the contact person from the external collaboration partner.

Students writing a Bachelor's/Master's Thesis at the Department of Materials Science are subject to the Guidelines for Integrity in Science, Study and Research[1] and the mandatory electronic training program of Montanuniversität Leoben (https://ecu.unileoben.ac.at/) as well as the written and face-to-face training offered by the Department of Materials Science. Students may only enter laboratories and operate equipment or facilities after receiving all required training and safety instructions from a department employee who is familiar with the laboratories, equipment, and facilities. This must be confirmed by signing the corresponding training record.

[1] https://www.unileoben.ac.at/universitaet/universitaetsleitung/satzungsteile-des-senats/

1. Procedure

Prior to starting a **Bachelor's Thesis**, students must enroll in the course "Bachelor Seminar – Materials Science and Technology". In addition, they are advised to attend the "Preparatory Seminar Bachelor Thesis – Materials Science and Technology".

After selecting a suitable topic for the **Master's Thesis** and being assigned a supervisor, students must attend the mandatory module "Science and Responsibility," which provides an introduction to scientific research and academic writing. Within the module, also an extensive literature research followed by the formulation of the research questions to be addressed in the Thesis has to be done. The module also includes the presentation and defense of an exposé including the following parts:

- an overview on the existing state-of-the-art in the field of the Master's Thesis,
- the gaps in the present understanding,
- the formulation of the research questions to be addressed,
- the methodology to be applied to answer said research questions,
- the expected outcome,
- and the relevant literature.

Students need to take into account that all parts included in the module "Science and Responsibility" needs to be finalized until the end of the respective semester.

Once the topic for the Master's Thesis and the research questions have been defined, the necessary agreement for the Master's Thesis must be uploaded to and approved by student and supervisor within MUonline.

During the starting phase of the Thesis, a detailed concept is drawn up and extensive literature research is carried out. When drawing up the concept, the research questions, the methodology and the work packages, the duration (25 ECTS, corresponding to a working time of 625 hours) and the expected outcome of the work should be set out in writing. The literature research serves to provide the student with an overview of the subject area relevant to the work. The work is then supervised on an ongoing basis, i.e. the student reports to the supervisor at regular intervals on the progress of the work. This ensures that the work progresses and the topic is met.

To facilitate the methodological development of the Bachelor's/Master's Thesis, it is recommended to submit a clear outline of the written work (e.g. one page with the planned content, headings/subheadings and estimated page count of the different sections) to the supervisor to check the logical structure. The essential parts of the Bachelor's/Master's Thesis

should be suitable to serve as the basis for a possible publication in a scientific journal, both in terms of content and style as well as structure and presentation.

2. Design of the Thesis

Proper and appealing design is an essential part of academic work. These formal guidelines are intended to help students design and carry out their Bachelor's/Master's Thesis in accordance with internationally accepted academic standards. In addition to the obtained scientific findings, also their presentation within the Thesis is taken into account for assessment purposes.

Scientific texts should be structured clearly and formulated precisely in an easy-to-understand and appealing style. Therefore, digressions from the topic, repetitions, redundant information, and convoluted language should be avoided. Furthermore, the Thesis should not be a simple chronological sequence and description of the experiments and measurements carried out. The primary focus should be on the scientific thread running through the Bachelor's/Master's Thesis, which should be given absolute priority over the desire for complete and detailed documentation of the work carried out or scientifically unsuccessful experiments. If such a detailed documentation is needed, it should be provided in an appendix to the Thesis. A suitable template for scientific theses can be downloaded from the Department Homepage[2].

2.1 Content of a Bachelor's/Master's Thesis

A Bachelor's/Master's Thesis should have the following structure (certain parts may be omitted if necessary):

- Cover page
- Affidavit
- Foreword/acknowledgements
- Table of contents
- List of abbreviations, if applicable
- Introduction, motivation and research questions
- Main section
- Conclusions
- References
- Appendix, if applicable

Cover page

[2] https://materials.unileoben.ac.at/lehre/richtlinien-bachelor-/master-/doktorarbeiten

When choosing a title for your Bachelor's/Master's Thesis, please note the following:

- The title should provide concise information about the topic.
- The title should arouse interest in reading the Thesis.
- A short title may be supplemented with a subtitle.

The cover page of a Master's Thesis is generated during the electronic submission process[3] and must be integrated into the uploaded and bound final version.

Affidavit

The affidavit is an essential part of the Thesis and must be included and submitted correctly. With the affidavit, the student confirms that the Thesis has been prepared in agreement with the Guidelines for Integrity in Science, Study and Research[4] of Montanuniversität Leoben. Templates for the affidavit are available within MUonline. For a **Bachelor's Thesis**, the affidavit needs to be signed and included in the Thesis. However, do not include the signed affidavit in either the printed or uploaded **Master's Thesis**. Instead, insert an unsigned version directly after the cover page in both the printed and uploaded versions. In addition, print, sign and scan the affidavit and upload it separately and submit it in-person to the Study Support Center. Optionally, the affidavit can be digitally signed and uploaded – in this case the in-person submission at the Study Support Center is not necessary.

Preface/acknowledgements

The preface should be placed directly after the affidavit. It serves to make statements about the context of the Thesis, e.g. about possible embedment within larger projects, funding or collaborations. In the acknowledgements, you thank those who helped you during the preparation of the Thesis. You may also add personal comments there.

Table of contents

The table of contents should provide a structural overview on the organization of the Thesis and the relations between the individual chapters and sections. It should allow the reader to quickly locate specific topics. A well-structured table of contents reflects careful planning and systematic thinking, which are key aspects of scientific work. For the author of the Thesis, it serves as a tool to ensure coherence, balance, and completeness across all parts of the Thesis.

The **decimal classification system** (1, 1.1, 1.1.1) is recommended for structuring the chapters and sections.

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[3] See your business card within MUonline

[4] https://www.unileoben.ac.at/universitaet/universitaetsleitung/satzungsteile-des-senats/

- If a chapter or section is subdivided, it must contain at least two subheadings.
- Concise and succinct headings make a table of contents easier to navigate.
- Page numbers need to be given for every chapter/section heading.

Introduction

The introduction is already an integral part of the scientific text. It should include the following points:

- Brief overview on the existing state-of-the-art in the field of the Thesis, including the necessary references to the existing and relevant literature
- Identification of gaps in scientific research (motivation for the Thesis)
- Definition of research questions
- Description of the chosen methodological approach, i.e. which experimental and/or theoretical methods are used, and how do you expect the chosen methodology will contribute to answer the mentioned research questions
- Reference to the structure of the Thesis, providing a brief overview of each chapter/section and its content

Main section

The main section of the Thesis consists of a literature review, the description of the experimental/theoretical methodology, the obtained results and their interpretation/discussion. In this section, the chosen topic is presented within a logically and precisely structured, but not in an essayistic and chronological, manner. The Thesis is therefore divided into chapters and subchapters. However, too many subdivisions reduce clarity; it is therefore advisable to limit yourself to a maximum of three levels. Sections or paragraphs consisting of only one or two sentences should be avoided.

Headings should be highlighted in bold. It should be taken care to ensure that the headings of chapters, sections and subsections provide a concise summary of the respective content. Within the sections, bullet points may be used to make lists clearer. Greater clarity is achieved through the use of illustrations and tables (although tables should not duplicate the data shown in graphs or given in the text).

The section with the description of the used experimental/theoretical methods has to inform the reader precisely and completely, so that the performed experiments and/or calculations can be reproduced.

The results obtained and insights gained must be thoroughly explained (with reference to the figures and tables shown) and discussed on the basis of the available scientific literature (i.e. with

appropriate citations). In this discussion, evaluation of the work of other authors should be avoided; a neutral presentation must be the focus. Quotations serve to enrich and substantiate your own thoughts and should help to solidify, expand and develop them further.

Conclusions

This concluding section is absolutely essential; it is one of the most important chapters of the entire Bachelor's/Master's Thesis! Students often feel that they have already said everything there is to say. Some believe that the conclusion is just a repetition of what has already been said. This is not the case – it is advised to clearly distinguish between an abstract and conclusions. An abstract summarizes the most important findings of the Thesis (it is thus often called summary). The abstract needs to be submitted to MUonline. In contrast, for the conclusions it is advisable to go back to the introduction and reread the motivation for your work and the defined research questions. Based on this, the following questions should be answered:

- Where did I break new scientific ground?
- How did I conduct my experiments?
- What outstanding scientific results did I achieve?
- How do I evaluate these results and how do they contribute to advancing the state-of-the-art in the field of the Thesis? Are there any limitations or open questions?
- What insights does my work provide for possible future research activities and/or possible applications?

It is the utmost importance to answer these questions! This concluding chapter must be written so that it can be read and understood without knowledge of the main part of the Bachelor's/Master's Thesis and forms a complete unit in itself.

2.2 Formal layout of the Thesis

Before writing your Bachelor's/Master's Thesis, it is strongly recommended that you study the scientific theses and papers available at the Department in detail in order to familiarize yourself with the scientific writing style! Students should develop effective reading strategies and learn how to identify relevant papers within the extensive published literature (see S. Keshav[5] for more information). Scientific theses must always be written in a precise and concise style that presents the necessary facts clearly and unambiguously. The most important basic principle of scientific writing is that all information, results and findings must be verifiable and comprehensible.

[5] S. Keshav, How to read a paper, ACM SIGCOMM Computer Communication Review, 37 (2007) 83, https://doi.org/10.1145/1273445.1273458

Typography and layout

While Bachelor's Theses may be written in German or English language (after consulting the supervisor), Master's Theses prepared within the Master Study Programs Materials Science and Advanced Materials Science and Engineering must be written in English language. The Thesis should be written using a suitable word processing system and formatted in either single- or double-page style, in accordance with the following guidelines[6]:

- Page format: A4, white, 90 or 100 g/m^2
- Font and font size: Arial, Calibri or similar, font size 12 pt, fully justified alignment
- Line spacing: 1.3

Page length

A Bachelor's Thesis should be about 20 pages long, whereas for a Master's Thesis about 50 pages are deemed to be suitable. Significant deviations from these recommended page lengths necessitate former approval by the supervisor. A suitable page count of the individual sections of a Bachelor's/Master's Thesis is shown in Table 1.

Table 1: Typical page count distribution in Bachelor's and Master's Theses.

	Page count	
Chapter	**Bachelor's Thesis**	**Master's Thesis**
Introduction	1	1
State-of-the-art	4-5	10
Experimental/theoretical methods	2-3	5
Results and discussion	10	30
Conclusions	1	1-2
References	1	2-3
Sum	**20**	**50**

References

As a general rule, any information that has not been compiled by the student themselves or is not generally known in the respective subject area must be substantiated by a citation of a suitable reference. Similarly, cited works must be generally accessible, i.e. unpublished internal reports or lecture or poster presentations cannot be cited. A consistent reference style that is

[6] A suitable template for scientific theses can be downloaded from the Department Homepage: https://materials.unileoben.ac.at/lehre/richtlinien-bachelor-/master-/doktorarbeiten

accepted within the respective field must be applied. Use of reference managers like Mendeley or Citavi is recommended, but necessitates sufficient time to familiarize with these systems.

Spelling

For Bachelor's Theses written in German language, the latest edition of the Austrian dictionary is binding for spelling. For theses written in English, both British and American English may be used, but the students must consistently use one of these two options. Before submission, the Thesis must be checked for appropriate language style and grammatical and orthographic correctness (e.g. by using spelling and grammar correction tools). In addition, it is recommended that a competent person checks the Thesis for errors and correctness of content. A formally flawless Thesis is a prerequisite for a positive assessment.

Figures, tables, equations and references

- Figures (e.g. graphs, pictures, micrographs) must be numbered consecutively within the chapter and accompanied by descriptive captions below them. These captions should be self-explanatory! All figures must be referred to in the text and their content or statements must also be described in the text.
- Tables should also be numbered consecutively within the chapter, but should have a descriptive short text (table heading) above the table.
- Figures or tables taken unchanged or modified from books, journals or other sources must be accompanied by a reference to the source.
- For texts, figures and tables created in English, note that the English spelling uses a decimal point rather than a decimal comma (e.g. 10.5 instead of 10,5).
- Formulas and equations should be numbered consecutively within the chapter, indented 1 – 2 cm from the left margin and included in the punctuation.
- Citations must follow a referencing style that is standard for the subject area of the Bachelor's or Master's Thesis (see, e.g., the scientific journals relevant for the topic).
- As a general rule, any information that has not been developed independently by the student but taken from literature must be cited. In principle, original literature should be given preference over secondary literature.
- Direct quotations taken from other sources should be written in *italics* and require a reference.

3. Use of artificial intelligence tools

Artificial intelligence (AI) based tools (e.g., text generation, translation, summarization, coding assistance, or data analysis tools) may be used in the preparation of a Bachelor's/Master's Thesis only if their use complies with the Guidelines for Integrity in Science, Study and Research[7] of Montanuniversität Leoben. Students remain fully responsible for the content, structure, accuracy, and originality of their work, regardless of whether AI tools are employed. Students must complete the relevant training in using AI-based tools to fulfil the regulations of the EU AI Act.

Any use of AI-based tools that goes beyond basic language or formatting support must be documented transparently and comprehensively. This includes a clear description of which tools were used, for what purpose, and to what extent (e.g. idea generation, language revision, code debugging), including a documentation of the used prompts and the estimated proportion of AI-generated content in the overall Thesis indicated as a percentage. Such information must not be included in the Thesis, but be provided in electronic form to the supervisor with the submission the Thesis, in accordance with AI Guidelines of Montanuniversität Leoben[8].

AI tools may not replace the student's own intellectual contribution. In particular, AI-generated content must not be presented as original scholarly work without critical evaluation, revision, and integration. The use of AI does not exempt students from properly citing sources, verifying factual correctness, or ensuring methodological rigor. Plagiarism, including the uncritical or undisclosed use of AI-generated text or results, constitutes a violation of academic integrity.

The permissibility and scope of AI use may vary depending on the academic field, the nature of the Thesis, and the supervisor's requirements. Students are therefore strongly advised to discuss the intended use of AI tools with their supervisor at an early stage of the Thesis process.

4. Thesis approval

Bachelor's Theses represent examination papers prepared within the Bachelor Seminar. They are not submitted via MUonline, but forwarded to the supervisor.

Master's Theses are final theses; they must be submitted via MUonline in accordance with the procedure prescribed by the Study Support Center and in bound form in A4 format. The black front cover must feature the coat of arms of Montanuniversität Leoben, the words "Master's

[7] https://www.unileoben.ac.at/universitaet/universitaetsleitung/satzungsteile-des-senats/

[8] Richtlinie des Vizerektors für Lehre und Internationales sowie des Studiendekans für den Einsatz KI-basierter generativer Werkzeuge, Mitteilungsblatt der Montanuniversität Leoben, 108. Stück, Nr. 181, 04.04.2024. https://www.unileoben.ac.at/fileadmin/shares/avaw/lehre/MBL_108_KI_an_der_MUL.pdf

Thesis" and the name of the author printed in gold. After consultation with the supervisor, it may be necessary to submit additional bound copies (e.g. for the working group or research partners).

For both Bachelor's and Master's Theses, the supervisor must be provided with all samples and electronic data, including the Thesis in electronic form.

The final version of the Bachelor's Thesis must be submitted to the approving supervisor at least three weeks before the respective Bachelor's Seminar. A comprehensive timeline for submission the Master's Thesis and for completing the Master's degree can be found at the homepage of the Study Support Center[9], recommending a 40 days period of the final (i.e. approved) version of the Thesis before the defense. In parallel, the German and English versions of the abstract of the Master's Thesis must also be submitted to the supervisor; only after approval can the two abstracts be entered into MU-online. In addition, a poster for the Department's poster gallery must be submitted before the defense after consultation with the supervisor. The poster template is available at the administration office.

Bachelor's Theses may be subject to a **plagiarism check** by the supervisor, while for Master's Theses such a check is mandatory. In the event of proven plagiarism, the Thesis may be required to be revised or may receive a negative assessment.

If it is necessary or desired by an industry partner to block access to a Master's Thesis for a duration of one up to five years, the student must apply for this him- or herself by presenting suitable arguments. Since Bachelor's Theses are not final theses but seminar works that are not accessible within MUonline, they cannot be blocked.

[9] https://ssc.unileoben.ac.at/en/studienabschluss/masters-degree