

Master Curriculum Health Sciences and Technology

Guidelines for Conducting a Master Thesis Oct 2023 / RoM

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1 General Rules

1.1 Aim of the Master Thesis

The master thesis is a mandatory part and usually concludes the study programme. By conducting a master thesis, the students demonstrate their ability to carry out a structured, scientific piece of work independently. In general, it includes the study of existing literature, the specification of the research question, the choice of the methodological approach, the collection, analysis and interpretation of data, and the reporting of the findings (Study Regulations Art 22⁴).

1.2 Prerequisites

Before starting the master thesis, the bachelor studies have to be completed and any requirements for being admitted to the master studies have to be fulfilled (Study Regulations Art 32¹).

1.3 Supervision

The master thesis is conducted within the area of the corresponding major, usually under supervision of the chosen tutor. The supervisor defines the topic together with the student and determines the deadlines for the master thesis. The topic has to be clearly defined and should allow the student to contribute to the research question. With master theses conducted outside D-HEST and officially affiliated groups, the chosen tutor is responsible for quality control (project outline, supervision, grading) (Study Regulations Art 32³⁺⁵). The outline and schedule of the master thesis has to be defined in writing and signed by the student and the supervisor.

Tutor = D-HEST professor responsible for definition of Learning Agreement

Supervisor = person responsible for definition and supervision of master thesis (usually a professor/PD; has to be acknowledged by tutor); in many cases identical to tutor

1.4 Financial Issues

Payment for executing a master thesis outside of ETH Zurich may not be agreed with third parties. However, compensations paid to students to cover expenses incurred performing a master thesis are allowed (Instruction of Rector). An application for 'SEMP Europe Projects & Traineeships' or 'SEMP Worldwide Projects & Traineeships' may be made to the ETH Exchange Office up to two months before project start.

-> <https://ethz.ch/students/en/studies/study-abroad/exchange/research-projects.html>

1.5 Duration

The written report of the master thesis has to be submitted within 28 weeks; the oral presentation and defense can take place shortly before or after this deadline. Prolongations have to be approved by the director of studies; part time execution is possible only in special cases (e.g. due to illness). The master thesis can be combined with the research internship, so that a stay in the same research group is possible for a total duration of 9 months; in this case, the prerequisites (see 1.2) already apply for the research internship (Study Regulations Art 32²⁺⁴). The attendance of 1-2 master courses in parallel to the full-time master thesis should be permitted if possible.

1.6 Mobility/Exchange

The master thesis can be performed abroad (student exchange) except for students that have master courses accredited from student exchange (Study Regulations Art 15¹). For projects in industry, a sample 3-party-agreement between ETH, company and student for master thesis projects can be found at <https://ethz.ch/staffnet/en/service/legal-matters/documents.html>.

For students with no ETH bachelor background, a study exchange for the master thesis is possible only in exceptional cases and has to be approved by the corresponding tutor and the director of studies (Study Regulations Art 15²).

Master theses performed in Switzerland with a close supervision by D-HEST professors and no involvement of the student exchange office do not count as mobility.

2 Course of Action

2.1 Enrolment

The master thesis has to be registered for in myStudies (-> projects/papers/theses) specifying the starting date which has to be within one month before and after the enrolment date. For activity rates less than 100% (see 1.5) please contact the study administration office. As Lecturer/Supervisor please select your supervisor. ETH supervisors outside D-HEST have to be registered by the study administration office. In case of external work please define together with your tutor an ETH internal supervisor and register your external supervisor as co-supervisor. The title is a working title and can be changed until the end of the thesis. The proposal can be loaded up at any time during the duration of the master thesis.

2.2 Proposal

The detailed proposal has to be written by the master student and contains an introduction to the research question (review of relevant literature), the research question itself, the methods, the references and a detailed time schedule. The proposal consists of 2-10 pages and has to be accepted by the supervisor before starting with the research. The proposal should be presented within the research group of the supervisor in a short lecture with subsequent discussion.

2.3 Ethical Issues

The supervisor is responsible for the fulfilment of ethical requirements.

2.4 Presentation and Defence of the Master Thesis

Usually within two weeks before or after the submission of the written report, the student presents the thesis in a seminar of about 15-30 minutes duration. Subsequently, the thesis will be discussed with the student by the supervisor(s) and by the whole audience. Presentation and defence should last at least 40 minutes in total. The deadline for the master thesis fixed in myStudies is applying to the written report, not the presentation/defence.

2.5 Completion of the Master Thesis

Copies of the master thesis have to be handed in to each supervisor for grading purposes (with external theses also to the responsible tutor). The supervisors define if they prefer a hardcopy or an electronic version of the thesis. The originals of the informed consent forms (if applicable) and all (raw) data have to be handed in to the responsible supervisor for correct storage.

A pdf of the final version of the master thesis has to be handed in to the HST study administration. If the master thesis is the last part of the master, the master's degree request can be handed in just after completion (no fixed deadlines).

2.6 Affiliation with Publications

If a master thesis is supposed to result in a publication in a peer-reviewed indexed journal, the authorship (including its order) has to be discussed and determined at an early stage. If possible and justified, the master student should sign as first author, the main supervisor as last author. With execution outside ETH, the student should sign also under the affiliation of the group of his tutor.

3 Format of the Master Thesis

3.1 Language

The thesis has to be written in English, comprehensibly and in an appropriate style. It is recommended to have the thesis corrected by a third person before handing it in.

3.2 Scientific Writing Style

The thesis should be structured in chapters (see next pages). Within a chapter or subchapter, paragraphs (5-15 lines) usually start with a topic sentence and may end with a mini-conclusion. Contrast linkers and signpost words help in guiding the reader. Please avoid paragraphs with only 1-2 sentences.

Use unusual abbreviations sparsely. Each abbreviation has to be defined when it is used the first time and has then to be used consistently. Abstract and body text are considered individual parts where abbreviations have to be newly defined; it is recommended to avoid abbreviations in the abstract. Cross references to figures and tables are usually presented in brackets at the end of a sentence.

The shift from informal to a more formal writing style can be supported by actions like:

- switch from prepositional verbs to single verbs (set up -> establish)
- avoid contractions (wasn't -> was not)
- use formal negative forms (not ... many -> few)
- place adverbs within the verb if possible (then it can be solved -> it can then be solved)
- limit the use of direct questions
- avoid addressing the reader directly as "you"

3.3 Formal Layout (Recommendation)

Format:	A4
Page margins:	top and bottom: 2 cm, left 2.5 cm, right 1.5 cm
Font & Font size:	11-12 points, Arial recommended
Columns:	single-column
Paragraph:	line spacing 1.5, justified
Page numbers:	bottom

3.4 Number of Pages

The number of pages is no criterion for the quality of a master thesis. The content and the dedication to the subject are the key factors (quality is more important than quantity; an usual range is 20-40 pages).

3.5 Paper Form

It is possible to write the master thesis directly in form of a scientific paper. In this case, the formal requirements of the corresponding journal apply (e.g. layout, number of pages). It is even more important in this situation that the contribution of the student is traceable for grading purposes. For this purpose, an additional short document has to be handed in describing the contribution of the different authors of the paper in detail.

4 Structure of the Master Thesis

4.1 Title page

- See page 7. The brackets [...] have to be filled.

4.2 Table of contents

- Structure of the thesis (usually 2-3 levels).

4.3 Abstract

- Brief overview of the subject (research question, methods, results, discussion) about 250 words; no citations

4.4 Introduction

- Scientific background and relevance of the subject
- Focused review of the relevant literature
- Research gaps, divergent points of view
- Research question and precise hypothesis if applicable

Recommended tense: present (current knowledge), perfect (reference to research areas), past (reference to single studies).

4.5 Materials and Methods

- Subjects, selection criteria, ethical approval
- Design of experiments
- Equipment and instruments
- Data analysis and statistics

The methods section has to be written in such a way that the reader could replicate the experiments without any further information.

Recommended tense: past, passive form.

4.6 Results

- Neutral presentation of the results in the order of their importance
- Presentation in text, table or diagram/illustration (with reference in the text)
- Statistical analysis (at least of the hypotheses)

Each result is presented only once, either in the text or in a figure or table. For each figure or table, there has to be a reference in the text.

Recommended tense: past.

4.7 Discussion (with Conclusions)

- Precise answer to the research question, overview of main results
- Interpretation of own results (only of those which were presented in the result section!)
- Discussion/comparison of the results to existing literature
- Possible weak points, maybe outlook
- Conclusions (only discussed main factors)

If there is a large number of results, they can be discussed in a chapter "Results and Discussion", where each result is immediately discussed. At the end, a comprehensive discussion needs to be written in a separate subchapter, which does not repeat the discussion elements.

Recommended tense: present (interpretation), other tenses if applicable

4.8 References

- List of all references (either in alphabetical order according to the first author's name or with numbers in order of appearance)

In the reference section, all literature which is cited in the text has to be listed. Using a literature management programme such as Zotero, Endnote, BibTeX or Mendeley is strongly recommended; however, there is no prescribed format layout.

Please make sure that the type of source is correctly selected (article, book, book chapter, internet information, etc.) so that the following information is provided:

- Article: authors, title, journal, year, volume (if applicable), pages
- Book: authors, title, publisher, place of publishing, year, edition
- Book chapter: authors, chapter title, editors, book title, publisher, place of publishing, year, pages
- Internet information: authors, title, date of retrieval, URL, date of issue

4.9 Acknowledgements

This part is optional, but common practice, since a study can hardly be conducted without the help of other persons. Their support should be acknowledged.

4.10 Appendix

This part is optional. Depending on the study, an appendix can show additional details from the methods (e.g. information sheet, questionnaire, etc.) or from the results.

4.11 Plagiarism

- Declaration of Originality

Students have to follow the Citation Etiquette, and the signed Declaration of Originality has to be incorporated as last sheet into every copy of the master thesis.

5 Grading of the Master Thesis

The master thesis is completed by a written report and an oral presentation with discussion. A mark is given for the overall performance. The master thesis is passed with a grade of at least 4.0 (best grade 6.0, worst grade 1.0; ¼ marks). A failed master thesis can be repeated once, but with a new subject and in some cases a new supervisor (Study Regulations Art 32⁶⁻⁸).

The grade consists of (see also template grade sheet master thesis on HST homepage):

- Execution of thesis (67%)
- Written report, oral presentation and defence (33%)

and should be submitted in eDoz within 4 weeks after completion. The grading should be explained to the student afterwards.

The following aspects are assessed during execution of the thesis: Planning, time management, organization, initiative, development of own ideas, critical review of given ideas, independence, co-operation/teamwork, commitment.

The following aspects are assessed in the written report: Deduction and clarity of the research question, reproducibility of the methods used and clarity of the presentation of the relevant results, reproducibility and completeness of the interpretation (in terms of the research question and the discussion of the relevant literature), structure, comprehensibility and formal correctness of the thesis.

The following aspects are assessed during oral presentation and defence: Clarity of the research question, selection and presentation of the most important results, reproducibility of the conclusions, coherence and originality of the presentation, demeanour, use of (audio)visual material, time management, answers to questions.

ETH Zurich
Department of Health Sciences and Technology
Master in Health Sciences and Technology
Major in [xxx]

[TITLE]

Master Thesis

In partial fulfilment of the requirements for the Master of Science ETH
in Health Sciences and Technology (MSc ETH HST)

Submitted by:
[First Name Name]

Supervisor(s):
[(Title) First Name(s) Name]
[Institute or Professorship or Institution]

Tutor:
[(Title) First Name(s) Name]
[Institute or Professorship or Institution]

Zurich, [Month Year]