



Master's Thesis Guidelines

of the Aalto University

School of Engineering

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1 INTRODUCTION

This Master's Thesis Guide is intended as a tool for both students writing a master's thesis at the Aalto University School of Engineering and for the supervisor and thesis advisor of the thesis.

The guideline for writing the master's thesis describes the process of writing a master's thesis from the start to its approval. The actual guidelines for formatting the master's thesis, including tips on the presentation style, can be found from the Word Thesis [template](#) for all Aalto University schools. The Master's Thesis guide has been written so that the table of contents serves as a directory for more detailed information a student might need when writing his or her thesis.

2 GOALS OF THE MASTER'S THESIS

2.1 Goals for the contents of the master's thesis

The master's thesis is a piece of applied research. The key goal of the master's thesis is solving a problem relevant to the field of study based on existing scientific knowledge in compliance with the principles of responsible conduct of research. The goal is to produce a scientific thesis. The scientific nature of the master's thesis should not, however, be underlined too much, since producing new scientific knowledge is not expected of a master's thesis, but only of a doctoral dissertation. The solutions developed in the master's thesis must be useful to the practice of the field.

The master's thesis shall be written on a topic related to the advanced studies of the degree programme, agreed upon between the student and the supervisor who is specialised in the topic of the thesis.

The goals of the master's thesis are to:

- provide the skills needed to acquire scientific knowledge independently and to identify, distinguish and solve scientific and professional problems also under new circumstances and to apply scientific knowledge also otherwise.
- provide in-depth knowledge of the theories and research method, problem-solving and design methods essential to the studies.
- to provide in-depth knowledge of the issues studied.

The degree programme committee of the school approves the topic and the language of the master's thesis and appoints a thesis supervisor and one or two thesis advisors for it. As necessary, the degree programme committee may assign the thesis supervisor to also act as a thesis advisor for the thesis. The degree programme committee shall decide the approval and grading of the thesis after examining the written statement by the thesis supervisor.

2.2 Learning objectives for the master's thesis and their evaluation

The master's thesis is written to demonstrate mature thinking, and in particular, aptitude for independent problem solving. In the thesis, students are expected to produce results based on a research method and to formulate a research question. Additionally, it is important to learn how a written report is written. Writing a legible, well-organised and coherent report is one of the key challenges of the master's thesis project and at the same time, the thesis is the last chance to get feedback on a text written for one's studies.

One goal for the master's thesis is learning to execute a research project independently, systematically and efficiently. Although the thesis is done independently, collaboration between the author, the thesis supervisor and thesis advisor is crucial. Since the master's thesis is always a product of independent work, the contribution of the thesis advisor or supervisor must not be evident in the work itself. This requirement of independence cannot, however, prevent or reduce supervision. Thesis supervision is a way to find the right direction, to seek new perspectives and to gain information of the most recent knowledge in the field.

The success of the master's thesis is evaluated in terms of its success in, e.g. the following (see also Chapter 5.1 Evaluation of the master's thesis):

- identifying a significant and important research problem;
- defining the research problem (research question);
- defining the scientific/theoretical framework for the work by finding the relevant sources;
- defining the research methods and empirical material;
- defining the concrete research frame;
- defining the nature of the new knowledge produced and identifying of the relevance and merits of the study and
- the novelty of the research and the innovativeness of its solutions.

The Degree Programme Committee and Academic Committee of the School of Engineering have agreed in their meetings in December 2021 that Master's Theses cannot be written as a pair or group work. Instead, the written part of the work must always be done individually.

2.3 Master's thesis in the degree structure

The master's thesis is a 30-credit entity that includes not only the written thesis but also the maturity essay and presentation of the thesis.

3 ROLES AND STAGES OF THE MASTER'S THESIS PROCESS

3.1 Designating the thesis supervisor and advisor

The master's thesis process has three principal actors: the thesis author, thesis supervisor and thesis advisor.

The topic and the language of the master's thesis are approved by the school upon application by the student; the school also appoints a thesis supervisor and one or two thesis advisors for it.

The school appoints a professor from the tenure-track system to be in charge of supervising the student's thesis. When confirmed by the dean, the thesis supervisor may, for special reasons, be some other member of the school's academic staff who has sufficient academic credentials and thesis supervision skills. (Degree Regulations for Bachelor's and Master's Degrees, section 10)

The supervisor is an academic expert helping the student in finding the suitable theoretical sources for the topic and supporting the student in writing the thesis. The supervisor may also refer the student to specialists in the topic of the thesis. The thesis supervisor is responsible for ensuring that the master's thesis meets the goals and requirements set by the school for the thesis. If someone other a professor or lecturer at the master's programme serves as the thesis supervisor, the thesis topic approval form must be signed by the master's programme director.

The school appoints one to two advisors for the student's thesis. The professor or other individual in charge of supervising the thesis may also act as the thesis advisor. The thesis advisor shall hold at least a master's degree. The advisor is often an expert in the company or organisation collaborating in the thesis project and may help in the execution of the empirical part of the thesis. The thesis advisor may also be an Aalto University researcher or doctoral student or a university teacher specialising in the field of the thesis.

Designation of the thesis supervisor and advisor must be done in compliance with the Aalto University policy on disqualification, available on aalto.fi pages at [Objectivity and impartiality guidance in the university | Aalto University](#).

3.2 Choice and approval of topic

The topic of the thesis is decided in discussions between the student and the possible thesis supervisor. The final choice is always made by the student. Topics may be available in research being conducted at the school or the topic may have to do with themes covered on the courses. The master's programmes may also have their own thesis 'topic banks'. The master's thesis topic may also be related to work done during a work placement. In such cases, it is important that the topic and contents of the thesis be discussed also with the possible thesis supervisor before making the topic application.

The suitable stage to start the master's thesis is when the student has sufficiently relevant knowledge that relates to the topic of the thesis and the objectives of the degree. The bachelor's degree must be completed before beginning work on the master's thesis. When assessing relevant knowledge, both completed and ongoing advanced studies of the master's degree are considered. The supervisor may also suggest modifications to the student's personal study plan, e.g. choice of alternative courses or timing of courses, to support the thesis work. The student should present his/her personal study plan.

Schools design their curricula in a manner that allows the students to complete their studies within the normative duration of studies specified in legislation. The curriculum of a master's programme is a tool to assess the suitable stage. The level of sufficiently relevant knowledge should not be too high. Assuming the student has studied according to the schedule suggested in the curriculum, he/she should be able to start working on the thesis after the first year's studies. This usually means that the student has completed a large part of the major courses. In case the supervisor is not familiar with the curriculum of the programme, he/she should ask for advice from the responsible professor of the student's major or from the learning services of the student's school.

Confirmation of the topic is sought from the degree programme committee via the e-transaction system eAge <https://eage.aalto.fi>. Deadlines for applications are published on the [Student Guide](#) on your programme's pages -> During your studies -> Thesis

Before completing the form, the student and thesis supervisor or thesis advisor have agreed on the topic in writing. Email discussions, a signed memorandum of the initial meeting, or some other written approval must be appended to the form. A model agreement and other details on applying for a thesis topic are available on the [Student Guide](#) on your programme's pages -> During your studies -> Thesis.

The application form includes the details of the thesis supervisor and those of thesis advisor(s), and the language of the master's thesis. The thesis is written in either Finnish, Swedish or English. Perfect command of one of the national languages of Finland (Finnish, Swedish) is demonstrated

through a maturity essay written either for the Bachelor of Science (Technology) degree or another bachelor's degree. The language of the degree will be either Finnish or Swedish, if the student writes the master's thesis in Finnish or Swedish, regardless of the language of the master's programme.

The topic of the master's thesis remains valid for one year as of the date of approval. The extent of the master's thesis is 30 cr. This equals about 6 months of full time studying. The scheduling of the thesis process should be discussed together with the student, supervisor and advisor(s) to ensure that the schedule is feasible. When keeping to the agreed schedule is a factor in the thesis evaluation, the thesis supervisor should agree with the student in advance on the procedure followed if the student fails to meet the deadline.

It is good practice to not mention company or brand names or use any abbreviations in the topic. In addition, the topic may not be formulated as a question.

Since minor specifications to the topic are allowed after its approval but major changes require submitting a new application, all specifications and changes to the topic must be agreed upon with the thesis supervisor. The topic must be applied for again if there is a change of thesis supervisor, thesis advisor or in the language of the thesis.

It should be noted that the topic for the master's thesis and the completed master's thesis cannot be approved at the same meeting of the degree programme committee.

3.3 Checking the degree structure

Student's personal study plan (HOPS) and student's degree structure are checked at the latest when the student applies for the master's thesis topic.

3.4 Preparing a research proposal

When the topic is suitable for a master's thesis in the view of the supervisor, the student makes a research proposal.

The research proposal defines, for instance, the following:

- * background, the theoretical framework and research problems
- * objective of the thesis (main objective, interim objectives)
- * research methods
- * timetable and possible budget

Often the main objective of the thesis is best put in the form of a question. The research problem/questions specify what the work answers to. The research proposal should also present some interim goals, for instance, finishing the literature review section, finishing the analysis section and so forth. The research proposal is reviewed at, for instance, the kick-off meeting with the supervising professor and thesis advisor, either together or separately. The supervising professor and the student may also go through some literature related to the topic in the same meeting.

The deadline for the master's thesis shall be agreed upon between the thesis supervisor and the student and set as a maximum of one year as of the date of approval of the topic.

3.5 Master's thesis process

When both the thesis supervisor and the thesis advisor have approved the research proposal for the master's thesis, the actual execution of the thesis work starts; you should reserve about 6 months for this stage. The total number of hours to be spent on the master's thesis is about 800. The duration of the execution phase is affected by for instance, the extent of the research problem the experimental methods used in the thesis and the evaluation of the results produced as well as any other possible individual reasons. At the start of the process, students are recommended to focus on the written material so that the earlier research on the topic may best be put to use to support the research. The original research proposal may be modified slightly and specified as the study progresses and usually this is recommended.

Contacts between student and the professor supervising the thesis are usually frequent at the start and end of the research while contacts to the thesis advisor should be frequent throughout the writing process. The key duty of the thesis supervisor is ensuring that the topic of the thesis is suitable and that the research proposal provides a framework for a successful execution of the thesis. The student may however always contact the supervising professor if questions arise regarding the progress of the work.

3.6 Evaluating the master's thesis

When the student has drafted the first manuscript of the master's thesis, the thesis supervisor examines it thoroughly and gives the student feedback on the corrections and changes needed. At this stage, it is possible to discuss the evaluation of the thesis and the requirements set for the research and the report writing when aiming for a given grade. Usually, the examination process takes maximum 4 weeks, and 2-3 weeks should be reserved for the corrections and changes suggested. While the thesis is being examined by the thesis supervisor, the thesis advisor should read the manuscript and comment it in the light of the goals set by the target organisation.

When the student has made the corrections and changes suggested by the thesis supervisor and thesis advisor, the thesis is usually resubmitted to the thesis supervisor for examination. The student should aim at producing a final version of the thesis for this review to avoid multiple correction rounds. When the supervisor has approved the corrections, s/he will give the student permission to publish the thesis.

It is worth bearing in mind that the views of an individual supervising professor on the comment rounds of the thesis may differ from that presented above.

If the master's thesis is not submitted for examination by the deadline, the topic will expire, and the student shall apply for a new topic by submitting an application to the school

The thesis writing process is presented as a process diagram in Appendix.

4 PRESENTING THE MASTER'S THESIS AND MATURITY ESSAY

4.1 Presenting the master's thesis

The master's thesis process also includes a presentation of the finished thesis at a time agreed upon with the thesis supervisor. The presentation, or similar event to showcase the thesis, has to be held at the latest the last day the student files an application for the approval of the thesis.

More information about programme or department presenting practices can be found on the [Student Guide](#) on your programme's pages > During your studies -> Thesis.

4.2 Maturity essay

The master's thesis author must write a maturity essay to demonstrate conversance with the field. At the School of Engineering the abstract of the thesis will serve as the maturity essay. The supervisor of the thesis will check that the abstract of the thesis shows the student's knowledge about the topic and field in question. The completion of the maturity essay is agreed upon with the supervising professor before filing the application for the approval of the thesis. In addition, the maturity essay shall demonstrate proficiency in Finnish or Swedish, if no demonstration was given for the student's bachelor's degree by writing a maturity essay. (Degree Regulations for Bachelor's and Master's Degrees, section 13)

The contents of the maturity essay are reviewed by the thesis supervisor, while its language (if Finnish or Swedish) is evaluated by the Language Centre. Those students with Finnish schooling and who have already demonstrated their language proficiency in a maturity essay for a Bachelor of Science (Technology) or for another bachelor's degree are not required to demonstrate it again by writing a maturity essay for the master's degree. The language of the maturity essay may be failed if its language does not meet degree requirements.

Students are to reserve about 14 days for the language check from the date of receipt of the text by the Language Centre. The maturity essay is graded on a pass/fail basis, and its grade does not affect the grade of the master's thesis. The credits for an approved maturity essay are given by the master's thesis supervisor. A failed maturity essay may be retaken.

The requirement of a maturity essay also applies to international students, who usually write their maturity essays in English. Maturity essays written in other languages than Finnish or Swedish are only subjected to a review of the contents, not the language.

5 OBTAINING APPROVAL FOR THE MASTER'S THESIS

The student returns his or her application for the evaluation of the master's thesis as soon as 1) the topic has been approved, 2) the presentation has been given and 3) the abstract of the thesis which serves as a the maturity essay has been completed.

To apply for the evaluation and approval of the master's thesis, students go to the e-transactions system (<https://eage.aalto.fi>). Deadlines for applications are published on the [Student Guide](#) on your programme's pages -> During your studies -> Thesis.

For details on the final document in the electronic system, see the programme's website at the [Student Guide](#) ->During your studies -> Thesis.

The master's thesis is approved at the meeting of the Degree Programme Committee on the basis of the grade proposal issued by the thesis supervisor. The form for master's thesis evaluation is provided as an appendix to this guideline. The degree programme committee meets frequently during the academic year; the meeting dates are published on the programme's aalto.fi website at [Student Guide](#) on your programme's pages ->During your studies -> Thesis.

School of Engineering master's theses are submitted electronically; submissions are sent to Aaltodoc, the publication archive maintained by the Aalto University Learning Centre. Once approved, the master's thesis is a public document (see details under item 7 Publicity of the master's thesis and copyright).

5.1 Evaluation of the master's thesis

The master's thesis is graded on the scale of 0 "fail" /1 "passable" /2 "satisfactory" /3 "good"/4 "very good" /5 "excellent". Under the Aalto University General Regulations of Teaching and Studying, a master's thesis submitted for evaluation must be evaluated within 4 weeks of its submission. The thesis is graded by the thesis supervisor. The master's thesis evaluation form is provided as the Appendix to this guideline. Evaluation may be weighted slightly differently in different research fields, but key evaluation criteria have been presented in Item 2.1 'Goals for the contents of the thesis'. The Appendix of this guide (Guidelines for master's thesis evaluation) presents the factors influencing grading in more detail.

The overall average grade for the degree is calculated as the credit-weighted average grade of all the courses completed so far, including the master's thesis.

Degree may be awarded "Completed with Honours" if the weighted average grade of the courses included in the degree (including the thesis) and the grade for the thesis both are at least 4.0. The decision regarding awarding a degree with honours rests with the school in connection with the awarding of the degree.

The evaluation and approval of the master's thesis shall be requested in writing from the school (see section 5, Obtaining approval for the master's thesis). The title of the thesis, the grade and names of the thesis supervisor and the thesis advisor are noted in the degree certificate.

5.2 Appealing against a grade of a study attainment (Universities Degree (Yliopistoasetus), Section 17)

Students dissatisfied with the grade of their thesis may appeal against the decision in writing to the Aalto University Academic Appeals Board within 14 days of receiving notification of the decision. The appeal shall arrive at the university before the closing time of the Registry (at 15.00) on the deadline date. If the student is notified of the decision by an electronic message (by e-mail), the notification is deemed to have been received by the student on the third (3) day after mailing, unless proven otherwise. If the student is notified of the decision by mail, the notification is deemed to have been received by the student on the seventh (7) day after mailing unless proven otherwise. When calculating the appeal period, the day of receiving the decision shall not be included. Address to the Aalto University Academic Appeals Board:

Aalto University Academic Appeals Board
Registry
P.O. BOX 11000
FI-00076 AALTO
kirjaamo@aalto.fi

The appeal must specify the following:

1. student name and contact information (address, e-mail address and telephone number)
2. date of student receiving notification of the decision
3. decision (incl. name of thesis and name of person responsible for grading)
4. the change sought with the appeal
5. grounds for the appeal (copies of documents on which the student bases his/her appeal if not already submitted to Aalto University).

5.3 Electronic version of the master's thesis and online publishing

Master's theses of the School of Engineering will be submitted and stored only in electronic format. Students submit only one final copy of their thesis as a PDF/A file through the eAge system. For additional information on creating a PDF/A file, see the Instructions to convert a file to PDF/A: [Converting a file to PDF/A compliant version | Aalto University](#) .

Please note, that the master's thesis is a public document (see details under item 7 Publicity of the master's thesis and copyright).

6 GENERAL INSTRUCTIONS ON WRITING THE THESIS

The actual guidelines for formatting the master's thesis, including tips on the presentation style (font, line spacing, margins, referencing) can be found from the Word Thesis [template](#) for all Aalto University schools.

6.1 Collecting source literature and seeking information

Before starting the actual master's thesis writing, students collect and list the necessary source literature. In the beginning, it is worth going through enough reference material. The literature review may be done manually by seeking information in the sources of the library or by searching related references in Finnish and international databases.

Finding suitable and reliable information for the master's thesis may prove challenging. There are many ways to seek information, for instance, library catalogues, reference and full text databases, international sources, articles in scientific journals, reviews, congress papers, theses and international societies of the discipline. Internet directories and link lists should be used with caution: for instance, Wikipedia is not an appropriate source.

The information specialists of the Aalto's learning centre will help you in seeking information and in using the information systems and material provided by the learning centre. You can turn to an information specialist for instance in questions related to information search for theses. More information: [Information service and information skills training | Aalto University](#).

6.2 List of references and compiling it

The starting point is that a reference must always be given if you are not stating your own interpretation or conclusion or 'general knowledge'. This means that references must be given, for instance, when presenting the results or claims made by another researcher or using a table or figure taken from someone else's work. A direct quote is put in quotation marks. References should be made to original sources or as close to an original source as possible and not to a later publication that refers to the original source.

Compiling a list of references is a central part of scientific publishing. The use of references has been stipulated in the Copyright Act (Tekijänoikeuslaki 404/1961), and the appearance of references to printed material has been defined in the SFS standard 5342 and that of references to electronic material in the SFS standard 5831. The list may be compiled in several ways depending on the style used. The two most common systems are the Harvard system, which is recommended also for the thesis, and numeric referencing. Both of these referencing systems have been explained in more detail in the Word Thesis [template](#) for all Aalto University schools.

Since the referencing systems used at Aalto University may vary by programme, it is best to ask for detailed instructions from the thesis supervisor.

6.3 Abstract

The abstract is a short description of the essential contents of the thesis: what was studied and how, and what were the main findings. Templates for the abstract to be appended to the thesis are available in the Word Thesis [template](#) for all Aalto University schools.

6.4 Academic integrity in writing the master's thesis

Under the Aalto University General Regulations on Teaching and Studying, all teaching and studying must take into consideration responsible conduct of research. Students shall familiarise themselves with the available instructions and ask for assistance if instructions are unclear. (Aalto University General Regulations on Teaching and Studying, Section 39)

Misconduct, plagiarism and consequences thereof

In a studying context, misconduct is first and foremost defined as a deliberate act or means of misrepresenting one's own or someone else's level of competence. Forms of misconduct include fabrication, misrepresentation and unacknowledged borrowing or plagiarism.

Plagiarism, or unacknowledged borrowing, refers to representing another person's material as one's own without appropriate references. This includes research plans, manuscripts, articles, other texts or parts of them, visual materials, or translations. Plagiarism includes direct copying as well as adapted copying. (Aalto University Code of Academic Integrity, Item 3.3)

In accordance with the Aalto University General Regulations on Teaching and Studying, a study attainment may be left ungraded if the student is deemed to have violated against the Code of Academic Integrity while completing it. If the alleged violation concerns an approved and/or published thesis, the violation is processed in accordance with the guideline of the Finnish Advisory Board on Research Integrity (RCR guidelines 2012). If the allegation concerns an unpublished master's thesis submitted for examination, it must be inquired of the student whether s/he demands that an investigation referred to in the RCR guidelines be conducted instead of the procedure defined in the university code, and the decision on the approval of the thesis is left pending until the allegation has been investigated.

For details on the Code of Academic Integrity and the consequences of violating it and related processes, see the Into website: [Aalto University Code of Academic Integrity and Handling Violations Thereof - Academic policies and regulations - Student Guide \(aalto.fi\)](#)

Electronic originality check

Aalto University uses an electronic tool, Turnitin, which recognises similarities between written texts and thus helps in the detection of plagiarism. All master's theses of the School of Engineering must be submitted to the MyCourses assignment submission inbox set up by the thesis supervisor and equipped with the Turnitin logo. Once the thesis has been submitted, Turnitin automatically generates a similarity report (also referred to as the originality report), which compares the text against digital material in the Turnitin database and marks the detected similarities with different colours.

If the supervisor has not set up a Turnitin-type submission inbox but the student wishes to perform a preliminary similarity check (originality check), he or she can do so in the MyCourses workspace 'Independent Turnitin Originality Check', which has been specifically set up for this purpose at [Course: Independent Turnitin Originality Check \(aalto.fi\)](#)

If the interpretation of the similarity report gives the teacher cause to suspect violation of the Code of Academic Integrity, the procedure followed is the same as that followed with other violations of academic integrity.

Additional information: Turnitin for students:
<https://wiki.aalto.fi/display/turnitin/Turnitin+for+Students>

7 PUBLICITY AND COPYRIGHT OF THE MASTER'S THESIS

Students who are preparing their theses should keep in mind that the thesis is a public document. The thesis submitted for evaluation may not contain any secret information.

Information about the thesis can be retrieved from the Aaltodoc portal. Archived copies of the thesis itself may be viewed at the Learning Centre in electronic or in printed form. In addition, theses produced in a digital format will be electronically sent by the Learning Centre to anyone requesting a copy.

If a thesis is produced on commission for a business, any parts of the thesis containing commercial secrets must be left as part of the background material, and not be included in the actual thesis for evaluation.

No thesis will be put on the Aaltodoc portal, where it may be obtained by anyone, unless the author gives his or her consent. Thesis meta data, however, (such as the name of the thesis and author, the author's graduation year and degree programme, and thesis keywords) shall continue to be available online for public view. Authors may choose to make their entire thesis texts public, in which case the thesis in its entirety will be available to all Aaltodoc users in PDF form. Student can postpone the publication of the thesis file in open network by one (1) year. Background material is separate from the thesis itself, and therefore it is not saved on the Aaltodoc portal.

If the author does not grant permission, the thesis shall not be obtainable directly from Aaltodoc, but a customer may submit a request to the Learning Centre for it (oppimiskeskus@aalto.fi). More information: [Theses as public documents - Academic policies and regulations - Student guide \(aalto.fi\)](#)

Aalto University has made a contract template to be used when students agree upon making a master's thesis with an external collaboration organisation. It should particularly be noted that the agreement is always made between the student and the external organisation and it should be communicated to the supervising professor. The contract includes, for instance, provisions on the copyrights of the thesis. More information: [Study and educational projects – contracts with organisations outside Aalto University | Aalto University](#)

8 FUNDING OF THE MASTER'S THESIS

The master's thesis may be done without separate funding. At times, the work is funded by working in the collaboration company or through a grant. In addition, some Aalto University research projects offer employment for master's thesis writers; for details, contact the professor of the programme.

9 SUPPORTING THE THESIS PROCESS

The Aalto University Library and Information Services, the Language Centre and various departments offer courses to help students in writing the thesis. Contact the planning officer of your master programme for details [Student Guide -> Support for Studying](#) > Contact information for Learning Services.

Students writing their master's thesis in English may attend the Writing Clinic tutoring service of the Aalto University Language Centre. For additional information, visit the Language Centre website at [Writing Clinic \(aalto.fi\)](#).

10 LITERATURE

Literature supporting the master's thesis work:

Crone W. 2020. Introduction to Engineering Research. University of Wisconsin – Madison. 232 p. ISBN: 9781681737997

Kauranen I., Mustakallio M. ja Palmgren V. 2007. Tutkimusraportin kirjoittamisen opas opinnäytetyön tekijöille. Otaniemi TKK. 109 s. ISBN 951-22-8359-x.

Nykänen, O. 2002. Toimivaa tekstiä. Opas tekniikasta kirjoittaville. Helsinki TEK. 212 s. ISBN 952-5005-64-X

Heikkinen, R. 2005. Tiedonhakijan teho-opas. Jyväskylä: Docendo, 2005. 154 s. ISBN 951-846-258-5

Novak, J. 2002. Tiedon oppiminen, luominen ja käyttö: käsittekartat työvälineinä oppilaitoksissa ja yrityksissä. Jyväskylä: PS-kustannus. ISBN 952-451-057-X

Aalto University Learning Centre Guides, Resource guides: <https://libguides.aalto.fi/en>

[Aaltodoc \(https://aaltodoc.aalto.fi/?locale-attribute=fi\)](https://aaltodoc.aalto.fi/?locale-attribute=fi) – Full-text publications of the Aalto University schools: theses, reports, conference and other publications.

11 APPENDICES

APPENDIX: GUIDELINES FOR MASTER'S THESIS EVALUATION

1. General information about the evaluation of master's theses

The Section 10 of the Degree Regulations for Bachelor's and Master's Degrees issues provisions on the master's thesis. The School of Engineering has a common policy on the academic evaluation of its master's theses. These guidelines for evaluating the master's thesis and the related appendices are used in the evaluation and grading of all master's theses leading to a Master of Science (Technology). The guideline is intended for master's thesis writers, thesis advisors, supervisors and the approvers. The evaluation of the master's thesis and the grading decision shall be based on the criteria listed in section 3.

The purpose of the master's thesis is to serve as a demonstration of the skills of the student. The supervisor shall evaluate the complete thesis submitted for evaluation, including the title page. As applicable, other factors, such as the independent contribution of the student and his/her ability to stay on the agreed schedule may be considered in the evaluation process.

The extent of the master's thesis is 30 credits, equivalent of six (6) months of full-time studies. The topic of the master's thesis remains valid for one (1) year as of the date of approval. Significantly exceeding the time agreed upon with the supervisor may lower the grade. However, delays beyond the control of the student will be considered extenuating circumstances.

The thesis supervisor submits a written statement on the thesis with a proposal for a grade, i.e. an examiner's statement to the degree programme committee.

When preparing the statement, the supervisor may also request statements from the thesis advisor(s). In cases where the supervisor has proposed the grade of excellent (5), Passable (1) or Fail, the degree programme committee shall consult another professor of the school with expertise in the research field when deciding on the grade. Having familiarised itself with the examiner's statement and any additional statements, the degree programme committee shall decide on the approval of the thesis and on its grading.

Criteria for the second examiner of a Master's thesis. The Degree Programme Committee of the School of Engineering discussed in its meeting on 24 August 2015 the role of the examiner of a Master's thesis in the case where the supervisor proposes the grade 1 or 5 and a statement from another professor is needed. The professor acting as the second examiner should not be someone familiar with the thesis beforehand and cannot have acted as an advisor for the thesis. In addition it was concluded that the second examiner needs to be a professor at Aalto University.

2. Characteristics of an acceptable master's thesis

To qualify as an academic thesis, a master's thesis should meet all the criteria described below to an at least satisfactory extent. The grade assigned depends on the extent to which the criteria have been met.

- *Definition of research scope and goals*

Research scope has been defined

Clearly defined goals

The research questions and hypotheses contained in the scope of research and goals are evident from the thesis.

- *Command of the topic*

The student demonstrates command of the topic and understanding of the scope of research

The student demonstrates understanding of the relevant theoretical framework

The student demonstrates skills in making use of literature and other sources of information.

- *Methods, conclusions*

The student demonstrates ability to choose justified methods for reaching the goals

The student demonstrates ability to apply the chosen methods

The thesis contains references to scientific publications

The thesis presents well-founded conclusions drawn from the results

The results answer the research questions presented

- *Contribution to knowledge and thesis structure*

The thesis is relevant to the set goal

The thesis is a well-organised logical whole

The thesis makes an original contribution to the existing body of knowledge, i.e. it is produced by the student.

- *Presentation and language*

The overall appearance of the thesis is appropriate

The thesis contains no such structural, grammatical or spelling errors that complicate reading.

The thesis is written in coherent, formal style. The thesis is a well-organised, coherent whole.

The given guidelines have been followed

3. Criteria by grade

The descriptions below outline the extent to which the thesis must meet the set basic criteria in order to be assigned the grade in question. An individual thesis may contain characteristics of many different grade descriptions; it is the overall quality that determines the final grade.

Excellent (5): An exceptionally meritorious thesis demonstrating very good skills in creating or applying technical or scientific knowledge. The thesis is impeccable in all respects, which is apparent primarily from the following:

- *Definition of the research scope and goals:* The goals have been presented clearly, and the research scope is clearly defined, which indicates deep understanding of the topic. The goals are set high but are attainable.
- *Command of the topic:* The sources used have been selected not only appropriately but critically; the number of relevant works cited is sufficient, consisting primarily of high-quality scientific publications (journals or other peer-reviewed forums). The results have been evaluated in the light of the cited works, as well as

in that of prior research and theories on the topic. In addition, the student demonstrates deep understanding of the research topic.

- *Methods and conclusions:* The student demonstrates command of the relevant research methods, uses appropriate and justified methods, reports the research process and the methods accurately and precisely and justifies the choices made. The reliability and transferability of the results have been thoroughly evaluated, and the thesis may be based on exceptionally extensive empirical data. In addition, the line of reasoning behind the conclusions is particularly clear, accurate and critical and proves that the student has gained a deep understanding of the topic. The research results provide thorough answers to the posed research question.
- Contribution to knowledge and thesis structure: The results meet the standards of international conference publications, even though it is not necessary that the thesis contribute to new scientific knowledge. The results are of interest to academia or industry or otherwise relevant to professionals in the field. The student has produced a meritorious thesis independently while the contributions of the thesis advisor and supervisor have been minor.
- *Presentation and language:* The appearance, presentation and language of the thesis are impeccable.

Very good (4): A meritorious thesis which meets all the basic requirements of a good thesis. In addition, the thesis has extraordinary merits identified in the examiner's statement in areas such as the following:

- *Definition of the research scope and goals:* The goals and scope have been successfully and clearly defined in an appropriate manner.
- *Command of the topic:* The thesis combines the cited works and empirical data consistently and clearly. The cited works consist primarily of high-quality scientific publications (journals, other peer-reviewed forums), which are sufficiently numerous and appropriately chosen. The student demonstrates good command of the research topic.
- *Methods and conclusions:* Appropriate methods have been used in a well-founded manner. The research process has been described at least on a general level, while the transferability of the results has been evaluated to some extent. The empirical data has been presented well and its relevance to the results is clear. The empirical data is sufficiently extensive to justify the conclusions drawn, and the line of reasoning behind the conclusions is easily followed.
- Contribution to knowledge and thesis structure: The results are of theoretical interest or have practical relevance. The research results provide an answer to the posed research question.
- *Presentation and language:* The thesis is a consistent written presentation of the topic and, for instance, the referencing is correct and consistent. The thesis is a coherent and balanced whole.

Good (3): A well-structured and independently written master's thesis. The thesis has all the necessary elements, but no particular merits. The examiner's statement identifies definite needs for improvement. A good thesis, which meets the basic requirements in at least the following respects:

- *Definition of the research scope and goals:* The goals have been somewhat clearly defined in a primarily appropriate manner. The thesis proposal is clear.
- *Command of the topic:* The student demonstrates good command of the relevant literature and background material, and has applied them appropriately, but the

connection between the background material and the empirical data is not necessarily made sufficiently explicit.

- *Methods and conclusions:* The methods and the experiments are adequate and justified. The methods have been chosen in accordance with the prevailing practice; they have been used correctly and reported. However, a critical evaluation of the methodology is not a requirement for this grade. The conclusions have been drawn appropriately from the material.
- *Contribution to knowledge and thesis structure:* The thesis produces reliable results using the chosen methods in a suitable manner. It also answers the posed research question or reaches the goal set for it. Contribution to new knowledge is identifiable, and the topic is at least of some interest to academia or industry. The thesis has mostly progressed according to the original thesis proposal.
- *Presentation and language:* The thesis structure has no major weaknesses; it is well-organised and serves its purpose. The thesis uses appropriate language, and satisfactory attention has been paid to the overall appearance of the thesis.

Satisfactory (2) An acceptable thesis with significant shortcomings in areas specified in the examiner's statement such as discussing the topic, the results, scheduling, structure, language or overall appearance of the thesis. The grade may also be lowered if the student has required a disproportionate amount of thesis supervisor or advisor support. The thesis has shortcomings in the following:

- *Definition of the research scope and goals:* The scope is narrow and vaguely defined, and the thesis may not answer the research questions. Both the goals and the thesis proposal are vaguely defined.
- *Command of the topic:* The references are few or of poor scientific quality. There are notable shortcomings in the referencing. Source evaluation is lacking and the list of references contains errors.
- *Methods and conclusions:* The empirical data is scarce or there are shortcomings in its collection or analysis. Critical analysis is scarce or non-existent. Although methodological choices have been made, methods are used inconsistently. The conclusions drawn are few and may even contain factual errors.
- *Contribution to knowledge and thesis structure:* The goals and results of the thesis contradict each other, and the student has evidently had difficulties in comprehending the goal or scope of the research or in defining the research questions. The thesis may also depend excessively on the cited works, i.e. the results are not based on independent research but rather on the references. The topic has little significance for the field of research or industry in question or no contribution to new knowledge can be clearly identified in the thesis.
- *Presentation and language:* The thesis is not a coherent, well-organised whole, and its various parts may be out of balance or it meanders. It contains inconsistencies, unexplained conclusions or even factual errors.

Passable (1): A poor thesis with significant shortcomings in meeting the basic requirements; however the thesis does meet the minimum requirements in terms of discussing the topic and the reporting practices. Completing the thesis has required a great deal of either thesis advisor or supervisor support. In spite of being advised to do so, the student has failed to correct the shortcomings. Serious shortcomings include:

- *Definition of the research scope and goals:* The goals are unclear and it is evident that the student has not fully understood the purpose of the master's thesis.

- *Command of the topic:* The references are too few, they are of poor scientific quality or ill-suited for the thesis. There are significant shortcomings in the command and referencing of the literature and prior research on the topic, and the bibliography contains errors.
- *Methods and conclusions:* The choices of methodology and material are inappropriate or poor. The chosen method has been applied erroneously. The empirical data is scarce or ill-suited for the purposes of the thesis. The conclusions are few and poorly founded.
- *Contribution to knowledge and thesis structure:* The student does not demonstrate ability to conduct independent research. The thesis is excessively dependent on the references or does not explain the results. The topic is irrelevant for the field of research or industry in question and no contribution to new knowledge can be identified. The time taken to complete the thesis was disproportionate to the difficulty of the topic.
- *Presentation and language:* There are significant shortcomings in the structure and presentation of the thesis; it is difficult to read and the line of reasoning is difficult to follow.

The thesis shall not be passed if it has a lot of significant shortcomings and thus fails to meet the minimum requirements for an approved master's thesis.

Appendix to the evaluation guideline: Aspects to consider in the evaluation of a master's thesis

The table below is intended for the thesis supervisor as a tool for evaluating the master's thesis. The middle column describes some typical characteristics of a good thesis, while the left and right columns list characteristics lowering or improving it respectively.

Table on aspects to consider in the evaluation of a master's thesis

ASPECTS TO CONSIDER IN THE EVALUATION	Characteristics lowering the grade	Characteristics of a good thesis	Characteristics improving the grade
Definition of research scope and goals	Narrow or poorly defined research scope Poorly defined goals Vague research questions	Clearly defined goals Carefully planned thesis	Precisely defined and justified research scope Demonstration of mature thinking in the definition of goals and research questions

<p>Command of the topic</p>	<p>Poor command of the research topic and its theoretical framework</p> <p>Few or irrelevant sources</p>	<p>Good command of the research topic and its theoretical framework</p> <p>Student has found the relevant reference materials on the topic.</p>	<p>Broad-based knowledge of the background material and the research topic</p> <p>The sources throw light on the topic from a variety of perspectives.</p>
<p>Methods and conclusions</p>	<p>Weak and vague reasons given for the methodological choices</p> <p>Shortcomings in the application of methods</p> <p>Few or poorly justified conclusions</p> <p>Poor referencing skills</p> <p>Notable shortcomings in source evaluation</p>	<p>Research questions answered using justified methods</p> <p>Conclusions drawn appropriately from the material</p> <p>Cited works evaluated critically</p>	<p>Methodological choices thoroughly justified</p> <p>Excellent command of methods</p> <p>Results evaluated critically</p> <p>Results examined from a variety of perspectives</p> <p>Theories have been applied very skillfully.</p> <p>Use of appropriate references of high scientific quality while paying attention to source evaluation</p>
<p>Contribution to knowledge and thesis structure</p>	<p>Results not in line with the goals Minor independent input</p> <p>The thesis has structural inconsistencies.</p>	<p>Results in line with the goals</p> <p>An original contribution to the existing body of knowledge</p>	<p>Thesis produces new results</p> <p>Results of interest to academia or industry or otherwise relevant to professionals in the field</p> <p>Student demonstrates solid skills in working independently</p>

<p>Presentation and language:</p>	<p>The language needs revision</p> <p>The thesis structure is unclear and the language does not facilitate the understanding of the content (style, vocabulary, sentence structures, spelling).</p> <p>The overall appearance needs improvement</p>	<p>The language is appropriate.</p> <p>The text is easily understood and the structure is sufficiently clear.</p> <p>The overall appearance is appropriate.</p>	<p>Written in fluent, formal style.</p> <p>The language facilitates the understanding of the contents, and argumentation is consistent throughout the thesis.</p> <p>Figures and tables are illustrative.</p> <p>Impeccable and coherent overall appearance</p>
<p>Other</p>	<p>The time used to complete the thesis is disproportionate to the difficulty of the topic.</p>	<p>The thesis has mostly progressed according to the original thesis proposal.</p>	

APPENDIX: MASTER'S THESIS EVALUATION FORM

EVALUATION OF THE MASTER'S THESIS

Master's programme:
Author:
Supervisor:
Thesis advisor(s):
Topic:

Area evaluated	1	2	3	4	5
Definition of research scope and goals					
Definition of research scope					
Presentation of goals in the thesis					
Command of the topic					
Command of the literature					
Command of the topic					
Methods, conclusions					
Command of the research method					
New significant results					
Correctness of the results and scrutiny of errors					
Conclusions, quantity, quality and relevance					
Contribution to knowledge and thesis structure					
Achieving goals					
Organisation, coherence and clarity of the thesis					
Share of independent input					
Keeping to the schedule					
Presentation and language					
Language					
Presentation and graphic design					
Grade proposal					

Verbal evaluation (required):

Place	Date
Evaluation by	

To qualify as an academic thesis, a master's thesis should meet all the criteria described below to an at least satisfactory extent. The grade assigned depends on the extent to which the criteria have been met.

Definition of research scope and goals

Research scope has been defined

Clearly defined goals

The research questions and hypotheses contained in the scope of research and goals are evident from the thesis.

Command of the topic

The student demonstrates command of the topic and understanding of the scope of research

The student demonstrates understanding of the relevant theoretical framework

The student demonstrates skills in making use of literature and other sources of information.

Methods, conclusions

The student demonstrates ability to choose justified methods for reaching the goals

The student demonstrates ability to apply the chosen methods

The thesis contains references to scientific publications

The thesis presents well-founded conclusions drawn from the results

The results answer the research questions presented

Contribution to knowledge and thesis structure

The thesis is relevant to the set goal

The thesis is a well-organised logical whole

The thesis makes an original contribution to the existing body of knowledge, i.e. it is produced by the student.

Presentation and language

The overall appearance of the thesis is appropriate

The thesis contains no such structural, grammatical or spelling errors that complicate reading.

The thesis is written in coherent, formal style. The thesis is a well-organised, coherent whole.

The given guidelines have been followed.