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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, will be available as a separate document on the programme's Into website <https://into.aalto.fi/display/enopinnot/Master+programmes> > Planning your studies. 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.

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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.

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 seminar presentation or a corresponding presentation.

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 master's thesis supervisor shall be one of the professors of Aalto University as defined in section 16 of the Aalto University Bylaws. For special reasons and by decision of the dean, the thesis supervisor may also be another professor, university lecturer, or senior university lecturer of the school. (Amended degree regulations approved 20 November 2017)

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.

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A person designated thesis advisor is required to hold 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 Inside at <https://inside.aalto.fi/display/files/Ohjeistus+ja+oppaat> (pdf only in Finnish).

3.2 Choice and approval of topic

The topic of the thesis is decided in discussions between the student and the 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', which the student may obtain from the programme or supervisor. 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 thesis supervisor before making the topic application.

Students may apply for a topic for their master's thesis when a minimum of 60 credits counted towards the master's degree have been completed. (Degree regulations of 2013 Section 12). 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 Into website at <https://into.aalto.fi/display/enopinnot/Master+programmes> > Key dates (update 11.1.2019). 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 programme's Into website <https://into.aalto.fi/display/enopinnot/Master+programmes> > Planning your studies.

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. If the student composed his or her thesis in one of the national languages of Finland, that language is indicated on the student's degree certificate as the language of degree, regardless of the language of degree of the master's programme.

The topic of the master's thesis remains valid for one year as of the date of approval.

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

Since the degree structure is checked at the latest when the student applies for the master's thesis topic, the application form is supplemented with details of the completed studies as grouped by the Master's programme. The student's HOPS is checked during the first year of master's studies; if changes are made to it afterwards, the updated HOPS must be sent again to the learning services of the programme.

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 particular 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 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 before the master's thesis is approved and evaluated.

4.2 Maturity essay

The master's thesis author must write a maturity essay to demonstrate conversance with the field of the thesis and proficiency in the language one has been educated in (Finnish or Swedish). The maturity essay may be an essay written on a topic given by the thesis supervisor and written under supervision. Alternatively, the maturity essay may be part of the master's thesis, in which case the method of completion is agreed upon with the supervising professor. The maturity essay must be written before the approval of the master's thesis.

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. Students 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. In such cases, the language of the maturity essay may be agreed upon with the supervisor. The language of the maturity essay may be failed if its language does not meet degree requirements.

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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 or seminar presentation given or a date set for it, and 3) the maturity essay has been completed or a date set for it (even when it has been written earlier for a bachelor's degree).

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 Into website at <https://into.aalto.fi/display/enopinnot/Master+programmes> > Key dates (update 11.1.2019). For details on the electronic document system, see the programme's Into website at <https://into.aalto.fi/display/enopinnot/Master+programmes> > Planning your studies.

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 Into website at <https://into.aalto.fi/display/enopinnot/Master+programmes> > Key dates.

As of autumn 2017, School of Engineering master's theses may only be submitted electronically; submissions are sent to Aaltodoc, the publication archive maintained by the Aalto University Learning Centre. If they wish, however, students may submit their work to be hardbound for their own use. 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 same scale as the other study attainments. 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 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.

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Under the Section 33 of the degree regulations of 2013, a degree may be awarded with honours if the weighted average grade of the courses included in the degree (excluding 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 grade and the name of the thesis supervisor 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. 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

From autumn 2017 onwards, the master's theses of the School of Engineering will be submitted and stored only in electronic format. The metadata and files of the master's theses are collected in the Aaltodoc publication archive through the eAge system, where students submit only one final copy of their thesis as a PDF/A file for this purpose. For additional information on creating a PDF/A file, see the guidelines of the Aalto University Learning Centre: https://aaltodoc.aalto.fi/doc_public/ohjeet/aaltodoc_pdf_a.pdf

Aalto University publishes the metadata of all theses online in the INSSI database. The metadata includes the author, title and translated title, thesis supervisor and thesis advisor and key words.

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All approved theses are archived as full-text versions in the Aaltodoc publication archive. The abstract and/or the full text are also published given permission from the student. The permission to publish is given via the e-transaction system when requesting approval for the thesis.

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) will be available as a separate document on the programme's Into website <https://into.aalto.fi/display/enopinnot/Master+programmes> > Planning your studies.

The master's thesis is to be a concise, clearly written and finalised written presentation of a topic, with the maximum length of about 100 pages with appendices. The appearance of the thesis must be neat, organised and elegant. Right alignment, use of headers and footers and mode of page numbering are optional.

Students are recommended to illustrate the thesis with appropriate pictures and tables. Tables are good for presenting exact values. Instructions on using figures and tables are given in various writing manuals.

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 a sufficient amount of 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 <https://learningcentre.aalto.fi/fi/category/opiskelun-tueksi/>

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

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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 formation guide for the master's thesis in the Into portal.

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 about 100 words) of the essential contents of the thesis: what was studied and how, and what were the main findings. The abstract should follow the models provided by the School of Engineering. Templates for the abstract to be appended to the thesis are available from the School of Engineering's Into pages in Finnish, Swedish and English <https://into.aalto.fi/display/enopinnot/Master+programmes> > Applications and forms.

For a Finnish thesis, the abstract should be written in both Finnish and English; for a Swedish thesis, in Swedish and English. The abstracts for English theses written by Finnish or Swedish speakers should be written in English and in either Finnish or Swedish, depending on the student's language of basic education. Students educated in other languages than Finnish or Swedish write the abstract only in English. Students may include a second or third abstract in their native language if they wish.

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 de-

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mands 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 <https://into.aalto.fi/display/ensaannot/Aalto+University+Code+of+Academic+Integrity+and+Handling+Violations+Thereof>

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 <https://mycourses.aalto.fi/course/view.php?id=3042>.

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

The master's thesis is a public document which shall be available at the school (Degree Regulations of the Aalto University School of Engineering). For all theses, the metadata, meaning the name of the thesis author, thesis title and its translations, the major of the student, and the names of the thesis supervisor and thesis advisor, are stored and published. In addition, the full-text versions of all approved theses are stored in the Aaltodoc publication archive. They may be accessed with the Learning Centre customer workstations designated for this purpose, where you can search for information about the theses, browse or read their full-text versions and print them.

The abstract and/or the full-text versions in the Aaltodoc publication archive may also be made publically available online if the student has given his/her consent to it. The Aaltodoc publication archive is available at <https://aaltodoc.aalto.fi>. The permission to publish the thesis is granted on the eAge form used for applying for approval of the master's thesis. The publication of the thesis may be postponed by a maximum of one (1) year as of its date of approval, i.e. the date of the meeting at which the thesis was approved. This means that the thesis does not have to be published immediately if delaying the publication is necessary due to, for instance, other publications, patent applications, or trade secrets. It should be noted, however, that in all cases, theses are

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public documents that can be freely viewed on the Learning Centre workstations designated for that purpose.

Issues related to the copyright of the master's thesis are resolved in accordance with the general copyright legislation, and inventions made during the master's thesis process are solved in accordance with valid patent legislation.

The master's thesis is a public document usually not covered by confidentiality provisions. The thesis may however include information about trade or business secrets, patentable inventions etc. Information which is not seen as covered by the principle of openness and thus be in the public domain cannot be included in the master's thesis which is a public document. In such cases, the author of the thesis and the thesis advisor must agree upon the details included in the master's thesis.

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.

<https://inside.aalto.fi/display/enles/Study+and+educational+projects>

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 <https://into.aalto.fi/display/enopinnot/Master+programmes> > Contact

Students writing their master's thesis in English in a school of technology may attend the Writing Clinic tutoring service of the Aalto University Language Centre. For additional information, visit the Language Centre website at http://languagecentre.aalto.fi/fi/services/writing_clinic/

10 LITERATURE

Literature supporting the master's thesis work:

Kauranen I., Mustakallio M. ja Palmgren V. 2006. Tutkimusraportin kirjoittamisen opas opinnäytetyön tekijöille. Otaniemi TKK. 109 s. ISBN 951-22-8359-x. (in the library or purchase at the [student service desk of the school](#)).

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-yliopiston kirjaston tiedonhankinnan opas](#)

[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 12 of the Degree Regulations of 2013 the Aalto University 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. In accordance with the degree regulations (2013, Section 12), 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), Satisfactory (1) or Fail, the degree programme committee shall, when possible, 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.

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.

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- *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:

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- *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.

Very 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.

Satisfactory (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:

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- *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

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Command of the topic	<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>
Methods and conclusions	<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>
Contribution to knowledge and thesis structure	<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>



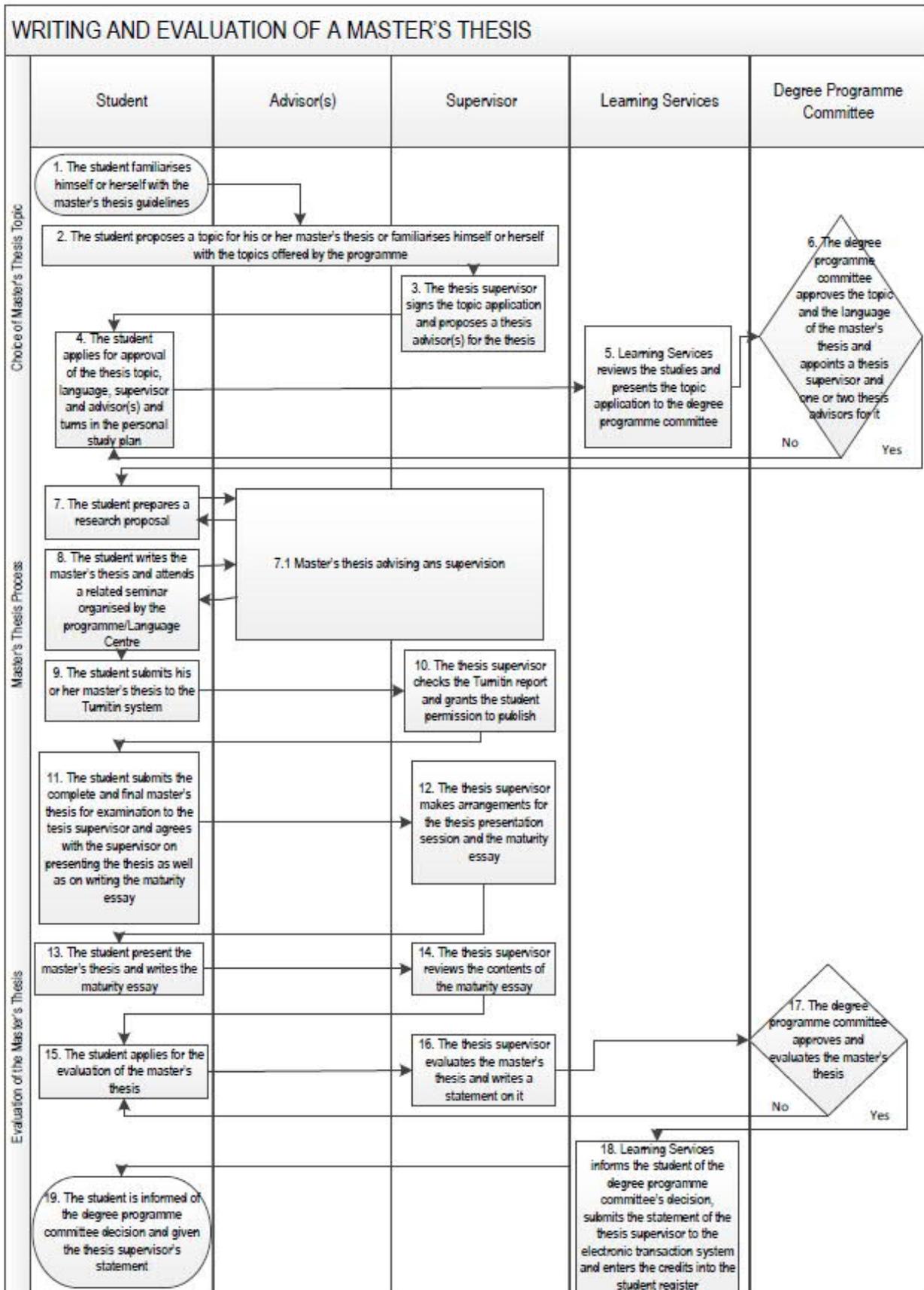
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<p>Presentation and language:</p>	<p>The language needs revision</p> <p>The thesis structure is unclear and the language does not facilitate the understanding of the content (style, vocabulary, sentence structures, spelling).</p> <p>The overall appearance 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>	

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**APPENDIX: WRITING AND EVALUATION OF A MASTER'S THESIS: PROCESS
DESCRIPTION**

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School of Engineering/Learning Services 21 November 2011, updated 29 January 2018

WRITING AND EVALUATION OF A MASTER'S THESIS: WRITTEN PROCESS DESCRIPTION

Degree regulations of 2013

CHOICE OF MASTER'S THESIS TOPIC

1. The student familiarises himself or herself with the master's thesis guidelines of the school and those of the programme. (Student)

2. The student proposes a topic for his or her master's thesis or familiarises himself or herself with the topics offered by the programme. (Student, thesis advisor(s) and thesis supervisor)

The master's thesis is written on a topic related to the advanced studies of the master's programme, agreed upon between the student and the thesis supervisor, who represents a research field relevant to the thesis topic.

3. The thesis supervisor signs the topic application and proposes a thesis advisor(s) for the thesis. (Thesis supervisor)

The master's thesis supervisor shall be one of the professors of Aalto University as defined in Section 16 of the Aalto University Bylaws. For special reasons and by decision of the dean, the thesis supervisor may also be another professor, university lecturer, or senior university lecturer of the school. The person designated as the thesis advisor is required to hold a master's degree. As necessary, the thesis supervisor may also act as the thesis advisor.

4. The student applies for approval of the thesis topic, language, supervisor and advisor(s), and turns in the personal study plan. (Student)

The student may apply for a master's thesis topic once he or she has completed a minimum of 60 credits towards the master's degree. To obtain approval for the master's thesis topic, the student submits his or her application to the e-transactions system (<https://eage.aalto.fi>). Deadlines for applications are published on the Into website at <https://into.aalto.fi/display/enopinnot/Master+programmes> > Key dates (update 11.1.2019). The student is responsible for ensuring that his or her official study plan has been approved and appended to the topic application.

5. Learning Services reviews the studies and presents the topic application to the degree programme committee. (Learning Services)

6. The degree programme committee approves the topic and the language of the master's thesis, and appoints a thesis supervisor and one or two thesis advisors for it. (Degree programme committee)

The topic of the master's thesis remains valid for one year as of its date of approval. If the degree programme committee does not approve the topic, the application is returned to the student.

MASTER'S THESIS PROCESS

7. The student prepares a research proposal. (Student)

The student prepares a research proposal as instructed by the thesis supervisor.

7.1 Master's thesis advising and supervision (Thesis supervisor/thesis advisor(s))

The student and thesis advisor agree on the execution of the master's thesis supervision. While the master's thesis is being worked on, the thesis supervisor shall provide the student with opportunities to report on the progress of the work, on which the supervisor shall give feedback. Similarly, the supervisor may require the student to report on the progress of the work.

8. The student writes the master's thesis and attends a related seminar organised by the programme/Language Centre. (Student)

9. The Student submits his or her master's thesis to the Turnitin system. (Student)

The Turnitin system recognises similarities between written texts and thus helps in the detection of plagiarism. For additional information on using Turnitin see <https://wiki.aalto.fi/display/turnitin/Turnitin+for+Students>

10. The thesis supervisor checks the Turnitin report and grants the student permission to publish. (Thesis supervisor)

11. The student submits the complete and final master's thesis for examination to the thesis supervisor and agrees with the supervisor on presenting the thesis as well as on writing the maturity essay. (Student)

12. The thesis supervisor makes arrangements for the thesis presentation session and the maturity essay. (Supervisor)

Master's thesis presentations are organised on a regular basis by master's programmes. For details by programme, see the Into page. The thesis supervisor and student agree on the time and place of the maturity essay. The student present the master's thesis and write the maturity essay in an order agreed upon with the supervisor, even before submitting the final thesis for evaluation.

13. The student presents the master's thesis and writes the maturity essay. (Student)

The student must give a presentation on his or her master's thesis and write a maturity essay to demonstrate conversance with the topic of the thesis and proficiency in Finnish or Swedish. Students 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. (Section 14 of the 2013 Degree Regulations of the Aalto University School of Engineering)

14. The thesis supervisor reviews the contents of the maturity essay. (Thesis supervisor)

The thesis supervisor submits a notification of the maturity essay completion and notifies Learning Services when the student has presented his or her thesis.

EVALUATION OF THE MASTER'S THESIS

15. The student applies for the evaluation of the master's thesis. (Student)

To apply for the evaluation and approval of the master's thesis, the student submits his or her application via the e-transactions system (<https://eage.aalto.fi>). Deadlines for applications are published on the Into website at <https://into.aalto.fi/display/enopinnot/Master+programmes> > Key dates (update 11.1.2019). A final version of the thesis, which can no longer be changed, is appended to the application. The student may fill in the application for the evaluation of the master's thesis as soon as 1) the topic has been approved, 2) the presentation or seminar presentation has been given or a date set for it, and 3) the maturity essay has been completed or a date set for it (even when it has been written earlier for a bachelor's degree).

16. The thesis supervisor evaluates the master's thesis and writes a statement on it. (Thesis supervisor)

The master's thesis supervisor shall issue a written statement explaining the grounds for the evaluation and a proposal for a grade; this shall be done within four weeks of thesis submission. When preparing the statement, the supervisor may also request statements from the thesis advisor(s) as necessary. In cases where the supervisor has proposed the grade of Excellent (5), Sufficient (1) or Fail, he or she requests an additional statement from another examiner. The thesis supervisor writes his or her statement on the official master's thesis evaluation form, while the other examiner formulates his or her statement freely.

17. The degree programme committee approves and evaluates the master's thesis. (Degree programme committee)

The degree programme committee shall decide the approval and grading of the thesis after examining the written statement by the thesis supervisor and any other statements written. If the degree programme committee does not approve the thesis or grade it, the application is returned to the student.

18. Learning Services informs the student of the degree programme committee's decision, submits the statement of the thesis supervisor to the electronic transactions system and enters the credits into the student register. (Learning Services)

19. The student is informed of the degree programme committee decision and given the thesis supervisor's statement. (Student)

Students dissatisfied with the grade of their master's thesis may appeal the matter in writing to the Aalto University Academic Appeals Board within 14 days of receiving notification of the decision.

APPENDIX : MASTER'S THESIS EVALUATION FORM

EVALUATION OF THE MASTER'S THESIS

Degree programme:	
Author:	Professorship:
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):



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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.