

## 11 APPENDICES

### APPENDIX 1: 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.

24 February 2014  
(updated 23 February 2016)

## 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:

24 February 2014  
(updated 23 February 2016)

- *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.

24 February 2014  
(updated 23 February 2016)

**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.

**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.

24 February 2014  
(updated 23 February 2016)

**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:

- *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 low- ering the grade	Characteristics of a good the- sis	Characteristics improving the grade

24 February 2014  
(updated 23 February 2016)

Definition of research scope and goals	<p>Narrow or poorly defined research scope</p> <p>Poorly defined goals</p> <p>Vague research questions</p>	<p>Clearly defined goals</p> <p>Carefully planned thesis</p>	<p>Precisely defined and justified re-search scope</p> <p>Demonstration of mature thinking in the definition of goals and research questions</p>
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 re-search 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 re-search 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>

24 February 2014  
(updated 23 February 2016)

Contribution to knowledge and thesis structure	Results not in line with the goals Minor independent input  The thesis has structural inconsistencies.	Results in line with the goals  An original contribution to the existing body of knowledge	Thesis produces new results  Results of interest to academia or industry or otherwise relevant to professionals in the field  Student demonstrates solid skills in working independently
Presentation and language:	The language needs revision  The thesis structure is unclear and the language does not facilitate the understanding of the content (style, vocabulary, sentence structures, spelling).  The overall appearance needs improvement	The language is appropriate.  The text is easily understood and the structure is sufficiently clear.  The overall appearance is appropriate.	Written in fluent, formal style.  The language facilitates the understanding of the contents, and argumentation is consistent throughout the thesis.  Figures and tables are illustrative.  Impeccable and coherent overall appearance
Other	The time used to complete the thesis is disproportionate to the difficulty of the topic.	The thesis has mostly progressed according to the original thesis proposal.	