

## GUIDELINE FOR MASTER'S THESIS EVALUATION

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

Provisions on the master's thesis are laid down in the Section 22 of the General Degree Regulations of the Aalto University School of Electrical Engineering. This guideline is intended for master's thesis writers, advisors, supervisors and the approving authorities. Section 2 describes the general characteristics and objectives of a master's thesis.

The evaluation of the master's thesis and the grading decision shall be based on the criteria listed in section 3. The chart presented in this guideline is designed to facilitate the supervisor's grading process.

**The master's thesis is an independent research project completed by the student.** The supervisor shall evaluate all parts of 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 shall be 30 credits, equivalent of six months of fulltime studies. The period of time spent working on the master's thesis may in reality be longer if the student is at the same time carrying out other studies or duties.

According to the General Degree Regulations, students shall have a maximum of one year to complete their thesis. In order to be eligible for the grade 5, the actual time (counted from the start of the thesis to finalizing it with the exception of e.g. delays consequential to the nature of the study, waiting for the equipment or similar) spent working on the thesis cannot exceed six months. If the student greatly exceeds the time agreed on with the supervisor the grade may be affected.

However, delays beyond the control of the student, such as falling ill, and extended studies towards the degree at the same time, will be considered extenuating circumstances.

The thesis supervisor submits a written statement on the thesis with a proposal for a grade, i.e. an evaluation statement to the Degree Programme Committee. When preparing the report, the supervisor may also request statements from the advisor(s). In cases where the supervisor has proposed the grade '5' or '1' or 'fail', the Degree Programme Committee shall either be provided with a supporting statement from a professor from an Aalto University School of technology or a university lecturer who is familiar with the field on question; or the initial statement shall be signed by another professor or university lecturer.

Collegial assessment, e.g. within the department, is also highly recommended.

Having familiarized itself with the examiner's report 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 at least a satisfactory extent*. The grade assigned depends on the extent to which the criteria have been met.

The following factors can be evaluated according to the scale: satisfactory/very satisfactory /good/very good /excellent, i.e. 1-5.

### **Definition of research scope and goals**

The research scope has been defined.

The goals of the thesis are evident.

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 and 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 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 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 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.

Many factors should be taken into account when evaluating a master's thesis. The chart below is designed to facilitate the grading process. The middle column describes some typical characteristics of a *good, i.e. grade-3 thesis*.

The left side column lists characteristics that lower the grade while the right side column lists characteristics that improve the grade.

	-	<b>GRADE 3 (good)</b>	+
<b>Aspects to consider in the evaluation</b>	<b>Characteristics lowering the grade</b>	<b>Characteristics if a good thesis</b>	<b>Characteristics improving the grade</b>
<b>Definition of research scope and goals</b>	<ul style="list-style-type: none"> <li>- Narrow or poorly defined research scope</li> <li>- Poorly defined goals</li> <li>- Vague research questions</li> </ul>	<ul style="list-style-type: none"> <li>- Clearly defined goals</li> <li>- Carefully planned thesis</li> </ul>	<ul style="list-style-type: none"> <li>- Precisely defined and justified research scope</li> <li>- Demonstration of mature thinking in the definition of goals and research questions</li> </ul>
<b>Command of the topic</b>	<ul style="list-style-type: none"> <li>- Poor command of the research topic and its theoretical framework</li> <li>- Few or irrelevant references</li> </ul>	<ul style="list-style-type: none"> <li>- Good command of the research topic and its theoretical framework</li> <li>- Student has found the relevant reference materials on the topic</li> </ul>	<ul style="list-style-type: none"> <li>- Broad-based knowledge of the background material and the research topic</li> <li>- References throw light on the topic from a variety of perspectives</li> </ul>
<b>Methods and conclusions</b>	<ul style="list-style-type: none"> <li>- Weak and vague reasons given for the methodological choices</li> <li>- Shortcomings in the application of methods</li> <li>- Few or poorly justified conclusions</li> <li>- Poor referencing</li> <li>- Source evaluation notably lacking</li> </ul>	<ul style="list-style-type: none"> <li>- Research questions answered using justified methods</li> <li>- Conclusions drawn appropriately from the material</li> <li>- Cited works evaluated critically</li> </ul>	<ul style="list-style-type: none"> <li>- Methodological choices thoroughly justified</li> <li>- Excellent command of methods</li> <li>- Results evaluated critically and examined from a variety of perspectives</li> <li>- Theories applied very skillfully</li> <li>- Use of appropriate references of high scientific quality while paying attention to source evaluation</li> </ul>
<b>Contribution to knowledge and thesis structure</b>	<ul style="list-style-type: none"> <li>- Results not in line with the goals</li> <li>- Minor independent input</li> <li>- Structural inconsistencies</li> </ul>	<ul style="list-style-type: none"> <li>- Results in line with the goals</li> <li>- An original contribution to knowledge</li> </ul>	<ul style="list-style-type: none"> <li>- Thesis produces new results</li> <li>- Results of interest to academia or industry or otherwise relevant to professionals in the field</li> <li>- Student demonstrates solid skills in working independently</li> </ul>
<b>Presentation and Language</b>	<ul style="list-style-type: none"> <li>- Language needs revision</li> <li>- The thesis structure is unclear and the language does not facilitate the understanding of the content (style, vocabulary, sentence structures, spelling)</li> <li>- Overall appearance needs improvement</li> </ul>	<ul style="list-style-type: none"> <li>- The language is appropriate</li> <li>- The text is easily understood and the structure is sufficiently clear</li> <li>- Overall appearance is appropriate</li> </ul>	<ul style="list-style-type: none"> <li>- Written in fluent, formal style</li> <li>- The language facilitates the understanding of the content, arguments are consistent throughout the thesis</li> <li>- Figures and tables are illustrative</li> <li>- Impeccable and coherent overall appearance</li> </ul>
<b>Time used</b>	<ul style="list-style-type: none"> <li>- Time used to complete the thesis disproportionate to the difficulty of the topic</li> </ul>	<ul style="list-style-type: none"> <li>- Thesis mostly progressed according to the thesis proposal</li> </ul>	<ul style="list-style-type: none"> <li>- Thesis has been completed very fast</li> </ul>
<b>Other</b>			<ul style="list-style-type: none"> <li>- Thesis includes a discovery or an invention for which a patent application has been filed</li> <li>- A scientific publication will be / has been made of the thesis</li> </ul>

**Grade 5** (Excellent): 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 cited works 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 referred forums). The results have been evaluated in the light of the cited works and 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 questions.
- **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 worked very independently on the thesis.
- **The thesis has been completed within the target time, i.e. six months, or at least within an otherwise agreed upon timetable.**
- **Contributions of the advisor and supervisor have been minor.**
- **Presentation and language:** The appearance, presentation and language of the thesis are impeccable.

**Grade 4** (Very good): *A meritorious thesis* which meets all the basic requirements of a good thesis. In addition, *the thesis has extraordinary merits identified in the thesis evaluation 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 referred 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, and they answer the research questions.

- **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. Language of the thesis is impeccable.

**Grade 3** (Good): *A well-structured and independently written master’s thesis. The thesis has all the necessary elements and good unity, but no particular merits. The examiner’s report 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. 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 knowledge is identifiable, and the topic is of some interest to academia or industry. The thesis has mostly progressed in accordance with the 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.

**Grade 2** (Very satisfactory): *An acceptable thesis with significant shortcomings identified in the thesis evaluation statement* in areas 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 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 bibliography 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 may have 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 thesis has little significance for the field of research or industry in question, and no contribution to knowledge can be clearly identified in the thesis.
- **Presentation and language:** The thesis is not a coherent, well-organised whole, its parts are out of balance or it ‘meanders’. It contains inconsistencies, unexplained conclusions or even factual errors.

**Grade 1** (Satisfactory): *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 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 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 language of the thesis; it is difficult to read and the line of reasoning is difficult to follow.

**The thesis shall not be approved it has a great deal of serious shortcomings and thus fails to meet the minimum requirements for an approved master's thesis.**