

# Provisional Grading Criteria Guidance for M.Sc. Dissertations

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June 23, 2005

## 1 Grading Criteria

The following areas shall be considered in evaluation and grading of theses. Some of these criteria are applicable only to certain formats of theses and must be selected appropriately.

### 1.1 External Criteria

Students should demonstrate creativity and resourcefulness in developing interesting ideas and approaches to the research problems posed in the dissertation. The dissertation should contain a quantifiable contribution to science, whether through new results or the confirmation of existing knowledge.

Students should also have demonstrated dedication to and interest in the research area and have developed an understanding of the field.

During advisory meetings, students should have participated actively in discussions and demonstrated the ability to reflect critically on their research.

Students should have demonstrated a significant extent of independence in planning and execution of routine elements of their research without requiring excessive supervision or guidance.

The level of difficulty may vary significantly from one thesis to another, while the challenges inherent in such research may not always be immediately visible. The grading for theses must take these levels of difficulty into account, typically by weighting the absolute quality of the research more strongly (e.g. through use of a multiplicative factor).

It should be noted that most of the external criteria cannot be assessed properly from the text of the dissertation itself but are based on assessments made by the student's advisor during the course of document preparation. This information should be used to inform decisions by all examiners.

## **1.2 Structure of the Dissertation**

The dissertation should have a commonly accepted structure appropriate for the type of research documented by the dissertation. This generally includes an introduction into the general area of research leading up to the definition of the area of research and a conclusion and summary chapter; with intermediate chapters clearly and logically progressing in the delineation of the research questions and methods as well as the documentation of results and their evaluation.

## **1.3 Exposition of the Dissertation**

Adequate communication of research results requires that the form, syntax, grammar, orthographic correctness, and style of the dissertation meet the standards of professional scientific communication. Lapses or omissions in the exposition can distort the results and may also make adequate evaluations of these results unmanageable.

In addition to the external structure described in section 1.2, the internal structure of the exposition must also be coherent and support the reader in following the line of argumentation.

Figures, tables, and viewgraphs must clearly contribute to the exposition and be legible and appropriate in their choice of visualization. Each technical term used in a dissertation must be defined either by a reference to a previously published definition (for standard terms with their usual meaning) or by a precise, unambiguous definition or reference to a definition in the literature that appears before the term is used (for a new term or a standard term used in an unusual way), while each term should be used in one and only one way throughout the dissertation.

The dissertation must consistently follow the norms of the field or guidance provided by the advisor for both citations and quotations, providing citations appropriate to the subject in locations where they are immediately relevant. All quotations must be clearly marked and cited as such.

The use of colloquialisms and humor is to be avoided.

## **1.4 Definition of Area of Research**

The area of research and the research questions addressed in the dissertation must be enunciated clearly. The research problems identified should provide a compelling rationale for the research questions.

Within the definition of the area of research, the research problem addressed should follow clearly and naturally from the description of the general area and provide sufficient motivation for the research subsequently described.

The dissertation should closely adhere to the central topics and research questions thus outlined and deviate only where immediately appropriate; background material and material unrelated to the research questions immediately at hand should either be omitted after consultation with the advisor or be confined to one or more appendices.

### **1.5 State of the Art**

As part of any scientific endeavor it is necessary to review the state of the art in a literature survey, both to identify research immediately related to the research questions posed for the dissertation and for elucidating techniques and approaches likely to be of use in addressing the research questions.

The quality and scope of the literature survey therefore contributes immediately and effectively to the overall quality achievable for a given dissertation and must be given appropriate attention. It should be reviewed for both comprehensiveness of the literature surveyed and the appropriateness to the given subject area. Appropriateness criteria include immediate relevance of the subject area at hand, the use of recent literature and primary references where available.

### **1.6 Sources and Methods**

The dissertation must contain an exposition of the methods used in addressing the research question. In case of experimental theses, this must include the design of the research protocol, procedures, materials used, as well as data on sources and methods of data collection used.

In more theoretical theses, this section must enunciate the underlying results, concepts, and theorems underlying the dissertation used in obtaining the results. In this case, the description sources and methods should be capable of outlining an answer to the research question posed in the introduction at a conceptual level.

Where non-standard techniques are used, their use should be justified and references be given to appropriate literature; in cases where the methods and techniques are outside the scope of the subject area proper it may be advisable to provide additional background information.

In either case this section must enable a suitably competent individual to replicate or validate the findings reported in the dissertation with reasonable effort and confidence.

### **1.7 Analytical Methods and Results**

The dissertation must clearly describe the experiments, analysis, study, or derivation of theoretical results in such a fashion as to enable a suitably competent individual to replicate or validate the findings.

The results of experiments must clearly provide evidence in support of the thesis. As is typical for experimental computer science-related research, this may emphasize a proof-of-concept (i.e. demonstrating the viability of a method/technique), or may provide a well-documented gain in efficiency over existing methods described in the chapter or chapters on the state of the art.

Results must be derived unambiguously and identified as such; where measurements are reported, a chain of evidence leading to conclusions must be clearly identified.

For theoretically oriented dissertations, all non-trivial derivations and theorems must be proven. The quality and level of detail of proof must permit the validation of proofs without undue effort.

## **1.8 Validity of Conclusions**

All conclusions must be clearly supported by evidence and their derivation be clearly visible and compelling from the argumentation provided within the dissertation. This also applies to corollaries and discussions on the applicability of the results.

As part of the conclusions provided, the dissertation should contain an outlook on open and compelling research questions identified during the course of the research.

## **1.9 Quality of Presentation**

In addition to the written dissertation, the results of the dissertation must be communicated to faculty and peers. The quality of this presentation has a significant impact on the effectiveness of the research itself.

As in the case of the written dissertation, the exposition of the material must be lucid and compelling, providing a coherent line of argumentation throughout the presentation.

Given time constraints, the selection of the content of the presentation is particularly critical. The presentation must contain the problem description and definition, an outline of the methods used in addressing the research problem, provide the results as well as a discussion of the results, providing a well-rounded overview of the research conducted. The presentation must be structured in such a way to make maximum use of the time available, avoiding both under- and overruns in the time used as well as excessively rapid presentation styles that do not permit the audience to follow the line of argumentation.

The use of media (e.g. blackboard, overhead projector, beamer) must support the presentation and not provide undue distractions. Similarly, the style of the presentation itself should permit the audience to concentrate on

the content instead of straining to hear or follow a presentation at excessive speed.

## 2 Weighting of Grading Criteria

The table 1 provides an approximate guidance on the relative weighting suggested for the individual criteria outlined above obtaining the comprehensive grade for a given dissertation:

Structure of the Dissertation	5%
Exposition of the Dissertation	10%
Definition of Area of Research	10%
State of the Art	20%
Sources and Methods	20%
Analytical Methods and Results	25%
Validity of Conclusions	10%

Table 1: Weighting of Grading Criteria

As noted in section 1.1, a particularly challenging research subject may merit the adjustment of absolute scores for the component areas “State of the Art”, “Sources and Methods”, and “Analytical Methods and Results”, while a more pedestrian subject may equally merit downward adjustment to reflect a lower level of difficulty. These weightings should, however, be used only judiciously.