

Guidelines for Doctoral Dissertations in the Information Society Technologies PhD Program

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1 Purpose of the Document

These guidelines build on the general university [guidelines on Doctoral Dissertations at TLU](#), and the guidelines published by the Doctoral Studies Council of Natural Sciences. They should give both students and supervisors guidance on what is usually considered a suitable doctoral dissertation in the **Information Society Technologies (IST) PhD Program** at Tallinn University.

Doctoral Dissertations in the IST program that clearly have a contribution to the Information and Communication Technology (ICT) field are usually submitted to the Doctoral School of Natural Science at Tallinn University. Because the disciplinary traditions in research and publications are different in the Natural Sciences and the ICT field, these guidelines try to specify the expectations towards ICT dissertations.

The following guidelines are meant to describe requirements for an **article-based PhD thesis** which typically consists of a number of published articles and an analytical overview that summarizes the contribution of the articles and establishes a coherent research contribution. The document will also establish some **guidance on how many credits are usually considered suitable for different categories of publications** that can be found in the ICT field.

2 Background

2.1 Publication Tradition in the ICT Field

Disciplinary traditions of where research is published vary dramatically between scientific fields. In the ICT field, it is very common that research results (and even substantial research contributions) are published in proceedings of high level conferences. There are in fact conferences in the field (e.g. CHI, WWW, ...) where **substantial research contributions are published in high quality** and a publication is considered superior to a publication in most scientific journals.

At the same time, there are conferences that have a very low quality with insufficient peer review and quality checks. There are also publication formats at conferences (also high quality ones) which are mainly meant for publishing **intermediate results, work-in-progress, small contributions or contributions that are not considered sufficiently mature or validated** (e.g. short papers, posters, late-breaking results, work-in-progress tracks, demos, workshops).

When taking the Estonian Research Information System (ETIS) classification of publications, unfortunately, all these mentioned publications could be classified under the category 3.1. It is therefore impossible to judge both the quality and the amount of contribution by simply considering the classification of the publication. The ETIS classification system is therefore **not a suitable system to give guidance on the quality and the publication channels** that should be pursued in the ICT field. It should therefore not be used to give students recommendations of suitable publication outlets.

2.2 University regulations on publications

TLU regulations on the minimum number of publications to be included in a dissertations specify a minimum of three high quality publications (of ETIS category 1.1, 1.2 or 3.1). It should be noted that this regulation establishes merely the *minimum requirement*, and experience shows that in the ICT field usually three publications are not sufficient to qualify as a substantial contribution for a PhD thesis.

Furthermore, because of the varying quality and format of 3.1 publications (see previous section), simply counting the number of publications in a particular category is not sufficient to judge the quality and contribution of papers. This can only be made by assessing the content, the particular publication format, and the quality of the outlet. This is why *critical peer reviews of submitted theses* are of utmost importance to ensure the quality of the work.

3 Requirements for Article-based PhD Theses

3.1 Suitable number and quality of publications included in the dissertation

As a rule of thumb, a PhD should contain an independent scientific contribution of **the size equivalent** to at least **three substantial and high quality peer reviewed publications**. Substantial means that the contribution would be equal to what would usually be published in one journal article (category 1.1 or 1.2), or in a full paper in a top level conference. Top level conference means that the conference would be recognized in the field to publish the highest quality mature research which is usually shown by a small acceptance rate.

The thesis can also contain a larger amount of shorter papers presenting smaller contributions. If this is the case, then these should still be peer reviewed, present a validated contribution and conform at least to category 3.1. Taking all publications together, the thesis should contain contributions **equivalent to three substantial publications**. In all cases, the analytical overview

needs to establish the coherence of the scientific contribution and relate it to the included articles (see section 3.3).

3.2 Including unpublished work in the dissertation

High quality publication outlets (especially journals) sometimes require a considerable time for reviewing and decision making. In the recent past, these outlets are being flooded with submissions. The situation has exacerbated to an extent where review cycles grow longer, and even high quality work needs to be reworked or resubmitted several times. Requiring all research in a PhD thesis to be finally published would put a severe risk on PhD students and delay study times to unacceptable levels. Preventing students from submitting their work after the research has been conducted and written up in a high quality form to await final acceptance would not be decent practice. Moreover, requiring only published work would encourage students and supervisors to submit the work to lower quality outlets with quicker (and less rigorous) review cycles.

Therefore, the following procedure is suggested: Work that has been submitted to a journal or conference but not yet accepted can be included as one of the articles in the thesis. The student needs to specify in the analytical overview to which outlet the article was submitted and that it has not yet been accepted. The total amount of the contribution documented in that article should not be more than 1/3 of the whole contribution of the thesis. Depending on the reviews of the thesis in the pre-defense, the pre-defense commission can decide to only allow submission to final defense once the article has been accepted. Note that in addition to this, the current university regulation require that in total three articles are accepted for publication.

3.3 Analytical overview

In an article-based dissertation, all contributions should be documented in the included articles. Therefore, the analytical overview should be short and concise, and it is recommended that it is no longer than 30 pages. The analytical overview needs to clearly present the scientific contributions of the thesis and establish coherence among the included articles. Especially in case the thesis contains more articles that build on each other, or where the contribution is distributed among several of them, the analytical overview needs to describe the relation between the articles and establish the coherence between the claimed contributions and the articles. In case of multiple authorship of the included publications, the analytical overview also needs to describe the individual contribution of the student to the work described.

Please note that the Doctoral Studies Council of Natural Sciences has published more specific **GUIDELINES FOR THE ANALYTICAL OVERVIEW OF PhD THESIS** which also contain regulations on the formatting and structure of the Analytical Overview.

4 Reporting credits for scientific articles in the Annual Progress Review

During the annual review, students and supervisors have to estimate the amount of credits per article. Generally, the credits are calculated according to the [Progress Review Criteria in Natural Sciences](#). Here, we give some guidance on how many credits are usually deemed suitable for the category (3) *Article in ETIS (Estonian Research Information System) categories 1.1, 1.2 or 3.1 accepted for publication*.

4.1 Number of credits per article

Under this category, the student can claim up to 120 credits during their studies. If we take above requirement that the PhD thesis should contain **substantial research contribution equivalent to at**

least 3 major publications, then the below table gives guidance on how to count articles that contain smaller contributions.

The following amounts of credits can be awarded per article on a cumulative basis. The student needs to keep track from report to report, how many credits have already been claimed for one article through a previous report.

The numbers are indicative and can be adjusted in special circumstances. All credits assume **single authorship, or articles co-written with the supervisors**. With multiple authorship, the ECTS should be divided by approximate amount of contribution per author.

The table also assumes that the article is fully included in the PhD thesis. The number of credits should be reduced if the article relates only partially to the PhD.

- 40 ECTS: 1.1 long article by single author or supervisor co-authored
- 30-35 ECTS: 1.2 long article by single author or supervisor co-authored
- 25 ECTS: 3.1. full conference paper in a high level conference, single or supervisor co-authored
- 20 ECTS: 3.1. full conference paper in a mid-range conference, single or supervisor co-authored
- 15 ECTS: 3.1. short paper in a conference, single or supervisor co-authored
- 10 ECTS: 3.1. doctoral consortium or poster paper contribution at a conference, single or supervisor co-authored

4.2 Splitting credits over time

There is no need to wait until the article has been finally published, but the credits can be split between the years of reporting in the following way (the following uses 1.1 articles as an example):

- The text of the article reviewed by the supervisor: up to 20 ECTS credits;
- the article in 'submitted' status: up to 35 ECTS credits - ECTS credits awarded earlier;
- 'finally accepted' status + 5 ECTS credits.
- In total, depending on the article's publishing status, 40 ECTS credits may be awarded cumulatively.

The same procedure applies to the other categories equivalently.

It is suggested that students keep track of how many credits they have assigned for which of the articles over the years so that the cumulative amount can be traced over the different review periods.