

Guidelines for Formatting a Doctoral thesis at the Institute of Ecology and Earth Sciences

The completion of a doctoral thesis is an achievement that demonstrates the doctoral candidate's inclusion to the research community. The thesis is not a life's work, rather it is an opportunity for the doctoral candidate to show that they have acquired all research principles and can continue as an independent researcher or as an expert beyond the academic world. Although the Regulation for Doctoral Studies¹ already specifies the general structure of a doctoral thesis, and the University of Tartu has adopted Good Practice of Doctoral Studies², we have compiled here several frequently recurring issues related to the formatting of doctoral theses. These issues are consistently raised in the Council of the UT Institute of Ecology and Earth Sciences – the institution responsible for deciding on the admission of doctoral thesis for defence.

Introductory Chapter³

When writing the Introductory Chapter for a doctoral thesis, the doctoral candidate must ensure that their novel contribution to the development of the research field is clearly understood. The Introductory Chapter provides an overview of the thesis, generally following the format of a research article. In each section, the doctoral thesis should be treated as a unified research work (as much as possible), not describing sections corresponding to individual articles separately (e.g. methods of all articles should be summarised together). It is preferable to emphasise common findings in the articles, especially highlighting the synergistic results that can only be evident when considering all the articles together.

The introduction of the Introductory Chapter should be longer and more comprehensive than is customary for case study articles. Optionally, the Introductory Chapter may include a section on the research history, connecting the results of the work to previous studies. The Introductory Chapter of a doctoral thesis provides an opportunity to explore these connections in a more nuanced and detailed way compared to research articles. The doctoral thesis represents the next step in the development of the research field, and to ensure academic continuity, it is essential to be aware of the previous development of the discipline both globally and in Estonia.

Regarding methods, there is no need to include too many details. Preferably, tables or figures that synthesise the methodological approach of different articles should be presented. Similarly, there is no need to repeat the technical and numerical results presented in the articles, but to use a more generalised verbal presentation. A good discussion of a doctoral thesis should be more than the sum of individual discussions of different articles; it should reach further and higher.

Author's Contribution

Nowadays, the individual contribution to an article is becoming increasingly blurred in the scientific world, especially in the natural sciences. Assessing the author's contribution becomes more challenging with many co-authors. However, in a doctoral thesis, it is crucial to clearly define the doctoral candidate's contribution to the research. To achieve this, we

¹ <https://sisu.ut.ee/ope/regulations-doctoral-studies?lang=en>

² https://ut.ee/sites/default/files/inline-files/good_practice_of_doctoral_studies.pdf

³ also called *framing text* in some documents

recommend a tabular overview of doctoral candidate's contributions to each research article (Table 1). In some cases, there may be additional subsections beyond those shown in the sample table (e.g., *Data Management*, *Chemical Analysis*), but the central aspects of the research must be mentioned (as in the sample table or in a different wording). Presenting this information in a table is not obligatory, but an alternative format should include all essential content.

In the case of co-authorship, especially when publishing articles together with fellow doctoral candidates, it is important to keep in mind that co-authors may also want to use the same articles in their doctoral theses. Therefore, the doctoral candidate must communicate with co-authors about contributions early on, and inform fellow doctoral candidates about the intention to use co-authored articles in their thesis. The application to allow the doctoral thesis to be defended must include a signed confirmation that co-authors from University of Tartu have been informed about the use of the article in the doctoral thesis. It is advisable not to include more than one research article in a doctoral thesis that is also submitted in another thesis.

Table 1. Sample table to present doctoral candidate's contribution to research articles I, II and III (' *minor contribution*; * *moderate contribution*; ** *large contribution*; *** *leading role*).

	I	II	III
Original idea			
Study design			
Data collection			
Analysis and interpretation			
Manuscript writing			

Unpublished Manuscript

If the doctoral thesis includes a manuscript that has not yet been published nor accepted for publication, it should be marked in the thesis as "(submitted) manuscript". It is not allowed to indicate, for example, "submitted to the journal name," as there is no guarantee that the article will be published in the mentioned journal. It is important to note that the manuscript must be ready for publication and properly formatted for it to be included in the doctoral thesis.

Research Articles in the Doctoral Thesis and Copyright

A doctoral thesis typically consists of the Introductory Chapter and research articles. In the electronic version of the thesis, articles are usually not included, but they are included in the printed version. Regarding the copyright of published articles in different scientific journals, follow the Regulation for Doctoral Studies (see section III.6, point 135)⁴.

Generally, figures from published articles can be used in the Introductory Chapter of the doctoral thesis, especially if the figure is created by the doctoral candidate. However, it is preferable to include new summarising figures that link various results of the doctoral thesis. It is not advisable to include unpublished figures in the thesis if these are planned for future

⁴ <https://sisu.ut.ee/ope/publication-doctoral-thesis?lang=en>

publication. Consider illustrating the thesis with simple and clear photos of the study area or study object, a map, or a schematic diagram that ties together various themes of the thesis.

Use of AI

For the use of text robots, follow the general guidelines of the University of Tartu⁵.

Doctoral Thesis Summaries

A doctoral thesis is accompanied by three different types of short summaries, two of which are mandatory.

1. A short summary for a broad audience (in Estonian and English), which is added to the thesis record in databases and included on the University of Tartu website. This text is used to introduce and advertise the thesis defence (on university websites, in newsletters). It should simply and briefly outline the main objectives, results, and conclusions of the work, avoiding specialised terminology. The length of both Estonian and English texts should be up to 2000 characters.
2. The required Estonian summary for the doctoral thesis is, as a good practice, approximately three pages long. It must be in Estonian scientific language, developing Estonian scientific terminology. Illustrations are permitted.
3. When preparing the Introductory Chapter of the doctoral thesis, consider also the possibility of turning it into a popular science article later. It does not necessarily have to be in Estonian and can be directed to readers outside of Estonia. This text should provide a broader background and explain in simpler terms what the work was about and what was found. Feel free to seek assistance from science journalists who can help with the formatting of the popular science article.

It is helpful to have these summaries read by colleagues or friends. This improves their quality, and the message of the doctoral thesis will be more clear for a general public.

Formatting

The general formatting rules of an academic text also apply to the doctoral thesis. Consider carefully where to use the first-person singular "I" and where to use the plural "we". The Introductory Chapter is a responsibility of the doctoral candidate, but experiments are usually not conducted alone. Therefore, both forms can be used in the thesis, but attention should be paid to where each form is appropriate. For example, hypotheses and conclusions of the research must be the author's contribution.

It is not advisable to include single-sentence subsections or paragraphs, or paragraphs that deviate from the structure of the work. The latter may be appropriate in exceptional cases, when it is necessary to introduce a larger section before moving to the subsection level. Excessive use of subsections (often in Methods section, where each method description is a separate subsection) should be avoided.

Although the formatting of the reference list is taught at all levels of higher education, experience shows that there are still problems with it in the doctoral thesis. Ensure that each research article is cited and referenced in a consistent style.

⁵ <https://ut.ee/et/sisu/university-tartu-guidelines-using-ai-chatbots-teaching-and-studies>

If the doctoral thesis contains many abbreviations, these should be listed before the Introductory Chapter (on a separate page).

If progressing with the doctoral thesis is difficult, feel free to turn to the supervisor(s) or the attestation committee for assistance.

Compiled by: Taavi Pae, Riin Tamme, Tuul Sepp, Toomas Tammaru; October/November 2023; English translation was made with the help of *OpenAI. (2024). ChatGPT (Jan 17 version)*, large language model, <https://chat.openai.com/>.