



GUIDELINES FOR THE ELABORATION OF THE PHD THESIS - TUCN

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1. INTRODUCTION

The Technical University of Cluj-Napoca is an advanced research and education university, which has among its major objectives the increase of quality standards in the training for PhD-based research.

Doctoral research is seen as an important component of our university's activities and image. The PhD candidates' contribution is made especially through the innovative content of their research and through its input to the enrichment of knowledge, as well as through the way in which the products of the research (scientific publications, communications delivered during scientific events, etc.) are structured and presented. Among these means of dissemination, the doctoral research activity is concluded with a PhD thesis. According to the vision of the Council for Doctoral Education of the European University Association (EUA), the PhD thesis represents the publishable result of an original research, which represents a significant contribution to knowledge.

According to the development strategy of the Technical University of Cluj-Napoca and of the UTCN Doctoral School, we want to offer our students a simple guide for the elaboration of the PhD thesis. This guide supports the elaboration of a final, qualitatively written document that should represent the author of the PhD thesis and which should also be representative for the university in which the author has been trained as a PhD holder and researcher.

2. FUNDAMENTAL RULES IN WRITING A PHD THESIS

Writing a PhD thesis imposes a scientific approach, the existence of a coherent relationship between its form (through its means of elaboration) and its (scientific) content. The scientific writing style of the PhD thesis must be clear, precise, concise.

General Principles

Recommendations:

- have a simple and clear style to facilitate the reading and understanding of an as large as possible audience;
- avoid ellipsis and, as much as possible, abbreviations;
- check the coherence/overlapping of comments in the text regarding the data from the tables/figures;
- avoid unscientific formulations in favour of the conventional, scientific (technical, where possible) style;
- present each stage of the reasoning, even if the stages seem obvious, so that the reader is not obligated to use their imagination or to deduce things;
- avoid repetitions (for example: avoid using phrases from the Introduction in other sections; the Final Conclusions must not be


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- organised merely by summing up all the partial conclusions presented throughout the thesis, but they should be reformulated and synthesised);
- use abbreviations and acronyms that replace a word or a group of words respectively; abbreviations and acronyms have to be announced and may be used only if that term is repeated more than 3-4 times; consequently, it is necessary to introduce a separate section, called Abbreviations and Acronyms, at the beginning of the thesis, where the terms should be indexed, this way facilitating the reading of the thesis;
 - explain the abbreviations, acronyms and symbols used only once, when they first appear in the text; afterwards, the Abbreviations and Acronyms list should be used;
 - bibliographic references should be supplied any time it is necessary.

Grammar Principles
Recommendations:

- be accurate and use a correct syntax;
- adequately use verbal tenses; use past simple for everything that expresses the author's personal experience; use present simple for well-grounded notions;
- use the same word to refer to the same notion; do not use synonyms that could lead to confusions – in the case of specialised terminology;
- avoid useless adjectives and adverbs, especially those the purpose of which is to outline the "quality" of the technical data presented;
- before defence and publishing, it is recommended to thoroughly check the correctness of the grammar agreements, of orthography and punctuation imposed by the norms specific to the language in which the text is elaborated.

3. THE GENERAL STRUCTURE OF THE PHD THESIS

The thesis can be organised in two main distinct stages:

- The general part (the current stage of knowledge)
- The author's own contributions (the author's personal contribution)

The ratio between the sections is of at least 1/5-1/4 : 3/4-4/5;

It is recommended for PhD theses to comply with the following prerequisites (which shall apply to the extent to which they match your research):

- to fall within the national and/or international scientific research preoccupations;
- to be topical and appropriate;
- to have theoretical and practical relevance;
- to have a major original and novel section;


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- to have an experimental section to validate the theoretical results obtained (if applicable);
- to exhibit good documentation, i.e. knowledge of the specialised literature in the field of the thesis from the last 5-10 years;
- to exhibit the author's exquisite preparation in the field of the thesis;
- to use modern investigation instruments;
- to certify the PhD candidate's research skills;
- to include original elements in the development or solving of the research topic, as well as the means for their scientific validation;
- to be able to apply the results obtained in solving problems from industry, health, economy, etc.;
- to disseminate the findings in valuable publications.

The PhD thesis could have the following structure:

- a cover (it is made at the UTPRESS publishing house);
- a title page;
- acknowledgements (optional);
- content;
- a list of abbreviations, acronyms and symbols;
- an introduction;
- the content;
- conclusions and personal contributions;
- bibliography;
- a list of tables and a list of figures;
- appendices (optional)
- a list of publications – articles published by the author of the PhD thesis, which are relevant to the scientific research in the thesis (optional).

At TUCN there will be used the templates for the cover and the title page that are mentioned in the newly approved format.

The cover:

The information included in the new cover template shall be used and it shall be elaborated as it appears in the template:

- the field;
- the PhD candidate's name;
- the title of the PhD thesis;
- the name of the scientific coordinator;
- if there are two scientific coordinators, the first one mentioned is the main scientific coordinator; if the thesis has double coordination (double degree), a slash (/) shall be used to separate the two scientific coordinators.


The title page:

Usually, the title page reproduces the information from the cover. The members of the evaluation committee are added to the list.

3.0. TABLE OF CONTENTS, ABBREVIATIONS, TABLES, FIGURES

The table of contents offers an overview of the document and facilitates the identification of chapters and subchapters. That is why the table of contents is organised on three columns:

- the number of the chapter or of the subchapter;
- its name;
- the page where it can be found.

The table of contents has to include the entire thesis, i.e. the introduction, the content, the conclusions, the bibliographic references, the appendices, etc. The recommended numbering plan is the decimal one because the figure tier naturally indicates the degree of detail.

Example:

- 1. Chapter 1
 - 1.1. Subchapter 1
 - 1.1.1. Paragraph 1
 - 1.1.2. Paragraph 2 ...
 - ...
 - 1.1.n. Paragraph n ...
 - ...
 - 1.n. Subchapter n
 - ...
- m. Chapter m

The List of Abbreviations includes the symbols, abbreviations, acronyms and notes frequently used in the thesis. Symbols, abbreviations and acronyms have to be written alphabetically. A two-column layout is recommended, where the first column contains the symbol/abbreviation/acronym and the second one contains the explanation, the name of the symbol, even the unit of measure if necessary. The symbols used in the specialised literature shall be complied with as much as possible in the standards, too.

It is mandatory to mention the List of tables and the List of figures in the Table of Contents and to detail them in a separate list, while mentioning the source when they do not belong to the author.

3.1. THE INTRODUCTION OF THE PHD THESIS

The introduction has to include:

- the reason why the topic was approached;


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- the importance and the topicality of the theme;
- the category of national and international preoccupations of the research group in which the topic falls;
- the title of the thesis, its premises and the objectives of the research;
- some synthetic comments on the approached research method, on the research methodology;
- a brief presentation of the chapters of the thesis.

At the end of the introduction, the author can express their gratitude to the institutions and persons who have contributed to the completion of the thesis by granting facilities for experiments, through professional discussions, suggestions and observations made during the period of doctoral studies.

3.2. THE CONTENT OF THE PHD THESIS

The doctoral thesis must prove the author's advanced scientific knowledge in the approached fields, must contain elements of novelty and originality in developing the research topic, as well as methods for their scientific validation. The three major parts of the thesis are:

- the general part;
- the specific part;
- the experimental part (optional).

The last two parts shall be included in the thesis in the PERSONAL CONTRIBUTION section.

Recommendations:

- give titles to chapters by valuing the strength of the words (keywords);
- present the findings in a logical order that facilitates the understanding of the topic, and not in the order in which they were obtained; for instance, if the thesis includes a/some theoretical study/studies, as well as a/some experimental study/studies, the PhD candidate shall decide either to present the fundamental elements at the beginning (if they make up the justification for the researched theoretical elements) or to present them after the theoretical elements (if they make up the explanation for the observations to the initially descriptive theoretical study).

The experimental results are presented as numerical value tables, diagrams, histograms, oscillograms, or other types of recordings, photos, links to video recordings, etc. The experimental part may be preceded by numerical simulations or, in special cases, it can be replaced by a numerical modelling. The experimental or simulation findings are compared to the theoretical findings. The drawing up of this part has to emphasize the candidate's experimenter qualities.



3.2.1. THE GENERAL PART

The general part, covering roughly 20-30% of the thesis, has one-two chapters. This is a synthesis of the analysis of the existing solutions, known from the specialised literature. The presentation is made at the principle level, using schemes, mathematical relations, graphs, figures, using pertinent bibliographical references that are both recent and accessible and selected according to their importance so that the importance and topicality of the theme are emphasized, so that they fall into the national and international preoccupations of the research group within which the PhD candidate has carried out their activity.

The PhD candidate should avoid taking entire paragraphs from other sources even if the sources are cited. They should rather synthesize the information, they should grasp the essence of the cited work, as well as its relevance to the discussed subject matter.

3.2.2. THE SPECIFIC PART

The specific part represents the largest part of the thesis, it covers approximately 50-60% of its number of pages and can be structured in 3-5 chapters that include the PhD candidate's contributions. Each chapter has to end with some partial conclusions and with the original contributions deriving from the findings.

This part describes in detail the techniques, methods, analytical and numerical instruments, equipment, devices, stands used during the doctoral research, or any other methods of investigation used, according to the topic, offering pertinent bibliographic references.

3.2.3. THE EXPERIMENTAL PART

(especially for the technical profile)

The experimental part can cover 20-30% of the thesis, in line with the character of the thesis, of the research carried out. This part can have one or two chapters depending on the method chosen for the experimental testing, according to the specific part checked through the experiment. The purpose of the experimental study is to check the accuracy of some of the solutions proposed in the specific part and, therefore, it has to allow for a direct and clear comparison to the solutions presented in the specific part.

3.2.4. FINDINGS

Findings are presented objectively and scientifically.

Recommendations:

- present them in chronological order (immediate results, late results);
- present them all;


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- adjust the concordance in presenting numerical information (text, figures, tables);
- avoid introducing marginal results that have nothing to do with the purpose of the research.

3.2.5. DISCUSSIONS

The PhD candidate interprets the results obtained; this chapter should be constructed using personal comments which reflect the author's scientific culture, intelligence, as well as the degree of elaboration of the thesis.

Recommendations:

- mention if the purpose of the research has been attained by synthetically presenting the main results that are directly related to it;
- outline the actual contribution brought to the research in the field;
- evaluate the quality and validity of the findings by critically and objectively discussing the material and the methods used, by interpreting the findings;
- compare personal results to those of other authors;
- avoid exceeding the objectives set in the Introduction.

Remark:

In the case of humanities, for example, the findings and the discussions based on them are not necessarily delineated in two separate sections. The recommendation is to adapt the structure to the specific content.

3.2.6. CONCLUSIONS OF THE PHD THESIS AND ORIGINAL CONTRIBUTIONS

This part of the thesis includes the original contributions of the research work, the degree to which the initial objectives have been reached, the directions in which the research should be continued, as well as the problems that have remained unsolved.

Recommendations:

- include some paragraphs on the PhD candidate's contributions, on the originality and value of the findings, their possible applicability, the way in which they could be used to continue the research;
- include some paragraphs on the extent to which the proposed problems have been solved, on the extent to which the objectives have been attained, the problems that have been left unsolved, the new problems that have appeared during the research, as well as the newly resulted research directions;
- present ways of capitalising on the results (application, patenting, if applicable);


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- present the method of disseminating the results obtained (scientific communications, journal articles, etc.).

This part is numbered as a distinct chapter and shall be developed on 6-10 pages. It is recommended that this chapter include two distinct parts: a part containing the conclusions and another part dedicated to personal contributions. The elaboration has to be clear, concrete, synthetic, succinct.

3.3. MEANS OF ILLUSTRATION

They can be used to present the Findings, but also in the General Part, or in other chapters of the author's Personal Contributions.

Means of illustration:

- suggestively express what is difficult to draw up;
- succinctly offer maximum of information in minimum space;
- limit the risk of repeating the same information in a chapter/subchapter;
- have informational autonomy – through the title, legend, footnotes – being fully-fledged entities that can be read/interpreted independently from the text;
- it is mandatory to refer to them in the text, the numbering being made according to the reference to them.

Recommendations:

- avoid expressing under the form of tables the limited information that could be clearly and succinctly exposed as a text;
- avoid presenting the same information as text, table and figure;
- to reproduce figures and/or tables from another publication, it is necessary to obtain the author's approval (author's right, copyright) or to cite the source (as a bibliographic reference).

3.3.1. TABLES

- the numbering is made using Arabic numerals;
- the numbering corresponds to the order in which they appear in the text, at least one reference being mandatory;
- the title, formulated as Table 1.1 for example, is situated at the top, being followed by a short text that summarises the content;
- if the number of columns is higher than the double of the number of rows, the columns have to be switched to rows.

INSTITUȚIA ORGANIZATOARE DE STUDII UNIVERSITARE DE DOCTORAT
IOSUD-UTCN**3.3.2. FIGURES, PHOTOS, IMAGES**

- the numbering is made using Arabic numerals;
- the numbering corresponds to the order in which they appear in the text, at least one reference being mandatory;
- they have a legend located subadjacently, which includes all the elements necessary to understand the figure (explanation, symbols, abbreviations, scale, etc.);
- types of figures: schemes, graphic representations, photos;
- the schemes, the images/photos and the graphs are treated as figure-like entities – therefore, a common numbering is used, the same method of reference in the text (fig. 2), as well as the same way of writing the legend;
- the fragmentation of data by presenting them in separate figures should be avoided, being preferable to synthesize them in a “composed” figure;
- the photo presents the product that should be tested or that has resulted as a physical prototype from the scientific research (in the case of theses from the field of engineering);
- for images containing human faces, the covering of their eyes is mandatory (to keep them anonymous);
- it is prohibited to retouch images in any (digital or analogic) way, these being used only for annotating and showing the significant details (in the case of theses from the field of engineering); in the case of theses from the field of architecture, the images (photos included) can be processed according to the topic of the thesis: collages, photographic editing, 3D visualisations, etc. can be made.

3.4. BIBLIOGRAPHIC REFERENCES

- a reference selection is made by documentation, the PhD candidate has to cite only works that they have read and that they have selected for their value, for the ideas and the results contained when compared to the research topic;
- they allow for making reference to: articles, treaties, monographs, patents, official documents, databases, etc.;
- only published, read documents have to be cited, avoiding indirect citation as much as possible;
- the citation of a reference can be repeated several times;
- the placement of references is mandatorily made: both in the body of the thesis, after the statement of that information – within or at the end of a phrase – as well as at the end of the thesis, under the form of a list in a separate section (Bibliography);
- for technical theses, the sequential numbering system is recommended;


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- in the field of humanities, using footnotes on the page and in the bibliography is recommended – Chicago manual of style.

Recommendations:

- avoid errors in transcribing the reference, which can cause difficulties in finding the article;
- avoid errors in citing the content of the reference, with inadvertences between the stated fact and the article cited;
- *avoid making references to* articles that are not easily accessible, summaries of papers presented in congresses, published in periodicals, articles accepted for publishing;
- *it is preferable to avoid referring to* papers presented in congresses, which have not been published, or to data that are not publicly accessible.

3.5. INSTRUCTIONS ON HOW TO WRITE BIBLIOGRAPHIC REFERENCES

The Sequential Numbering System

In the text:

- references are numbered with Arabic numerals, in the order in which they appear, between square brackets;
- if a reference is cited several times, the number first attributed to it is kept;
- between brackets, references are classified in ascending order and are separated by commas or a hyphen: [5-9] or [3, 6-10].

In the reference list:

- the classification is made according to the appropriate order number from the text, without an alphabetical criterion;
- it facilitates reading;
- it can be difficult for the author who, if they manually introduce a new reference, has to renumber all the following references, which might lead to an error; it is recommended that MSWord References/Cross-reference instruments be used.

4. RULES FOR TYPING THE PHD THESIS

4.1. TYPING INSTRUCTIONS

The purpose of the typing instructions is to ensure uniformity in the way in which PhD theses are drawn up, having an impact on their legibility, visibility and archival.



PAGE FORMAT

for a B5 book (final format 17 x 24 cm)

page mirror 13 x 20 cm

- **No. of pages < 200**

Paper format A4

Margins

Top	3 cm
Bottom	6,7 cm
Inside	2 cm
Outside	6 cm

Footer 5,7 cm

Mirror margins

- **No. of pages > 200**

Paper format A4

Margins

Top	3 cm
Bottom	6,7 cm
Inside	2,3 cm
Outside	5,7 cm

Footer 5,7 cm

Mirror margins

- Text typed using **Cambria 12**, line spacing 1 cm.
- Titles for tables, figures and footnotes with **Cambria 10**

Other instructions:

- the title page is not numbered and contains all the information from the template;
- the thesis is numbered from the first page of the table of contents to the last page – corresponding to the written text;
- the table of contents includes:
 - the titles of chapters, subchapters and paragraphs,
 - the list of documents included as **Appendices**, numbered in their own ascending order, which can have titles that suggestively reflect the content;
- the text of the thesis is written using a Cambria font, diacritical marks, size 12, line spacing single, alignment *Justify*;


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- for the titles of sections, chapters, subchapters and paragraphs, fonts descending in size shall be used, starting from the section to the chapter and then to the subchapter, etc., for the purpose of outlining them:
 - titles of sections (Introduction) and chapters (1.): Cambria, size 16 pt., Bold;
 - titles of subchapters (1.1): Cambria, size 14 pt., Bold;
 - titles of paragraphs (1.1.1): Cambria, size 12 pt., Bold.
- the thesis has to be printed on both sides of the paper; as a detail, it is recommended to start each chapter on an odd page;
- figures (schemes, graphs, images/photos) should be placed conveniently on the page, the modern numbering, in an ascending sequence, being recommended for each chapter, the number of the figure being preceded by the number of the chapter (e.g.: Fig. 1.1 – corresponding to figure 1 from Chapter 1); figures are referenced in the text according to their number (e.g.: fig. 3.1, fig. 3.2-3.6); the legends of the figures are written using the same font used for the text of the thesis (Cambria), but with a font that is smaller than the one used for the body of the text (size 10 pt.);
- tables should be placed conveniently on the page, the modern numbering, in an ascending sequence, being recommended for each chapter, the number of the table being preceded by the number of the chapter (e.g.: Table 2.1 – corresponding to table 1 from Chapter 1); tables are referenced in the text according to their number (e.g.: table 2.2, table 2.4-2.6); the title of the table and the text in that table are written using the same font used for the text of the thesis (Cambria), but with a font that is smaller than the one used for the body of the text (size 10 pt.);
- if a quote is longer than three lines, it shall be arranged in a paragraph that is separate from the rest of the thesis, as a block text, with a font that is smaller than the one used for the body of the text (size 11 pt.);
- all the equations inserted in the text shall be numbered consecutively using Arabic numerals under the form (1), (2), (3), ... The ordinal numbers of the equations shall be aligned on the right sight of the page, between parentheses. Equations are placed centrally. All the symbols used shall be explained in the body of the text. Equations are written using Cambria font, size 12 pt. The in-text reference to the equations is made using the abbreviation “Ec.” (in Romanian)/“Eq.” (in English), (e.g. „... Eq. (13) results in ...”).

$$\bar{F} = m\bar{a} \quad (1)$$

- footnotes/endnotes can be used;
- translations in the body of the thesis: if the translations belong to the author, this shall be mentioned between brackets after the translated quote or in its footnote


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as [tr.n.] (in Romanian); if published translations already exist, it is preferable to use those.

The PhD thesis should have at least 150-160 pages and maximum 175-200 pages containing text, without the bibliography, 15-20% of it representing **The General Part (The Stage of Knowledge)**, while the difference represents the author's **Personal Contributions**.

4.2. SUBMISSION, ARCHIVAL

The rules for submitting a PhD thesis are included in the **Procedure on the completion of PhD studies within the Institute for Doctoral Studies (IOSUD) of TUCN**, as well as in the **List of documents for thesis submission**, available on the IOSUD-TUCN website: <http://iosud.utcluj.ro>

4.3. SUMMARY OF THE PHD THESIS

According to current legislation, a thesis summary has to be made in Romanian and in English (in PDF format – **15-20 pages**, excluding the bibliography and the table of contents, the first page containing information about the title, the author, and the PhD coordinator – the new template has to be used).

The summary mandatorily includes the Table of Contents of the PhD thesis, with the appropriate page numbering according to the thesis in order to allow those interested in it to have an overview of the general structure of the thesis. When elaborating the summary, the PhD candidate has to focus on the data existing in his Personal Contributions, complying with the operational structure for the writing of an original article. *The main idea when drafting the summary is to attract attention to the original elements that characterise and justify the doctoral research.* The text shall be conceived in such a way that the reader has access to the following information:

- motivation of the topic and for carrying out the doctoral research;
- the defined objectives;
- the material and the methods used;
- the main findings;
- discussions on the significance and relevance of the findings;
- conclusions.

The summary has to be drafted in the limit of 10-20% of the number of pages of the PhD thesis (i.e., **maximum 20-40 pages**). The summary of the PhD thesis has to be written in an international language as well (English), bearing in mind the increase of its visibility at international level. The summary shall be drawn up by complying with the same rules as for the PhD thesis.

Appendices:

- Template_PhD thesis_TUCN
- Template_Thesis summary_TUCN