

"GHEORGHE ASACHI" TECHNICAL UNIVERSITY OF IASI
UNIVERSITY DOCTORAL STUDIES COUNCIL (C.S.U.D.)



GUIDE FOR WRITING AND ELABORATION OF THE PHD THESIS
COD. GHID. 03

**1. LIST OF THOSE RESPONSIBLE FOR DEVELOPMENT, AUTHENTICATION AND
APPROVAL OF THE EDITION/REVISION**

DEVELOPED	AUTHENTICATED	ENDORSED		APPROVED	EDITI ON	REVISION
C.S.U.D.	C.S.U.D./ DEAC	CEAC	Administrative Council	Senate	1	0
Prof.univ.dr .ing. Alina Adriana MINEA	Prof. univ.dr.ing. Ioan MĂMĂLIGĂ	Prof.univ.dr.ing. Neculai SEGHE DIN	Dan CAȘCAVAL	Prof.univ.dr.ing. Iulian Aurelian CIOCOIU		
05.05.2021	may 2021	may 2021	18.05.2021	21.05.2021		

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2. STATE OF EDITION AND REVISIONS WITHIN EDITIONS

No.	Revision / Date of application	Chapter and revised pages number	Content of the alteration	Surname and name			
				Developed	Authenticated	Endorsed	
1.	E1R0/ 21.05.2021	Complete guide	New guide	Prof.univ.dr.ing. Alina Adriana MINEA	Prof.univ.dr.ing. Ioan MĂMĂLIȚĂ	Prof.univ.dr.ing. Dan CAȘCAVAL Prof.univ.dr.ing. Neculai SEGHEDIN	Prof.univ.dr.ing. Iulian Aurelian CIOCOIU

1. INTRODUCTION

“Gheorghe Asachi” Technical University of Iași (Institution Organizing Doctoral Studies - IOSUD) is an advanced research and education university that has, among its major objectives, the increase of quality standards for doctoral studies. TUIASI promotes excellence through innovation, interdisciplinarity and convergence in doctoral studies, and the research carried out in doctoral studies is an important component of TUIASI's university activities and image. The contribution of doctoral students to the increase of the university reputation is made especially by the innovative content of the research carried out, but also by the way in which the products of scientific research are structured and presented (scientific papers, oral or poster communications during symposia, scientific conferences, etc.). which is also included in the doctoral thesis.

The doctoral theses within the TUIASI Doctoral School must be the result of the doctoral student's own scientific research activity and must contain **original** theoretical and applied results for the scientific knowledge in the field of the thesis.

2. GENERAL RECCOMANDATIONS

For the elaboration and writing of the doctoral thesis, the TUIASI Doctoral School makes the following general recommendations:

- adopting a simple and clear wording, which facilitates the reading and understanding of the text by a wider audience;
- checking the coherence/overlap of the comments in the text regarding the data in the tables/figures;
- adopting the general technical language agreed by each scientific field and avoiding unscientific or conventional formulations;
- maintaining a logical thread of the narrative, especially with reference to the introductory chapters;
- avoiding the repetition of paragraphs in the text of theses; where it is necessary to resume some previously explained hypotheses, it is recommended to reformulate them (for example, in the chapters of conclusions; research methodology, etc.);

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- in the case of the use of abbreviations, they must be defined in the text at the first appearance and listed in a dedicated section, at the beginning or end of the thesis;
- inserting bibliographic references whenever necessary and especially in the case of particular scientific statements.

Grammar principles

In writing a doctoral thesis, PhD students must take into account a few basic principles, namely:

- use of clear expression and correct sentence syntax;
- correct use of verb tenses; the use of verbs in the past tense for everything that expresses the author's personal experience and in the present tense for well-established notions;
- avoiding the overuse of synonyms that can be confusing, especially in the case of established scientific terms;
- avoiding repetitions;
- if the text is written in Romanian, the use of diacritics is mandatory;
- it is recommended to rigorously check the grammar rules, spelling and punctuation imposed by the rules specific to the language in which the text is written.

The doctoral theses elaborated in the TUIASI Doctoral School must comply with the following general conditions:

- to be included in the doctoral field that is being approached;
- to be up-to-date and timely;
- to demonstrate a good documentation in the approached scientific issue, which means a good knowledge of the specialized literature in the field of the thesis, with preponderant reference to the publications from the last 5-10 years;
- to be of theoretical and/or applied importance;
- to be developed in accordance with the scientific method;
- to be original and contain novelty elements;
- contain an experimental/numerical part that validates the theoretical results obtained (where applicable);
- to use modern investigative tools;
- to contain elements of originality in the developing or solving of the approached research topic;
- to demonstrate a very good preparation of the doctoral student in the field of the approached doctoral topic;

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- the obtained results shall be disseminated in the academic community, in accordance with the research topic and the approached field (publications with impact factor associated with Web of Science, participation in international and national conferences, other publications specific to the doctoral field).

3. STRUCTURE OF THE DOCTORAL THESIS

The doctoral thesis must contain two relevant parts, not necessarily identified as such in the content of the doctoral thesis:

- General part (introduction, current state of knowledge, etc.),
- Part of own contributions (research methodology, personal contribution, experimental/numerical/theoretical results, interpretation of results, etc.).

The ratio between the two parts is recommended to be 1:2, which means that the general part should not exceed 1/3 of the final thesis.

The following structure of doctoral theses is recommended:

- *Cover page*;
- *Table of contents*;
- *A one-page summary*, where the structure of the thesis and the content of its chapters can be described;
- *Thank you notes* (optional);
- *Name of symbols and abbreviations inserted in the text* (optional);
- *List of figures contained in the thesis* (optional);
- *List of tables contained in the thesis* (optional);
- *Introduction* that must contain:
 - justification for approaching the topic,
 - the importance and actuality of the topic,
 - framing the topic in the international, national, team research concerns (state of the art),
 - the premises and objectives of the research.

All of these points suggested above will be supported by citations from the main stream of publications.

- *The content of the thesis*. Here are some suggestions:
 - The thesis will contain chapters that will introduce, not necessarily in this order, the basic concepts, the research methodology and research results on the chosen topic (state of the art),

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the original contributions introduced in the thesis and how it relates to existing results in research (critical assessment of the state of the art);

- Bibliographic references (citations) will be inserted wherever it is necessary to support personal contributions in relation to the current state of research in the field (Note: a unitary citation will be adopted, as recommended in point 5 B of this document);
- The content of the thesis must reflect: the current state of research in the field, the methodology of approaching the research carried out in the thesis and the obtained results, together with their interpretation (results discussion).
- *Conclusions.* This part of the thesis will contain a brief and structured presentation of the results obtained in the thesis. as well as the indication of future research directions, related to the topic addressed in the thesis. As a recommendation, the conclusions can be structured in three parts, namely: final conclusions, personal contributions and open research directions in the field approached.
- *Bibliography / References.* Bibliographic references written correctly and completely, consistently, in one-to-one correspondence, will be used for all the works cited in the thesis. The bibliography is not considered a chapter, so it is not numbered.
- *Annex 1.* List of original publications of the author of the thesis. This annex will present the results of the research, published in journals or communicated at conferences. For each publication, the category of the publication (journal work, conference proceeding, etc.), its indexing (WoS, IEEE, SCOPUS, Google Scholar, etc.) and the associated impact factor (if applicable) will be mentioned.
- *Other annexes* (optional, if applicable or required by the thesis).

Specific recommendations:

- Avoiding the use of tables for limited information, which can be stated clearly and succinctly as text;
- Avoiding the presentation of the same information both in the form of a table and a figure;
- In order to reproduce figures and/or tables from another publication, it is necessary to obtain the authorization from the holder of the intellectual property right (copyright - in case of taking over the figure as such) or citing the source (as bibliographic reference - in case of processing of already published data). The replication of data already published in the literature should be avoided as much as possible. Exceptions are the data published by the author of the thesis (which are an integral part of the thesis) or those used as means of comparing the obtained results, in which case it is mandatory to cite the source or obtain permission, depending on the situation;
- Avoiding inserting photos with existing commercial equipment in the laboratory (eg. Specific equipment - TEM, SEM, Analyzers, etc.), which can be highlighted in the text simply with their

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name/manufacturer. Exceptions are the functional models attached to the classic equipment, the equipment of own design or adapted/improved/modified, etc.

4. ETHICAL REQUIREMENTS

In writing the doctoral thesis, the existing norms of ethics in the research and development activity existing at national and international level will be respected.

Are forbidden:

- reporting fictitious results;
- falsification or manipulation of results;
- plagiarism or self-plagiarism.

In accordance with art. 4 (1) lit. d) of Law no. 206/2004 on good conduct in scientific research, technological development and innovation and art. 310 of Law no. 1/2011 of the National Education, the following constitutes serious deviations from the good conduct in the research-development activity:

- manufacturing results or data - reporting fictitious results or data, which are not the real result of a research-development activity;
- falsification of results or data - selective reporting or rejection of data or unwanted results; manipulation of representations or illustrations;
- modification of the experimental or numerical data / equipment in order to obtain the desired data, without reporting the alterations made;
- plagiarism - the presentation in a written work or oral communication, including in electronic format, of texts, expressions, ideas, demonstrations, data, hypotheses, theories, results or scientific methods extracted from written works, including in electronic format, of other authors, without mentioning this and without referring to the original sources.
- Auto plagiarism - the presentation in a written work or oral communication, including in electronic format, of texts, expressions, demonstrations, data, hypotheses, theories, results or scientific methods extracted from written works, including in electronic format, of the same or to the same authors, without mentioning this and without referring to the original sources.

5. SPECIFICATIONS AND RECOMMENDATIONS

A. Specifications for desktop-publishing:

- Pages will be numbered.
- The chapters will start on a new page and their numbering, as well as the subchapters will follow a specific hierarchy (rank 1:1. CHAPTER; rank 2: 1.1. Subchapter; rank 3: 1.1.1. Subchapter; rank 4: 1.1.1.1 subchapter), which will not exceed rank four.

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- It is recommended to use a font of 11-12 for text, with a maximum spacing of 1.5 points.
- It is recommended to use a 2/2/2/2 cm frame (edges).
- Text alignment: The text in the paragraphs will be aligned between the left and right margins (Justify). The first row of each paragraph will have an indentation of 1 or 1.27 cm.
- The thesis is recommended to have a minimum of 100 pages.
- The numbering of figures, tables and equations in Arabic numerals is recommended.
- Each figure/table will have an explanatory legend - brief, but clear enough, so that the table or figure can be understood without reading the explanatory text in the body of the paper. The legend of the figures is usually placed under the figure; and the table legend is usually placed above the table.
- All tables and figures, respectively the equations, will have a serial number, which may include the number of the chapter in which they are placed (on the first position) and the actual serial number in that chapter, on the second position (e.g. : "Figure 3.2", which means that the figure is placed in Chapter 3 and is the second figure in Chapter 3. The subchapter in which the figure or table is placed will not be taken into account, ie we will never number "Figure 3.2.1.1".)

B. Specifications on citing sources of information

The sources will be cited in the text using one of the established systems, namely:

- Vancouver style, for which the use of the sequential numerical system is recommended, detailed as follows:
 - sources are quoted in the order in which they appear in the text, numbered ascendingly and separated by commas or hyphens, as appropriate (for example: [5-9] or [3, 6-10]);
 - citing the sources is done in Arabic numerals, in brackets;
 - if a source of information is cited several times, the number assigned for the first time is kept.
- the APA system (a variant of the Harvard style) that uses the following template: author, year, the references being entered in the "References" list in alphabetical order (<https://apastyle.apa.org/style-grammar-guidelines/citations/basic-principles/author-date>, <https://libguides.navitas.com/harvard/APA-v-Harvard>). Advantages:
 - it is very convenient for the one who writes the scientific material, because the cited sources are not numbered and others can be easily added, or the existing ones can be deleted;
 - the list of bibliographic references can be modified whenever the author has to do so;
 - if the same author or group of authors has published several papers in the same year and they are cited in the text, the differentiation is made by letters added after the year of publication: Smith and Jones (1998a); Smith and Jones (1998b).

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C. Recommendations regarding the elaboration of the current state of research in the approached field

The main purpose of a doctoral thesis is the contributing in an original way to what has been discovered and is already published in the scientific literature. Therefore, the current state of knowledge is the main argument in the construction of the thesis, in order to demonstrate the originality of the doctoral research.

The presentation of the current state of knowledge in the approached field must have logic, coherence and be in accordance with the studied topic. The PhD student must use the information selected and presented in this chapter as an argument for achieving their original objectives in the doctoral thesis.

In achieving the current state of knowledge in the field, it is not enough to simply write a paragraph on the research analysed and then cite the author. The main purpose is to describe what has been achieved in different aspects of the topic and how the results of one's own research answer the questions and investigations in the doctoral thesis. Emphasis should be placed on the results of previous research, the methodologies used and their relevance, so that some gaps in the existing research can be highlighted, which can be remedied by research conducted in the context of the thesis. Therefore, it is recommended to perform a comparative and critical analysis of the current state of research. More precisely, the analysed research must be reflected and evaluated critically, through methods and approaches from the specialized literature, as well as the conclusions drawn by each cited researcher. The specialized literature must be summarized in its own words, with the correct and clear highlighting of the conclusions and statements of the quoted author.

In order to help the doctoral student, in the following we **propose a general scheme** of the sections for the correct review of the specialized literature, these being able to be adapted, as the case may be, for each doctoral field:

- Introduction to the topics covered in the bibliography;
- Theoretical foundations of the topic in the literature;
- Examining previous research that is relevant to each of the aspects of the doctoral thesis;
- The need for further research in the field, which must answer a few questions, such as:
 - In which aspects of the research is the information identified in the literature deficient?
 - What is the niche in the literature that will be developed through the doctoral thesis?
 - What are the methods used in the research?
 - What are the advantages and disadvantages identified in the literature?

At the end of this analysis, the purpose, importance and objectives of the research to be developed by the doctoral student are declared, in the context of the current state of knowledge.

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D. Recommendations regarding the elaboration of the chapters of description and interpretation of the research results in the approached field

These chapters should cover some basic elements, such as:

- research methodology
- presentation of results
- interpretation of results

The research methodology is a fundamental part of the doctoral thesis. This may consist of: developing a new experimental/theoretical/numerical approach, a concept, a new mathematical/physical model or developing a new application approach, based on a well-established, relevant and consistent experimental analysis, so that the results are relevant and original in relation to the existing literature.

The doctoral student's approach regarding the research they carry out, respectively the methods used, the mathematical models, the analyses, etc. is presented. This part involves establishing research hypotheses, identifying appropriate methods and/or techniques/equipment for conducting research in the field.

The most important part of this chapter is the presentation of the methods used to conduct the actual research. Usually, these research methods must be recent, and the presentation must clearly show the need to approach the selected methodology. The use of an outdated research method, given that the literature offers newer and proven better research solutions, may be a weak point of the doctoral thesis.

If research requires it, the statistical or, in general, mathematical methods used must be chosen and applied correctly. Errors that can result from not mastering these means of research create nonsense, disqualify the doctoral thesis and can put the author and the doctoral supervisor in a delicate situation! The reliability of the program used is scored and the results of this program are summarized.

If an experimental research is performed, the working procedure must be sufficiently detailed, based on appropriate citations from the literature, so that the thesis reader can easily reproduce the experiments performed by the doctoral student in the thesis. The analysis of the identified experimental errors adds value to the thesis.

The **results are presented** in text, tables and/or graphical representations, without presenting the same data in both tabular and graphical form. It is not enough to indicate that the results obtained are in table x and in figure y. The PhD student will insert in the doctoral thesis the results of the research published during the doctoral studies, with the appropriate citation. In this case, the need to obtain the consent of the copyright holder in case of full or partial download of the text/figures/tables remains in force. The results of the research should be discussed, possibly in comparison with the literature. The discussion must be relevant and supported by scientific arguments.

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The **interpretation of the results** has the role of clarifying the meaning and implications of the research results. This should not be a duplication of the record of research results, but an explanation of their significance. The results should be compared, correlated and commented on in relation to the findings from studies published in the literature. Deviations from the literature must be explained by the doctoral student in a plausible manner, with scientific arguments.

E. Recommendations on drafting the chapter of conclusions

This chapter will cover some basics, such as:

- a brief narrative of the contributions made in the doctoral thesis and the degree of fulfilment of the thesis objectives;
- the general conclusions of the carried out research;
- personal contributions in the approached field;
- further research and open perspectives by addressing the analysis topic.

6. FINAL SPECIFICATIONS

This guide establishes the general framework for the elaboration and writing of theses to be defended in IOSUD TUIASI, regardless of the doctoral field assigned to the Doctoral School of the University. Depending on the specifics of each doctoral field, each CCPD can develop and implement a set of instructions applicable to the assigned doctoral field(s). This guide complements the PROCEDURE FOR SUPPORTING THE DEFENCE OF DOCTORAL THESES, Code PO.CSUD.01, which establishes the models approved by IOSUD TUIASI for the cover, the first page of the thesis, the summary of the doctoral thesis, the activity report and the list of works of the doctoral student.

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