**General Instructions for preparing and writing M.Sc. Dissertations**
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**Nov 14th, 2022**

**Table of Contents**



## 1. General Recommendations

**Your external reviewer will be upset if you do not care about the issues discussed in this section.**

**Your text is the first contact between you and your external reviewer**. A good text, ***well written, polished, free of typos, well formatted and organized***, demonstrating:

- a fair amount of work
- in-depth understanding of the subject of your study
- good aesthetic aspect

will cause a good impression from the beginning. If you cause a bad impression, your chances of getting a good grade or even passing your M.Sc. Examination are greatly reduced. Therefore, you should take good care of:

- formatting, organizing and giving a good aesthetic aspect to your text,
- avoid common grammar mistakes and typos (**always use a spell-checker and grammar corrector**),
- do not use the first singular person (“I did...”). Use instead the first plural person (“We did...”) or the passive mode,
- do not write very long sentences,
- do not write sentences in the future tense (after all, the work has to be finished if you reached the point of handing in your dissertation :)
- never, ever, misspell the names of authors and article titles in your bibliographic section, and in your chapters
- choose and plan well the structure of your dissertation and the contents of each chapter,
- take good care of the references: they need to be complete (do not omit authors, title, booktitle, number, volume, year, publisher etc). Use the same format for every entry. If you need to cite URL, add the access date,
- choose a standard for writing acronyms, names of software, packages, works written in other languages etc,

- captions of tables appear on the top, captions of figures appear on the bottom.

## 2. Knowing your area of research

Before starting your dissertation, you need to **define** the subject of your work and perform a **thorough systematic** bibliography review of the theme you chose.

What is a systematic review? It is the one where you define your subject theme, search the web for papers or search in books, and define rules for filtering the resulting material, producing two sets:

- one with “included” material (very closely related to your subject) and
- another one with “excluded” material.

An explanation should be given of why some material goes to the “included” set and other material goes to the “excluded” set. (In fact, in other areas, a **systematic** review involves more than what is here described, but for the dissertations in our department, it suffices to search for related work this way).

In order to start your search for the subject, you need to choose suitable keywords and prepare queries to be used in Google Scholar, ISI Web of Knowledge, Scopus, MesH etc. These search engines will return a number of papers on the subject you are looking for. **You need to read at least the abstract and conclusions of every paper retrieved after your search**. Now, you filter out only the ones you think are very closely related to your research work, and give a reason for choosing those papers. You also need to give a reason for not choosing the other papers. If your search returns too many papers you may need to constrain more your search terms or limit by year of publication.

It may be useful to choose a criterium to categorize the papers you include, even if it is something as simple as sorting by date of publication. The contents of these papers need to be discussed in a chapter of your dissertation. You should discuss at least: (1) materials and methods used, (2) main findings, (3) limitations, and (4) differences (or similarities) between these works and yours. **It may be also useful to have a table listing the publications with their main characteristics.**

In the end of your bibliography review chapter you need to have a discussion where you convince the reader that there is a problem and limitations to be solved in the literature, and that you will improve on that (your next chapter should propose reasonable solutions to problems and limitations).

## 3. Organize your bibliography

Start organizing your bibliography file. Choose one of the standards available to start organizing your references. Usually your department/faculty has clear rules about the standard to be used. If you are formatting your text using LaTeX, most references found during your bibliographic search can be exported in BibTeX format. Tools like Zotero or Mendeley help you organizing the references and help exporting to BibTeX format. **Do not omit: editors, publisher, page numbers, volume, year, authors, titles etc.** In the case

of citing other M.Sc. or D.Sc. works do not miss the institution and year. Technical reports should also have institution and year of publication. **Your bibliographic entries should be as complete as possible and correct.**

## 4. Follow rules for citations and references

Your dissertation needs to have a Bibliography Section with a list of the cited works you have in the text. In the process of writing your dissertation, make sure to properly cite the authors you are basing your text on. For example, “Smith *et al.* [1] discovered that...”. In this sentence, Smith is the first author of one of the publications you list in the Bibliography Section of your dissertation and [1] is the link that connects this citation to the publication in the bibliographic list. The expression “*et al.*” refers to other authors of the same publication and usually is written using italics. Rules for using “*et al*.” or not using “*et al*.” are:

- If your bibliographic entry has only one author, you cite only the author's **surname** (e.g., Smith [1]).
- If the bibliographic entry has two authors you cite the two authors' surnames (e.g., Smith and Jones [1]).
- If the bibliographic entry has more than two authors, you can use the expression “*et al.*”, like in the example shown before (Smith *et al*. [1]). Usually, the expression “*et al.*” is italicized.

## 5. Follow rules to use external pictures and materials

Every picture, graph, diagram, algorithm etc needs to have a caption and a number and needs to be cited and explained in the text. Usually, captions of Figures appear on the bottom of the figure and captions of Tables appear on the top of the table. When referring to Figures, Tables, Algorithms etc in the text, use the first letter capitalized. For example, “...**F**igure 1 shows...”.

Do not leave blank spaces between text and a comma and include always a blank space after a comma. The same rule applies to parentheses. For example, use:

“...in order to perform this experimen**t, w**e used the following parameters...”
instead of:

“...in order to perform this experimen**t , w**e used the following

parameters...” or

“...in order to perform this experimen**t,w**e used the following parameters...”

## 6. Follow rules to include figures, diagrams etc in your text

If you want to use any picture, graph, diagram etc in your dissertation, **which was not created by yourself**, and that is available from some source, you need to make sure that

you can use it (check the copyright rules). If the copyright rules allow you to reproduce the picture (or other material) in your text, you need to insert a reference to the source (where the picture was taken from) in the caption. If you are allowed to use a picture, but want to slightly modify it, you need to say in the caption: Adapted from [1] (where [1] is the number of your reference in the Bibliographic Section).

## 7. General Structure of a dissertation

Your dissertation should have at least the following chapters:

- **Chapter 1**: Introduction
**Usually, it is the last chapter written.**
It should contain a summary of your work. Here you explain in two to five pages:
    1. the context of your work highlighting and **defining** the problem you need to solve,
    2. what you want to do (objectives) and
    3. why you want to do it (motivation),
    4. how you want to achieve your objectives (methodology), always supporting your text with the available literature,
    5. contributions (results that confirm that you achieved your objectives)
    6. organization of the chapters that come next.

- **Chapter 2**: Basic Concepts
In this chapter you need to present the foundations of your work: theoretical aspects, background material etc. In summary, here you write about everything that is needed to understand the terminology, maths, methods, expressions, metrics, models etc used in the remaining chapters.

- **Chapter 3**: Related Work (Bibliographic Review/Survey)
Here you need to discuss about other works in the literature that do something similar to what you want to do. You need to cite and discuss the relevant papers you chose to include in your study during your survey. Explain what others do, why it is not sufficient, and why you need to do what you want to do. It is helpful to **define some criteria to compare your work against others,** and build a table with main characteristics of other works. Finish this chapter with a discussion about the limitations of the studied works and motivate your next chapter: your contribution.

- **Chapter 4**: Your Work (Your contribution)
Description of algorithms, models, formulas, metrics, schema etc, everything related with your creation.

- **Chapter 5**: Materials and Methods
    - Definition of Experiments, Parameters, Datasets, Scenarios etc
    - Definition of Evaluation Metrics and validation methods

- **Chapter 6**: Results and Analysis

If you present graphs and curves and perform comparisons, use the same scale for all graphs. A very good book with neat ideas on how to do performance analysis and present results in the computer science area is:
R. Jain, "The Art of Computer Systems Performance Analysis: Techniques for Experimental Design, Measurement, Simulation, and Modeling," Wiley- Interscience, New York, NY, April 1991, ISBN:0471503361.
Text about results should follow three main aspects:

- Factual description: what do the pictures, curves, etc show? (For example, “Figure 1 shows number of processors in the x-axis and times in seconds in the y-axis. It can be observed that application 1 is the one that most benefit from using a large number of processors...”)
- Discussion about correlated results: “Applications 1, 5 and 7 are the ones that benefit most from using more processors because...”
- “Forecasting/conjecturing...”: in general, results indicate that if we use a large number of processors for applications of type xpto, we could expect better performance...”.

- **Chapter 7**: Conclusions and Future Work
- Research Summary
- Summary of the Main Findings
- Limitations
- Future Work

During writing, some of these chapters may collapse into just one. **Your work (chapters 4-7) should account for at least 50% of your full text.**

## 8. Table of Contents etc

Your dissertation needs to have a cover, and a table of contents. It is also useful to have, in the preamble, a list of Acronyms, Figures, Tables, Algorithms etc. It is recommended to have a look at other recent dissertations of your colleagues of the same department to make sure you use the right formatting rules. These dissertations are publicly available online in the digital repository of the University of Porto. The FCUP repository where your thesis will be publicly available can be found at:

https://repositorio-aberto.up.pt/handle/10216/9535.

For the main cover and internal covers of your dissertation you will need to fetch templates from sigarra and fill them up with your own information and a Declaration of Honor. As these files may be updated from time to time, check the sigarra documents related with “Provas Académicas”. You add these special documents with the command \includepdf in the file thesis.tex of the latex template, in case you use LaTeX.