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| **Master’s thesis guidelines** |

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# Introduction

The aim of this text is to propose some guidelines useful for the manuscript preparation of the master thesis in Mechanical Engineering and, in general, of written reports.

These guidelines are not mandatory because we consider more important the indications, about this topic, received by the academic supervisor.

# Manuscript structure

The manuscript needs to be structured as follows:

* **Front Matter**: It is formed, in sequence, by Title page, Acknowledgements (optional), Table of Contents, List of abbreviations (optional).
* **Text Body**: It comprises the chapters containing the content of the thesis, i.e., text, figures, tables, and references. Chapters can be grouped together in parts.
* **Back Matter**: After the last chapter, the back matter can contain an appendix, a glossary, and/or an index, all of which are optional.

## Front Matter

The Title page is the first page of the thesis and must include, on a white background as shown in Figure 2‑1:

* **The logo of Politecnico di Milano**.
* **The name of the School**. It is “SCUOLA DI INGEGNERIA INDUSTRIALE E DELL’INFORMAZIONE”.
* **The title of the Master course**. It is “Laurea Magistrale In Ingegneria Meccanica”.
* **The title of the Thesis**. It should be concise, but complete. In general, the title should not exceed two lines. The title should never be closed from the point.
* **Supervisor**. Above the title have to compare all the names of the thesis supervisors. Here must be also included the company’s supervisor, if exist.
* **Candidate**. The name and surname of all the thesis’ authors with their ID Code
* **The academic year**. It is relative to the candidate frequency.

The cover of the thesis must be identical to the Title page.



Figure 2‑1 Example of Title page.

## Acknowledgements (optional)

Acknowledgements (optional) must be directed to all those who, other authors, have contributed, in any way, in realizing the thesis.

## Table of Contents

After Acknowledgements page goes placed the Table of Contents, which must list the chapters and numbered paragraphs (up to a maximum of 3 levels) and their page numbers. It is useful for this purpose to use the automatic numbering system of word processors.

The Table of Contents precedes the actual content of the thesis.

## List of Abbreviations (optional)

A list of abbreviations and/or symbols is optional but it may be very helpful if numerous abbreviations and special symbols are scattered throughout the text.

## Introduction

The content of the thesis starts with its introduction. The introduction is a key paragraph; its form and content depend upon many factors, including the specifics of the assignment. It should introduce the problem dealt, objectives and achievements. If the thesis has been developed in a Company, a presentation of it, with particular reference to the business unit and the department in which took place the work experience, is desired.

## State of the art

This paragraph should permit to demonstrate the novelty of the thesis results. It is the synthesis of the literature found during the analysis of the thesis problem. The state of the art is also used to demonstrate the relevance of the problem treated, for example, detailing the researches in progress to solve the same problem and the different approaches adopted.

## Chapters

Add all of the chapters, sections and subsections that serve to explain the thesis, making use, wherever possible and useful, analytical reports, figures and tables. Clearly, particular attention should be posed in bringing out the author's individual contribution.

Each Section should not be shorter than 2-3 pages and not longer than 30. The central part of the thesis, namely the numbered chapters, ranging from the introduction of the findings, should be a total of between 30 and 90 pages.

The last chapter should always contain the concluding remarks of the work.

## Conclusions

In the conclusions, summarize and critically review the thesis. The conclusions shall contain a complete and objective presentation of the results obtained, by highlighting the progress made and also the limitations encountered. It is also appropriate that in the end appear the resulting recommendations and possible future developments.

## Bibliography

Every thesis must contain a bibliography, which lists all the sources used or consulted in writing the entire thesis and it is placed at the very end of the work. Citations must follow standards set by the style below proposed in the specific paragraph.

## Appendices

Appendices provide supplementary information to the main thesis and should always appear at the end of the text. The appendices usually contain parts that make the text too long and the reading of which is not strictly necessary, such as, for example, very large tables, very large drawings, detailed technical sheets of instruments, equipment and procedure, lists of programs, etc.

If you are unsure about whether content should be included in the thesis or in an appendix, consult with your supervisor.

# Guidelines for writing

This section provide a comprehensive overview of the guidelines about the style that should be adopted for writing the thesis.

## Language

Either British or American English can be used, but be consistent within your thesis. The correct spelling and grammar is taken for granted. Special care to some very common errors: incorrect or inadequate use of punctuation, incorrect use of spacing between words.

The language must be technical, precise, dry, concise and non-colloquial. You can use to describe the activities the first person singular or impersonal form. It is necessary to use official technical terms when they exist, and, otherwise, terms of very general use. Technical terms and abbreviations should be defined the first time they appear in the text. Avoid as far as possible to use "jargon" business or, if necessary, explain what the slang term in common technical language.

It is important to always use the same term for the same concept: the use of synonyms, in the technical literature, is often misleading. It is also important that the sentences are short, to reducing the number of relative clauses and avoids double negatives. In any case, it is essential to avoid any possible ambiguity.

## Originality

All information contained in the thesis that have not been produced or acquired during the work experience, must be highlighted and reported quoting the source of origin.

The candidate is clearly responsible with respect to the confidentiality of the information reported in the thesis and he/she must care to obtain all the authorization required for their diffusion.

## Layout

The format page of the thesis is A4 duplex; the margins have to be at least 25 mm for each side. It is possible to increase the inner edge to facilitate the binding. All pages should be numbered, except the title page.

The font system used (according to the rules of coordinated graphic of the University) must be a combination of Arial and GEORGIA fonts. It suggests a font size for the text between 11 and 12. The line spacing should be between 1 and 1.2.

The text should be justified by aligning it to the right and left, except for enumeration lists, which must be aligned to the left.

## Symbols and units

It is necessary:

* Do not use the same symbol to indicate two different quantities, not to use two different symbols to indicate the same quantity;
* Remove unnecessary symbols that are not involved in a formula or chart;
* Explain the acronyms in the text the first time they are used;
* Use the units of the international system (SI);
* If thesis contains a large number of terms and abbreviations, collect and define them in a special initial table (Abbreviations);
* Numerals should follow the British/American method of decimal point to indicate decimals and comma to separate thousands.

## Figures and Tables

All figures and tables must be numbered and have to include an explanatory and concise caption, as in the examples of Figure 3‑1 and Table 3‑1. Figures and tables should be preferably mentioned, quoted or described in the text before that they appear.

Eventually add a reference citation for figures and tables not original, paying special attention to their copyright.

Enumerate figures and tables consecutively using the chapter number (e.g. Figure/Table 1.1 for the first figure/table in the Chapter 1). Do not write “the following figure/table”.

### Figures

Figures should be well separated from the rest and sufficiently large so that they are also easily noticeable in the details and smaller written contained in them. They, also, must be close to the point in the text where they are referred to and, in any case, easily available. In hardback, it may be useful to print in color if the colors help the understanding of the figure. Figure and caption should be centered with respect to the width of the page, as shown in Figure 3‑1.

Before and after each figure is good to leave at least one line space.



Figure 3‑1. Micrograph of a specimen sintered stainless steel.

### Tables

It is good to write the numbers in the tables so that they have all the same number of significant digits or the same type of rounding.

It is good not to express physical quantities with a number of significant digits with respect to what realistically can be obtained by an industrial measuring instrument.

Some graphical instructions are included in Table 3‑1.

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| --- | --- | --- | --- |
|  | Font – size | Font – type | Colors |
| for the font instructions | The fonts used in the table should not be less than Arial 10 | It must be used in the table a sans serif font, Arial or similar recommended.The paragraph is left-aligned, like bullets |  |
| for page layout instructions | A table, if it is not very long, should be contained only in a page.If necessary, to the next page header with column titles must be reported |  | It is not bound by the choice of colors cell background and text |
|  |  |  |  |

Table 3‑1. Diagram of the tables.

## References

Books, conference proceedings, articles on scientific or technical journal, web sites used as reference must be cited in the text and enumerated in the bibliography at the end of thesis.

### Citations

Cite references in the text by the surname of the author/s followed by date of the publication in parenthesis. ("Harvard system"):

* One author:
	+ cite single-author references by the surname of the author
		- ... according to Hays (1994)
		- ... facing future generations (Hays, 1994).
* Two authors:
	+ cite double-author references by the surnames of both authors
		- ... according to Simpson and Hays (1994)
		- ... facing future generations (Simpson and Hays, 1994)
* More than two authors:
	+ by the surname of the first author followed by et al.; e.g. Pfirman, Simpson and Hays would be:
		- ... according to Pfirman et al. (1994)
		- ... facing future generations (Pfirman et al. 1994)

It is possible also cite with reference numbers in square brackets either sequential by citation or according to the sequence in an alphabetic list:

* ... facing future generations [2, 5, 7]

### Reference list

Entries in the list must be listed alphabetically except in the numbered system of sequential citation.

The rules are:

**Book with one author or a chapter in a book**

Saxby, G., 1996, *Practical Holography*, 2nd ed., Prentice Hall, New York, NY, Chap. 6.

**Book with two or more authors**

Watt, J. H. and van der Berg, S. A., 1995, *Research Methods for Communication Science*, Allyn and Bacon, Boston, MA.

**Journal article**

Dahl, G. and Suttrop, F., 1998, “Engine Control and Low-NOx Combustion for Hydrogen Fuelled Aircraft Gas Turbines,” Int. J. Hydrogen Energy, **23**(8), pp. 695-704.

**Conference Proceedings**

Welch, G.E., 2000, “Overview of Wave-Rotor Technology for Gas Turbine Engine Topping Cycles,” *Novel Aero Propulsion Systems International Symposium*, The Institution of Mechanical Engineers, London, pp.2-17.

**Thesis/Dissertation**

Chan, D.C., 1996, ”Effects of Rotation on Turbulent Convection: Direct Numerical Simulation Using Parallel Processors,” Ph.D. thesis, University of Southern California.

**Web Page**

McBride, B.J. and Gordon, S., 1996, “Computer Program for Calculation of Complex Chemical Equilibrium Compositions and Applications – II. Users Manual and Program Description,” NASA Ref Publ. No. 1311, (Retrieved November 04, 2016, from <http://www.grc.nasa.gov/WWW/CEAWeb/>)