How to write a thesis

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What to talk about

- Status of a thesis
- Get advice!
- Read before you write!
- Timetable and milestones
- Content of a thesis
- What belongs into which section?
- Times: past and present tense
- Graphs and Figures
- Tables
- Format
- Further information
Status of a thesis

- The Master Thesis is the first official document the gets you in the status of being a researcher
- The thesis shall contribute to knowledge with a new and unique piece of science
- The thesis proves your ability to work independently and to solve a scientific problem by your own (of course with some help from your supervisor/s)
- The thesis is the starting point for your career after your MSc course
Get advice!

• Make sure that you had training on the methodology to be applied in your thesis. If you have not achieved experience from prior modules, ask to get appropriate training (laboratory practical etc.).
• Make an outline of the proposed thesis
• Discuss the outline with your supervisor(s)
• Produce a revised outline with a preliminary timetable and check again with your supervisor(s)
• Keep nagging your supervisor(s) during the thesis work
Read before you write!

• Before you do any practical work related to your thesis: read scientific literature about your field of interest.

• This is because:
  • You may find out that your work has already been done (so you have to find something else)
  • You will get the necessary theoretical background (which is usually much more specific than anything you learnt in the modules)
  • You will get an idea about the specific methodology required for your work and about the potential time demand to apply the methodology
  • You will get the background information that is required to compare your results with previous results obtained by other scientists
  • You will train reading and understanding of scientific publications
Experience tells us (the supervisors) that thesis work always takes longer than expected by the students. To solve this and to keep on track you need:

- A timetable of the major working steps of your thesis work and the milestones that should be achieved at certain stages. This might look somewhat like this:

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Content of a thesis

• Title sheet (no numbering)
• Abstract (max. 1 page, only 1 paragraph, keywords, no page number)
• Authors declaration on originality of the work (no page number)
• Table of contents (page numbers e.g. as i, ii, iii, …)
• 1. Introduction (normal page numbering starting here)
• 2. State of the art
• 3. Material and methods
• 4. Results
• 5. Discussion
• 6. Conclusions
• 7. References
• Acknowledgements
• Appendices
What belongs into which section?

- Title sheet:
  - University
  - Institute
  - Supervisor
  - Title of the thesis
  - Name of the author
  - Date of finishing the thesis (month and year)
What belongs into which section?

• Abstract:
  • The main problem to be solved, the main methodology applied, the main important results and conclusions
  • Be as concise as possible! (most of the readers will only read the abstract. These few sentence are your chance to attract people to read more)
  • Keywords (c. 5 which cover your field of work as closely as possible)
What belongs into which section?

• Authors declaration:
  • states that no other sources than those cited have been used and that the work is original
  • Be aware: this is an official, legally binding document and must be true. A false declaration invalidates your Master title!
What belongs into which section?

• Table of contents:
  • This lists all the sections of the text part of your thesis (from "1. Introduction" to "Appendices") and informs the reader on which page to find these sections
  • Use a decimal numerical system with up to three sublevels, e.g.
    3 Material and Methods ......................................................... 7
    3.1 Study area ................................................................. 7
    3.2 Vegetation mapping .................................................... 9
      3.2.1 Plot size ............................................................... 12
      3.2.2 Species determination .............................. 14
      3.2.3 Braun-Blanquet tables ........................................... 17
    3.3 Statistical evaluation of data ................................. 20
  • Add lists of tables, figures, abbreviations etc.
What belongs into which section?

- 1 Introduction:
  - Starts at a quite unspecific level and leads the reader – through a rough overview of the state of the art – to your specific question.
  - Ends with the working hypothesis of your thesis and the scientific questions that you are going to clarify in your thesis.
  - Length: c. 3 pages
What belongs into which section?

- 2 State of the art (or "Literature review" or else):
  - This section lists the current knowledge in the field of your research question and contains the respective references.
  - Start with some more general aspects and go deeper into the specific research field of your thesis.
  - Ends with description of knowledge closely related to your thesis work.
  - A prerequisite for this section: good knowledge of the current scientific literature in this field (see timetable: "Scientific literature" as the first major workstep to be performed).
  - Length: c. 5 pages.
What belongs into which section?

3 Material and methods:
- Usually this is the first section to be written by a student because it describes what you have actually done.
- The MM section must enable the reader to repeat the work that you have done. Therefore, it requires much detail.
- You must mention any instructions of other authors that you have applied, any instruments (including type, manufacturer, location of manufacturer), any software etc.
- Length: depends on the methodology that you have applied. Usually, it is 5-15 pages.
What belongs into which section?

• 4 Results:
  • This section describes the results that you have obtained. It contains all the figures, conglomerate tables and statistics that you created during the data evaluation (the raw data go into an appendix)
  • Do not include references here
  • Give an accurate description of the results
  • Avoid repetition of text parts (no copy and paste, please)
  • Be aware: writing the results section may be the most boring part of your work (and reading it the most boring bit of work for the supervisor)
  • Length: depends on the amount of stuff to be presented and how well it can be documented as integrating figures and tables. Something between 10 and 30 pages.
5 Discussion:

- This section fulfils several aims:
  - It compares your results with previous results from other authors
  - It clarifies the innovation (the new added knowledge) of your work
  - It may also be a little self-critical, i.e. by announcing and explaining potential shortcomings of your work
- Therefore, the discussion will contain many citations which will be – at least in part – repetitions of those cited in section "2 State of the art"
- The discussion may be split into subsections covering different aspects/fields of your work
- The discussion demonstrates your ability to think critically about your research. It is therefore the most important section with respect to your intellect
- Length: dependent on the amount of data and of existing background information. Something between 5 and 15 pages.
What belongs into which section?

• 6 Conclusions:
  • This section raises the overall questions of your work:
    What has been achieved?
    What is still missing?
    What should follow-up activities focus on?
    etc.…
  • Length: c. 1 page
What belongs into which section?

• 7 References:
  • This list contains all citations that you made in the text or in the figures/graphs or tables
  • *Vice versae*, all citations in the references list must be found in the text or in the figures/graphs or tables
  • For formatting of the citation list: I suggest that you follow the format of an international Journal that potentially could publish also your work. Most important:
    - make your way of citing consistent throughout your list
  • Make an alphabetical list, sorted by first authors surname
What belongs into which section?

• Acknowledgements:
  • It is really up to you what to write here and whom to thank for support
What belongs into which section?

- Appendices:
  - Contain the raw data
  - Contain any additional information
  - Be aware: the thesis should be fully understandable also without the appendices
Times: past and present tense

- This is nearly always mixed up. Therefore: think about tense before writing.
- Rules and examples:
  - Present tense: statements that are still true according to best knowledge.
    Example: "Green plants convert sunlight into chemical energy (Miller et al. 1800)"
  - Past tense: actions / events that have taken place in the past.
    Example: "Sunflower biomass increased by 32% when grown at 26 instead of 22 °C (Hunter et al. 1985)"
Graphs and Figures

- A figure has a legend **below** it.
- The legend must be more or less self-explaining.
- All elements of the figure (axis labeling etc.) must be large enough (at least 2.5 mm).
- Use appropriate scaling of the axes.
- Use clear symbols to distinguish different treatments/plots etc.
- Avoid color figures.
- Make graphs clear and easy to understand.
- Avoid putting too much information into one coordination system (since this may cause crowding of data points and prevent readability).
- Check graphs from publications in highly ranked scientific journals and learn from these how to create nice graphs.
Tables

- Tables have a header on top and explanatory remarks at the bottom
- Tables can contain lots of information. To achieve this, some thinking must be spent on how to organize a table
Format

• Think about the old eyes of your supervisor/s!
• Therefore:
  • Recommended font size: 12 (of course, headers may be larger)
  • Recommended font type: Arial
  • Recommended line spacing: 1 ½
  • Recall the recommendations on size of figures/graphs
  • Latin species names have to appear in italics
  • Avoid underlining
  • Avoid trying to get the attention of the reader by using bold font (leave it to the reader to decide what is important and what is not)
Further information

• Get finished theses from friends to get an idea what the 'product' might look like in the end.

• The Institute for Plant Production and Agroecology of the Tropics and Subtropics (380) has created guides both how to write a Master thesis and how to write a Diploma thesis:

  Master:

  Diplom:
  http://www.uni-hohenheim.de/www380/all/diplomarbeit.pdf