

Important Points when Writing Your Thesis

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Rating system:

- Summary: 10%
- Introduction / background work / Literature: 20%
- Formulation of the objectives of the work (aims): 5%
- Experimental: 15%
- Results and discussion: 35%
- References: 5%
- overall presentation of the work: 10%

The **summary** is the most important part of your thesis, since for most readers this will be the only part they read. Consequently, you should spend some time and effort on it. The summary gives you most grade points per page! It is not part of the thesis text; it should be placed right at the beginning of your thesis and should be understandable without reading the full thesis. Start off with a few introductory sentences, in order to allow the reader to understand the context of your work. Then explain in brief the used methods and give some highlights of the obtained results, if possible in a quantitative manner. End up with a few remarks on the relevance of your findings and/or further research needs. You should restrict the summary to one page at maximum. References typically do not belong to a summary. Please add an English summary in case you have written your thesis in German. If possible based on your language skills, a German *Zusammenfassung* gives you a bonus for theses written in English.

Abbreviations always must be introduced upon first use. If they are used in the summary, please do it separately in that section, since the summary has to be understood without the need to refer to the main text of the thesis.

Do not use **footnotes**. This is unusual in (natural) science texts and mostly unnecessary.

Make meaningful use of **subsections**: a chapter 1.1 does only make sense if followed by 1.2 and so on.

Do not use more than three numbered **section levels**.

The **introduction** shall give the reader some background of your topic and put it into the context of the state of the art in research. Do not start too general by describing methods already well-described in textbooks – one or a few references are sufficient. This is the case, for example for HPLC, GC, UV-VIS, MS, etc. Methods typically not found in textbooks should be briefly described, though. Refer to relevant literature for your topic, primarily published in textbooks and peer-reviewed journals. A reference list mostly consisting of web links is insufficient. Do not forget to take into account literature published by your supervisors in the field of your thesis work. Do not only describe what is already known, but also demonstrate current knowledge gaps that lead to your specific research questions and allow you to pick these gaps up in the explicit description of the goals/aims of your thesis at the end of the introduction or in the following chapter.

The **experimental section** can hardly be too detailed. You need to describe ALL chemicals, instruments, methods, etc. used. Anybody wishing to repeat your experiments should be able to do so by the given information. If you use data generated by others, it needs to be clear at least how these were generated (e.g. by suitable references to previous work). Start with the used chemicals and instruments that can often be summarized in tables. If you make use of calculations you should describe the background of these also in this section, not in the results part.

In the **results and discussion part** (please present the results and discussion in one chapter) you need to present all important results and discuss them. Discuss, not describe! Do not exclude data that do not fit your expectations/hypotheses/predictions. In discussion of the data you may argue why you do not consider some data further. As far as possible you should use statistical tests, e.g., for potential outliers and not base your decision only on your intuition – the latter can be very much misleading. You need to discuss your experimental results in the context of literature data. Quite frequently I receive theses, which contain hardly any reference or no reference at all. This is insufficient! End up the discussion by a short conclusion and outlook: what did one learn from the results of your thesis and what should future research address? For the latter, include specific suggestions by imagining you would embark on your work now, with your advanced knowledge. Maybe

the next student can follow in your footprints. Do not organize the results based on chronological order in which you did the experiments but rather in a meaningful order based on context. For the reader it is mostly irrelevant when and which order you carried out an experiment. Maybe you had a clever idea for a certain part of your work later on and you carried out further experiments after some other work. If your work contains for example analytical method developments and you applied the developed/optimized method later on to samples of interest in your thesis, then of course you should set off with the method development. Otherwise, it is hard to understand the achieved results.

Avoid text connections and expressions such as: "In the following I will show" or "In the next chapter (figure, table) you will see".

Most likely your thesis will contain **numbers** as a result of measurements. For all such numbers think about the error involved in their generation and derive a meaningful number of significant digits. Frequently I see data given as 1.23456789 mg/L or similar. Most often these are the result of data manipulation by spreadsheets, but they are totally unrealistic. If in doubt: there are also general rules available for estimating meaningful significant digits. As mentioned before, all your measurement results will contain some error. This is unavoidable. As far as possible, you should try to quantify such errors (precision for example via standard deviations of multiple measurements, trueness via reference methods or use of reference standard materials and so on). Quantification of errors will not always be possible in the context of your work, but you should at least think about this important point. Only with an estimate of error you can for example decide, if two values are significantly different or not.

Pay some attention to the **reference list**. I typically read it just after the summary, because it often gives me a good impression of adequate care in the final steps of preparing the thesis. Use a CONSISTENT format of in-text citations and, in particular, the reference list at the end of the thesis. If you use a reference manager to generate the reference list (which is recommended) you need to check its output right at the end manually. In particular, references to grey literature, i.e., previous theses, reports, etc. need to be carefully checked in order to allow sufficient data for retrieval of these references. Use extra care with the references of your supervisors, since errors are naturally noticed first in these references.

Finally, use a **spell checker** to avoid many simple spelling mistakes that may impose a poor overall impression.

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