

# **Guide for Bachelor and Master Students**

Chair of Biochemistry and Molecular Biology

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## General Notes

This guide will offer assistance with preparing Bachelor and Master theses for the group Biochemistry and Molecular Biology. Please also follow the testing guidelines of your field of study. You can also directly ask your thesis supervisor at any time.

### 1 Format Guidelines

The **size** of Bachelor theses should not be longer than 40-60 pages, and Master theses should be no larger than 70-90 pages. The number of pages is based on the text with figures and tables and does not include the table of contents, list of abbreviations, or reference list.

Bachelor and Master theses should be printed one-sided on white DIN-A4 paper and bound with a sturdy cover. Three copies of the printed thesis must be turned in before or on the due date to the secretary's office of the department of Biochemistry and Molecular Biology. Furthermore, a .pdf file of the thesis should be sent to the supervisor.

The **font** for the text and tables of contents can be Arial (11 pt), Times New Roman (12 pt), or Calibri (12 pt). Headers can use larger (14-16 pt) or bold typeface in order to stand out better. Figure footers, table headers, and footnotes should be clearly distinguishable from the main text via a smaller typeface (9-10 pt).

The text should be **justified**. Pay attention to correct automatic hyphenation of syllables.

The **line spacing** of the text and tables of contents should be 1.5. A larger spacing can be used between paragraphs.

In the **header or footer**, the **page number** should be displayed. Furthermore, information about the chapter may be integrated into the header. The table of contents, list of figures, list of tables, and list of abbreviations will be numbered with Roman numerals. The title page will be included in the count but does not display the page number. The main text as well as the reference list of the thesis will be numbered with Arabic numerals and will begin with the number 1.

The **margins** should be 2.5 cm top and bottom, 3 cm on the left, and 2 cm on the right.

The Bachelor or Master thesis can be written in **German** or **English**. This should be discussed with the supervisor beforehand. If the thesis is to be written in English, submit a

written request to the testing office. The writing style is to be academic and objective, and informal phrasing is to be avoided. You should also avoid using “I,” “we,” “you,” or “one” when referring to the researchers. Also try to avoid using very long, overly complex sentences. Normally the numbers one through twelve are written out; exceptions are percentages and measurements such as 50%, 100 mg, etc.

**Figures and Tables** from academic articles can be used as long as the source is clearly cited. Academic journals normally offer figures from articles in good quality (.jpg or .ppt files), which are usually available from the .html version of the article on the journal’s webpage. If the figure is only available in .pdf format, the resolution can be increased by first zooming into the picture and then copying it. All figures and tables will be numbered, given an appropriate title, and explained in necessary detail if need be. Figures receive a footer, tables a header. In the text, the figures and tables are referenced via their numbers. The figures and tables should be positioned as close as possible to the appropriate text section. The design of the figures and tables is open, but it should be consistent within the thesis.

## 2 Thesis Structure

The **cover page** should contain the following information: Justus Liebig University Giessen, Chair of Biochemistry and Molecular Biology, thesis title, whether it is a Bachelor or Master thesis, supervisor’s name, applicant’s name, and the location and date of submission. The font size and layout of this page is up to the author.

Depending on the type of thesis (literature-based or experiment-based), the following basic **structuring styles** are recommended:

### **Experiment-based Bachelor or Master Theses:**

Table of Contents

List of Figures

List of Tables

List of Abbreviations

- 1 Introduction
- 2 Materials and Methods
- 3 Results
- 4 Discussion

- 5 Outlook
  - 6 German Summary (Zusammenfassung)
  - 7 English Summary
  - 8 References
  - 9 Appendix
- Affidavit

### **Literature-based Bachelor or Master Theses:**

Table of Contents

List of Figures

List of Tables

List of Abbreviations

- 1 Introduction
  - 2 Basics
  - 3 Method of Approach
  - 4 Results
  - 5 Discussion
  - 6 Outlook
  - 7 German Summary (Zusammenfassung)
  - 8 English Summary
  - 9 References
  - 10 Appendix
- Affidavit

The **table of contents** should contain succinct, descriptive chapter headers and a logical structure. Normally headers with only one word are not descriptive enough. Sections listed at the same level in the table of contents should have the same level of content. The main chapters should be outlined in individual subsections with a maximum of four sublevels. (e.g. 1.2.1.1.1). There needs to be more than one subsection (if there is a 1.1, there must be a 1.2, otherwise the subsection is not necessary). The subsections should be at least a half page in length. Within longer subsections, main points can be indicated with cursive “subheadings.” The chapters will be numbered with Arabic numbers. After the final digit, according to DIN standards, there should not be a period (e.g. 1 Introduction rather than 1. Introduction; 1.3 Questions rather than 1.3. Questions).

In the **list of figures and list of tables**, the numbers, the title, and the page number of all figures and tables used in the text will be given.

In the **list of abbreviations**, all abbreviations used in the thesis will be listed in alphabetic order. Standard abbreviations such as ml, e.g., min, etc. do not need to be defined. The first occurrence of the term will be written out with the abbreviation in parentheses right after it. All subsequent occurrences will solely use the abbreviation. Generally, the number of abbreviations used should be kept to a minimum.

The **introduction** is different in literature-based vs. experiment-based theses; in literature-based theses, the introduction introduces the topic (focusing on central themes), sets the priorities, and lists the questions to be answered / goals of the thesis. In experiment-based theses, the introduction contains academic foundations of the topic, the current status of research, and questions to be answered / goals of the thesis.

In literature-based theses, the **basics** chapter contains the current academic status of research.

The **materials and methods** chapter contains a listing of all instruments and supplies used for the thesis along with information about the manufacturers and composition of buffers and solutions used. All methods used in the thesis should be explained.

In literature-based theses, the **results** section will present the results from the studies used for the topic. In experiment-based theses, only one's own results are listed in detail. Graphics are a good way to display the results. Please note that the results are not yet assessed or discussed in this chapter.

The **discussion** contains a classification and comparison of the results to the most current information available. An interpretation and assessment of the results comes next, where "negative" results and failed experiments must be discussed. Please note that repeating the results here should be reduced to a minimum level necessary for understanding.

In the **outlook**, unresolved problems, questions of a continued interest, and recommendations for further approaches are given.

Each thesis concludes with a **summary** of the contents, which is a maximum of two pages in length. The questions, goals, and most important results are depicted in such a way that the reader can get a comprehensive impression of the content. Try to use a logical structure and a common thread in order to avoid a mere listing of facts. The summary has to be written in both German and English.

In the **appendix**, data and graphics can be added that are not absolutely necessary for understanding the text but are nonetheless important for the thesis, for example,

experimental data and statistical measurements. The appendix should not contain long text passages. In the main text, all sections of the appendix need to be mentioned.

At the end of the thesis, there is an **affidavit** whose exact wording can be found in the testing regulations.

**Important:** When editing the complete thesis, it is important that the line of argument be conclusive and follow a logical structure. The “common thread” needs to be recognizable to the reader.

### 3 List of References

All ideas or results that did not originate from the author must be noted as such. Every citation needs to be verifiable. All sources used must be listed in the reference list. Citable information includes any sources that occur in academic journals, academic books, or textbooks. Information from Wikipedia or public magazines (e.g. pharmaceutical surveys) does not have to be cited. Any questions about this can be clarified with the supervisor.

**Verbatim quotes** will be printed exactly as they appear in the original text and will begin and end with quotation marks. Omitted sections of a quote will be marked with [...]. Verbatim quotes should make sense and should be used rarely.

The extent of **indirect quotes** should be recognizable to the reader. At the end of each corresponding quote, the source therefore needs to be given. If several sentences originate from the same source, the citation will be listed at the end of the section, not after each sentence.

**In the text**, the sources at the end of the quote are listed by author and year, e.g. (Müller *et al.*, 2013). If several articles from the same author and year are cited, the letters a, b, c, ... will be added directly after the year.

In the **list of references**, all sources mentioned in the thesis will be listed. The list will be in alphabetical order according to the first author's last name. It is strongly recommended to use a literature management program in order to organize the sources and create the reference list. There are several available for free or for a price. JLU's university library has a campus-wide license for Citavi, meaning this program can be used by students and coworkers for free. More information can be found on the website of JLU's data center (HRZ).

#### **Original articles and reviews from journals:**

Author 1, Author 2, ... **(year)** Title. *journal* edition, page number(s)

*Example:* Kehr S, Jortzik E, Delahunty C, Yates JR, Rahlfs S, Becker K (2011) Protein S-glutathionylation in malaria parasites. ***Antiox Redox Signal*** 15, 2855-2865

**Book chapters:**

Author 1, Author 2, ... (year) Title. In: Editor: *Book title*. Publisher, location, edition

*Example:* Jortzik E, Wang L, Ma J, Becker K (2012) Flavins and Flavoproteins – Applications in medicine. In: E. Schleicher (Editor): *Methods in Molecular Biology: Flavins and Flavoproteins*. Humana Press USA, New York, 1st Edition

**Sources from the internet:**

Author (year) Title. URL (access date)

*Example:* WHO (2013) World Malaria Report.

[http://www.who.int/malaria/publications/world\\_malaria\\_report\\_2013/report/en/index.html](http://www.who.int/malaria/publications/world_malaria_report_2013/report/en/index.html)

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