**Guidelines for Bachelor and Master Theses in the Chair of Bioprocess Engineering TU Berlin (As of October 2023)**

**General / Formatting**

Please choose an appropriate, easily readable font. Fonts without serifs generally work better (e.g. Arial, Calibri, etc.). The work should be in justification print, with a line spacing of 1.5 in the main text, and 1.2 in captions and the Materials & Methods section. Please avoid underlining!

Both sides of the printed document should be used in case of submission in printed form. Please clarify with your supervisor whether they prefer a submission in printed or digital form. In case of a submission in digital form, this needs to be authorized by your first and second evaluator (Please submit the signed Digital\_Abschlussarbeit form to the Prüfungsamt).

All original data and a folder with the used literature should be made available to the direct supervisor before submitting the thesis.

**Structure of the Thesis**

***Title Page / 1st Page:*** Bachelor/Master Thesis, Title of the thesis, candidate's name, matriculation number. Technische Universität Berlin, Institute of Biotechnology, Chair of Bioprocess Engineering Names of first and second examiner (Name of Advisor). Month and Year of Submission. Please do not use external logos (refer to examination regulations!).

***Table of contents:*** (can be generated automatically)

***1. Abstract:*** For theses in German, only a German Zusammenfassung is necessary (one page). For theses in English, both a German Zusammenfassung and an English abstract (each a maximum of one page) must be included.

Content: One sentence introduction, background, aim of the thesis (scientific niche and how it is addressed), results (most important, be specific, take them from the 10 theses of the thesis), conclusion (significance for the field)

***2. List of abbreviations:*** Generally, each abbreviation should be spelled out at its first mention. Please do not explain SI units, chemical elements, well-known symbols, etc. Only define specific abbreviations used in the work. Examples that might need explanation are ATF = automatic transition fluid or perhaps atomic task force.

***3. Introduction:*** A brief introduction to the topic (approximately 1 page). Should introduce the general topic of the thesis and summarize the structure of the work (overview). Must describe the scientific gap, niche.

***4. Literature Review:*** The literature review generally consists of about 10-20 pages for Master theses, or 8-10 pages for Bachelor theses, and may also include figures and/or tables (approximately 1-3). It is important here that the state of the literature on which the Bachelor/Master thesis is based is described in detail in the form of a scientific review (Note: NOT like a textbook!). The chapters should be structured in such a way that the current state of research in relation to the sub-areas necessary for the work is scientifically introduced. The literature used is then partially used in the discussion to analyse the own results.

***5. Aim:*** After the literature review, the definition of the aim follows (0.5-1 page): Clear presentation of the research or development task to be solved, possibly also in sub-points. The results presented are measured against the aim definition, i.e., it is evaluated to what extent the aim has been fulfilled.

***6. Materials & Methods:*** All materials and methods must be described in detail so that a anyone can reproduce the experiments. The scope should be of 10-20 pages for Master theses or of 5-15 pages for Bachelor theses. For each method, all used devices and chemicals must be specified with manufacturer, location, purity, etc. An additional list of devices and chemicals is not necessary***.***

***7. Results:*** (approximately 20-30 pages for Master theses, or 10-12 pages for Bachelor theses): Here, the results are presented in a logically sensible order (this order does not necessarily reflect the chronological sequence). Each individual result is accompanied by a representation (figure or table). For each individual result the following questions must be answered:

1. What is to be investigated (What is the aim of the experiment/investigation)?
2. How is this investigated? (Methodical approach)
3. What is the result? (Detailed description)
4. What is the conclusion?

Legends of the figures and titles of the tables should be self-explanatory. In the results section, the reference to the literature is minimal. Certain original data (series of measurements, parallel experiments, primary data that are not discussed in detail) can also be placed in the appendix.

**8. Discussion:** Discussion of the results of the work considering the state of the literature. Intensive work with the literature. The discussion starts with the most important and then goes into the details. At the end, there is a brief summary. (Approximately 10 pages for Master theses, or approximately 5 pages for Bachelor theses)

***9. Conclusions and Outlook:*** 0.5-1 page. Avoid literature references in this chapter. Conclusions: What do you conclude from your own work? What do you expect in terms of the development of the field? What do other scientists need to consider based on the present work? Outlook: Look into the future. Where does your work go from here? What do you suggest? What is your vision? If one of the research questions in the work could not be answered, you can suggest here what the next necessary steps are.

**10. Theses.** Numbered list (10 points) of the most important detailed results of the work, sorted by importance (maximum 1 page). The Theses can be very specific findings. Theses are statements/claims that arise from the results of the work, for which evidence has been provided in the context of the results achieved in the work (see <https://wortwuchs.net/these/> (German), <https://writingcenter.unc.edu/tips-and-tools/thesis-statements/>, <https://penandthepad.com/how-8229968-write-thesis-statement-science-report.html>, <http://www.cws.illinois.edu/workshop/writers/tips/thesis/>. The 10 theses provide a good basis for a condensed and specific summary of the results (abstract).

***11. References:*** Alphabetical listing by first author. To be indicated are: Author(s): Title; Journal, year of publication, volume (issue), page numbers from-to. Compilation preferably with a Reference Manager, Endnote, Citavi or other software.

L.A. Garbe; γ-Nonalactone in Beer: Biosynthesis by Yeast; *BrewingScience* **2008**, *61*, 175-180

S. Ohta, J.C. Bukowski-Wills, L. Sanchez-Pulido, F. de Lima Alves, L. Wood, Z.A. Chen, M. Platani, L. Fischer, D.F. Hudson, C.P. Ponting, T. Fukagawa, W.C. Earnshaw, J. Rappsilber: The Protein Composition of Mitotic Chromosomes Determined Using Multiclassifier Combinatorial Proteomics; *Cell* **2010**, *142(5)*, 810-821.

Sources from the Internet (if any) should be cited with URL and date of access. Citation in the text with Author and Year, e.g. (Kurreck et al., 2012), (Junne and Neubauer, 2010). 50‐80 references for Master theses, or 40-50 for Bachelor theses.

***12. Eidesstattliche Erklärung*:** „Ich versichere hiermit an Eides Statt, dass ich die von mir eingereichte Bachelorarbeit/Masterarbeit selbständig verfasst und ausschließlich die angegebenen Hilfsmittel und Quellen verwendet habe“, Ort, Datum, Unterschrift

***13. Curriculum Vitae:*** Short tabular CV(max. 1 page)

***14. Acknowledgements.*** MUST be included in the work (Can also be placed at the beginning). It is important, as the work is submitted under an individual name, but all scientific work today is interactive (single authors are the exception). Reference to all individuals associated with the work (including supervisor). Important: The acknowledgment must include the projects that funded the work (please discuss with the supervisor).

**15. Other:**

Note: A list of figures and tables is not necessary.

The scope of the work should be approximately 60-80 pages for Master theses, or 30-50 pages for Bachelor theses (excluding bibliography and appendix). Master theses must not exceed 100 pages in total, and Bachelor theses must not exceed 80 pages (appendix and bibliography not counted).

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|  | Master Theses | Bachelor Theses |
|  | Length (Printed pages) | Length (Printed pages) |
| Zusammenfassung / Abstract | **1** | **1** |
| Introduction | **0.5-1** | **0.5-1** |
| Literature review | **10-20** | **6-10** |
| Aim | **0.5-1** | **0.5-1** |
| Materials and Methods | **10-20** | **5-15** |
| Results | **20-30** | **10-20** |
| Discussion | **ca. 10** | **ca. 5** |
| Conclusion and Outlook | **0,5-1** | **0,5-1** |
| Total (excluding Theses, Table of Contents, References, Acknowledgments, CV | **60-80** | **30-50** |
| Number of References (minimum, may include more) | **50-80** | **40-50** |

Evaluation Form

