

Advice for Bachelor students for *PR with Bachelor Thesis – Administrative Details*¹

A thesis is an individual effort and no group-work is possible.

Disclaimer: These guidelines provide a general framework for conducting and writing a bachelor thesis. As each bachelor thesis has a different topic and focus, you must agree with your thesis advisor on the specific organization of your thesis.

Putting together a thesis is hard. To make your life a little easier we have put together some general guidelines on administrative details. This contains (1) how to find a topic and (2) specifics on the process, deadlines, and grading.

1. Finding a Topic

Ideally, you will find a thesis topic long before you enroll in the Bachelor thesis course. You should do this by talking to course instructors at courses that you really enjoyed. Or you can always knock on our doors and ask what research topics we might have available and see whether you could 'taste' the sweet honey of research before the end of your Bachelor. If you already found a supervisor and a **mutually agreed** topic please pass this information on to the course organizer before the end of the first week of the course.

However, if you were not able to do this ahead of time there is the possibility to be assigned a topic in the thesis course. It is mandatory for all students to be present at the first meeting of this course. At this meeting, all research groups participating in the course present their research areas together with a number of possible topics. Students should pay attention and take notes about the research areas and potential topics they are interested in. Afterwards, students have time until the end of the week to announce their preferences (how to exactly do this will be announced in the first meeting).

You will then be assigned a topic from this list. Those that do not send their preferences will be excluded from the course in that semester and will have to take it in the next semester.

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Please note that there are admission requirements, i.e. even though you might have a topic and supervisor, you will not be able to start your Bachelor thesis before you have passed particular courses. Details can be found in the published curricula.

Q: Is it also possible to come with your own topic?

It is generally also possible that you propose a topic yourself. In this case, it is your responsibility to find a supervisor before the seminar that fits the topic you want to work on. The potential supervisor will then evaluate the proposed topic in order to make sure that it fits into the scope and frame of a Bachelor thesis. Only if this evaluation is positive, you can work on this topic.

Q: Am I constrained on the topic of my thesis?

Yes! Depending on the subject of your studies, you will be constrained in the following way. If you are studying according to the 2011 curriculum and are enrolled in:

- Bioinformatics https://ufind.univie.ac.at/de/vvz_sub.html?spl=5&anchor=5212011B-PBB:
 - Bioinformatics with Bachelor's Thesis
- Business Informatics https://ufind.univie.ac.at/de/vvz_sub.html?spl=5&anchor=5262011-PBW:
 - Business Informatics with Bachelor's Thesis
- Media Informatics https://ufind.univie.ac.at/de/vvz_sub.html?spl=5&anchor=5212011M-PBM:
 - Media Informatics with Bachelor's Thesis
- Medical Computer Science https://ufind.univie.ac.at/de/vvz_sub.html?spl=5&anchor=5212011Z-PBZ:
 - Medical Computer Science with Bachelor's Thesis
- Scientific Computing https://ufind.univie.ac.at/de/vvz_sub.html?spl=5&anchor=5212011S-PBS:
 - Scientific Computing with Bachelor's Thesis

All of these have 18 ECTS.

If you are studying according to the 2016 curriculum and are enrolled in:

- Business Informatics https://ufind.univie.ac.at/de/vvz_sub.html?spl=5&anchor=5262016-ba:
 - Business Informatics with Bachelor's Thesis
- Media Informatics https://ufind.univie.ac.at/de/vvz_sub.html?spl=5&anchor=5212016M-ba:
 - Computer Graphics with Bachelor's Thesis
 - Multimedia with Bachelor's Thesis
- General Computer Science https://ufind.univie.ac.at/de/vvz_sub.html?spl=5&anchor=5212016I-ba:
 - Algorithms with Bachelor's Thesis

- Data Analysis with Bachelor's Thesis
- Computer Graphics with Bachelor's Thesis
- Internet Computing and Software Technologies with Bachelor's Thesis
- Information Management and Systems Engineering with Bachelor's Thesis
- Multimedia with Bachelor's Thesis
- Networks with Bachelor's Thesis
- Parallel Computing with Bachelor's Thesis
- Computer Science – Data Science
https://ufind.univie.ac.at/de/vvz_sub.html?spl=5&anchor=5212016D-ba:
 - Algorithms with Bachelor's Thesis
 - Data Analysis with Bachelor's Thesis
 - Information Management and Systems Engineering with Bachelor's Thesis
 - Parallel Computing with Bachelor's Thesis
- Computer Science – Medical Computer Science
https://ufind.univie.ac.at/de/vvz_sub.html?spl=5&anchor=5212016Z-ba:
 - Data Analysis with Bachelor's Thesis
 - Information Management and Systems Engineering with Bachelor's Thesis
 - Medical Informatics with Bachelor's Thesis
 - Multimedia with Bachelor's Thesis
- Computer Science – Scientific Computing
https://ufind.univie.ac.at/de/vvz_sub.html?spl=5&anchor=5212016S-ba:
 - Algorithms with Bachelor's Thesis
 - Data Analysis with Bachelor's Thesis
 - Parallel Computing with Bachelor's Thesis

All of these are 15 ECTS. For the general Computer Science bachelor you will only be able to choose a Bachelor thesis in a subject where you have chosen to take courses. I.e. if you didn't take any courses in the cluster of Computer Graphics, you will not be able to attend the "Computer Graphics with Bachelor's Thesis" practica.

2. Specifics on the process, grading, and deadlines.

Work load

A BSc thesis at the faculty of computer science at the University of Vienna is worth 15 ECTS. One ECTS is equivalent 25 hours of work per semester. Hence, assuming 15 weeks for one semester (given our deadlines), we are expecting you are putting in around 25 hours of work every week for your BSc work. This is the basis of our grading. Please note that if you are in the 2011 curriculum, the amount of work for a bachelor thesis is 18 ECTS.

Implementation requirement:

In order to successfully complete your thesis project, it will be necessary to implement a significant amount of code/software. Hence, it will be important to properly plan, architect, and

realize your software tool. This will be reflected in a logical and easy to follow structure of your code, including a clear and rigid testing regiment as well as good documentation.

Milestones & Progress Reports

A BSc project includes a significant amount of work, which necessitates continuous dedication of time and energy over the entire period of the project.

To ensure a continuous workflow, there are three crucial milestones that you must fulfill.

For each milestone, you need to send a **progress report** (pdf) to your supervisor via email. The progress report needs to include:

- the respective results of the milestone
- a documentation of your progress (what have you done)
- current challenges, open questions, and planned next steps.

These progress reports will help your supervisor to monitor the status of your thesis and give you advise or help you with your time management if needed.

Note, that sending these progress reports is your responsibility; it is not the duty of the supervisor to remind you to do so!

Unless differently agreed to with your supervisor, each milestone will be followed up with and discussed in a meeting. Please send the progress reports for a respective meeting no later than 24h before the meeting:

1. Milestone (~after 2 weeks)

The first milestone should be in the beginning of your BSc project after you:

- thought through the problem,
- did the first round of literature analysis,
- had some first ideas for solving the problem,
- have generated a time table with adequate sub-milestones, and
- collected questions that you would like to discuss with your supervisor.

During the meeting, you and your supervisor will focus on the following items:

- discuss and adjust sub-milestones
- concrete "thesis proposal" with sub-milestones, etc. (the "thesis proposal" will then act as a sort of "research contract" between us: in written form, it clearly specifies the goals that you want to have reached at the end of the thesis.)

2. Milestone (~after 1.5 month, halftime)

The second milestone is about the design/solution that you propose. For that, you will need to have done:

- iterative and parallel prototyping
- started coding the solution and have a first running software prototype

During the meeting, we will focus on the following items:

- check on milestone
- status update
- discuss issues and suggestions on how to go about them

3. Milestone (~after 3 month)

The third milestone regards the fully-implemented technique/tool you built. You need to describe:

- your technique/tool, or a link to it
- if necessary: a quick how-to about how to get it running, and how to use it (usually not more than 10-20 lines/bullet points)
- If your technique/tool needs additional software to be installed, please let your supervisor know at least one week before the meeting.

During the meeting, you and your supervisor will focus on the following items:

- do another status update
- check milestones and advancement
- derive final to-dos with respect to the technique/tool
- discuss and jointly decide on how to (further) evaluate it

Meetings

In addition to the three milestone meetings with your supervisor, you might engage in more than these meetings, for instance, weekly, or bi-weekly, one-on-one or in small groups. This depends on your project, your supervisor, and most importantly on your **own dedication**. Some general notes on meetings:

- Each meeting is usually between 30 and 60 minutes. Carving more time out of your supervisor's schedule is usually a tricky business.
- It is your responsibility to set a meeting time with your supervisor (do that early on (some weeks in advance, be aware of the ever-present time restrictions of your supervisor!).
- Be prepared for the meetings! Think about the points you want to talk about (agenda), prepare software demos (if you have any)! Send your supervisor any material you want to look at before the meeting at least 24h before the meeting (such as the progress reports).
- Plan ahead: that is, do **not** have your first meeting 2 weeks before the submission deadline!

Final presentation

After you are done (or when you are close to the end), you have to have a presentation in front of a broader audience. Usually, you will be given approx. 10-15 minutes slots including the presentation of your work and discussion.

- Prepare slides, practice your talk.
- The final presentations are usually in the last 2 weeks of the semester in which you are attending the Bachelor seminar (that is, you also should not try to cram all the work into the very last month!)
- The presentation should preferably be in English

Talk guidelines:

- Your presentation should include a live demo of the tool you have built (the demo is part of the 15 minutes)
- Focus on the most interesting parts! You don't have to talk about everything you have done, all the details will be in the thesis they don't have to be in the talk!
- Some details are necessary: e.g., #users in a study or some performance results
- You also do *not* have to exactly follow the outline of your written thesis! Often, it is not even necessary to talk about every section!
- Practice the talk!!! Stop the time when practicing: 15 min is not a lot of time!

Here are two models that you might find helpful when preparing (good) talks. While another style is totally ok, we do require you to think about what would work for your audience and how to best communicate your ideas and your contributions.

- *Onion model*: rather than telling a sequential story with a surprising end, you should think of the talk as rings of an onion. You start with the very core including the problem, goals but also the most important findings and contributions. Then step by step you add more details to this core, the rings of the onion. It, for instance, might be a good idea to start with the demo so people know what it is all about. Your audience will not have the same background on your topic neither will they have thought so deeply as you about it!
- *Prototyping T model*: Give you audience a quick overview of the breadth of what you did (the horizontal line in the T), but only go into depth for some parts of it (the most interesting ones, the vertical line in the T, note: you can go into depth with more than one thing of course, but be cautious not trying to fit too much things into your talk).

Deadline for submission

The deadline for your final submission is defined by when you take the course "Praktikum mit Bachelorarbeit". If you write your thesis in the summer term (SS), the final deadline is **June 30**. In the winter term (WS), the final deadline is **January 31**. It is recommended that you submit your thesis draft for feedback and review before you finalize it.

A suggested timeline

A good timeline for your thesis would be the following. Note, some individual adjustments are always possible, however, if you steer too far from this timeline, it will be hard if not impossible to be successful.

Mar 10 / Oct 10 – the topic should be clarified (Milestone 1)

Apr 30 / Nov 30 – significant progress (Milestone 2)

May 30 / Dec 30 – finished implementation (Milestone 3)

Jun 15 / Jan 15 – first complete draft of your thesis for review and feedback

Jun 30 / Jan 31 – last day for your presentation, final thesis submission; the presentation time slots are set by your supervisor and might not be exactly on the last day of the semester.

Grading

Your work will be evaluated according to the following grading scheme:

Presentation + Milestones: **10%**

- First three milestones: 3% (quality / quantity of progress)
- Final presentation: 7%

Design & Code: **45%**

Thesis: **45%**

- 30%: Content (quality of proposed solution, conducted evaluation, etc.)
- 15%: Written report

100-88%: grade 1

87-75: grade 2

74-63: grade 3

62-50: grade 4

< 50: grade 5 (failed)

Minimum requirements for passing the course:

- 50% of the points for the thesis
- 50% of the points for the Code AND
- 50% of the points for the presentation

Failure of achieving these minimum requirements will result in a grade of “5” (failing the course).

In order to give you a better sense for how we will evaluate your achievements, please consider the following:

Design & Code:

Evaluation of your design and your code will consider basic principles of software engineering:

We will check the quality of your **design** based on coverage and completeness of the design specifications in terms of textual specification, formal methods, and/or the use of design languages like UML, and using/targeting appropriate technologies, libraries, and tools. This means we will evaluate:

- how comprehensive is the design (e.g., are all major parts covered by design specifications)
- is the design sufficiently specified in a professional way (e.g., text, figures, UML specs, etc.)
- is the design well-structured (e.g., abstraction, modularity, partitioning into components, subsystems, etc.)
- can your design specification be used by another team to re-implement your project
- etc.

We will check the quality of your **code** based on its stability, robustness, and readability. And we will check if your coding has been performed using professional coding techniques and tools (e.g., using IDEs, GitLab, etc.) and how your code meets the design. This means that we will evaluate:

- how easy is it to get it running (is there sufficient documentation, does it include easy to try test cases, etc.)
- is it well documented (the code itself)
- is it well structured (from indentation to logical structure)
- does it make use of appropriate technologies, libraries, and tools
- does it deal well with errors / incorrect inputs
- etc.

Degree of difficulty:

We will consider the complexity of the problem statement, the degree of specification given vs. your own refinement of the tasks, available literature, the ratio of theoretical vs. practical achievements, keeping to the milestones, fulfillment of all requirements.

Originality:

We will consider self-initiative, finding solutions to an unsolved problem, novel solutions to a solved problem, a proper breakdown of the problem into smaller steps, does the quality of the results lead to interesting follow-up studies.

Scientific methods:

Understanding of the larger context of the problem statement, using the proper formal methods to approach a solution to the problem, the systematic and analytic approach taken, consideration and evaluation of alternative solution strategies, validation/proof of all hypothesis.

Style:

Ability to clearly and precisely articulate your thoughts, appropriate level of context, length of the write-up and single chapters as well as the appropriate use of illustrations.

Form:

The care put into the execution of the work and the writing, including illustrations and tables, layout, structure, table of content, etc. a proper overview of abbreviations, references, as well as legends to pictures and tables.

Overall, the purpose of a Bachelor thesis is to evaluate whether the student (on one's own) is able – within a certain timeline – to solve a problem within one's area of expertise using the skills learned during the courses. The written thesis includes a description of the problem as well as the insights gained using the proper scientific methods. The level of the work (and presentation) should be accessible to your peers.