

Getting started with a Master's Thesis (Version 1.0.0)

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Abstract

Finding and starting a Master's Thesis is not trivial and involves several aspects. Apart from making the choice between an internal and external thesis, interest of of students, professors and external project partners must be balanced. Furthermore, task and scope must be negotiated and supervision fixed. In addition, questions regarding side jobs, the disclosure of results and formalities must be addressed.

are supposed to invest a workload of 900 hours exclusively for this module.

Any regulations such as prerequisites before starting the module (usually a minimum number of credits achieved), pausing it or extending it beyond the regular duration of six months can be found in the exam regulations document. Students are strongly advised to check in which version of the exam regulations they are currently enrolled and, hence, which rules apply for them.

1 Audience

This document addresses computer science students in the master's program of Bingen UAS as well as companies or other parties wishing to cooperate in master's thesis projects with Bingen UAS.

3 Disclaimer

This document reflects my knowledge at the time of writing and makes no claims regarding completeness or correctness. Hence, it is by no means legally binding. Any regulations mentioned are subject to change and are meant to be carefully studied by students in addition to reading this guide.

2 Introduction

The study program Computer Science at Bingen University of Applied Sciences (UAS) reserves the third semester entirely for the Master's Thesis. This means students

4 Internal versus external Theses

Master theses can roughly be distinguished into two types:

Internal Thesis The thesis is executed directly at Bingen UAS. Typically, these are internal research projects conducted in the local laboratories. Sometimes, external parties may be involved for example in the role of feedback or requirements providers.

External Thesis The thesis is materialised outside of Bingen UAS in cooperation with an external project partner. In most cases, external project partners are companies from the industry. Apart from that, also private or public institutions can function as external project partners.

Another important discriminator between these types is the supervision. While internal theses are solely supervised by internal staff from Bingen UAS (typically professors themselves), external theses are co-supervised by a representative of the external project partner. In both cases, the first supervisor is a professor at Bingen UAS.

5 Deciding on a thesis type

It is completely impossible to give general recommendations which thesis type should be chosen. The “right” type highly depends on the individual student along with available topics at the time the decision is about to be made.

One major advantage of external theses can be that by doing the thesis, the student can get one foot into the project partner’s door. Often, such students are offered a work contract along the way, while students having completed an internal thesis must face the usual application route to find a job after their thesis. On the other hand, results from internal theses are often more likely

to be published being an advantage for students intending to pursue an academic career (after completion of their Master’s degree).

Topic-wise, results from both thesis types should enhance the general body of knowledge and provide a benefit for the broader research community. This can already be the case if a given problem has some interesting aspects and was solved in a way that is also applicable elsewhere. What must be avoided is pure product development as this does not match the expectations of a Master’s thesis.

The remaining sections discuss the case of external theses. Yet, they also apply to internal theses mentally skipping the external component.

6 Aiming for win-win-win

In external theses there are three involved parties. In many cases, they have (slightly) different goals so that a compromise between them must be reached. Although these goals can vary, from my experience the following distinction applies in many situations:

Students wish to solve challenging tasks in a field of their interest. They hope to be awarded with a good grade from the university and also plan to transit well to a potential future employer.

External Project Partners intend to have a particular issue solved for which they typically lack own capacities available. They also mean to recruit students as potential staff for their organization.

Professors will be the ones to grade the Master’s thesis and must ensure both

task and topic meet high academic standards. Professors often prefer supervising theses well aligned with their personal expertise and research interests. They aim to gain insights for new and unresolved challenges and can be interested in publishing results of the theses later on.

If you examine these goals carefully, you might spot potential conflicts. In most cases, they arise because not every problem unresolved at an external partner's institution is actually an interesting academic challenge. Issues, where the solution path is obvious and getting there only requires a hard working person usually don't qualify as applicable for master's theses. They might, however, perfectly meet all criteria for an internship.

7 Inception

Each master's thesis is unique. So are the ways how a Master's thesis is initiated. It does not matter who starts the initiative but it is important to keep the previously discussed differing goals in mind. It is a rather rare case that professors have worked-out ideas "in the drawer" and project partners at hand. In such cases professors often announce such projects or look for potential students themselves.

Students should avoid contacting professors without knowing in which field they plan to do their thesis. This is especially true for students without an external project partner at hand. Professors usually have good industry contacts and can request potential project partners, however, they usually cannot do it on a basis of "I have a student who does not know what he/she wants, do you have any open projects?"

Project partners should avoid offering "fixed" theses to students without having talked to professors that would be willing to supervise them. Instead, they are warmly welcome to propose ideas but should be open for reasonable compromises as the goals of all affected parties must be considered - and not only theirs.

8 Finding the right supervisor

With the exception of projects having been openly announced by a professor, choosing the supervisor is usually up to the student or external project partner. While the latter often make choices based on prior experience and matches with research interests, students may be doubtful which professor to approach.

Selection criteria such as matching research interests or expertise have already been mentioned. Some professors publish their interests on their website. In cases when they don't, researching previous publications or projects conducted by the professors is highly recommended.

Another issue is time and availability. Professors only have limited capacities, particularly regarding the supervision of internal theses being far more time-consuming than external theses. Furthermore, availability of professors during the semester holidays is often limited. Hence, it is strongly recommended to approach professors already weeks ahead.

9 Grading

The first supervisor must be a professor from Bingen UAS. Apart from the first supervisor, the thesis is also graded by a second examiner. Typically, the first supervisor

proposes a suitable colleague, however, students are free to issue own suggestions.

A supervisor from the external project partner can also be appointed as second examiner. However, this only works if this person holds the required qualification level. This check is done by the exam board and permission must be granted before the thesis starts. The request must be issued by the first supervisor. Once the thesis has started, only staff with the required qualification level from Bingen UAS can be appointed as second supervisor.

Grading criteria often differ among examiners. Hence, it is hard to give definite guidelines here - except for giving the recommendation, to discuss grading criteria with the examiners ideally before starting the thesis. Regarding myself, I usually apply the following five criteria that are based on recommendations from literature:

Knowledge and Skills Did the candidate demonstrate excellence in terms of skills? Did the candidate show willingness and ability to extend his/her knowledge and abilities?

Systematics and scientific approach Was the project approached systematically and in line with scientific principles?

Initiative, dedication and self-reliance Did the candidate develop own ideas on his/her own initiative?

quality of results Could all goals initially stated be met and have some even been excelled?

presentation of results Has the project been clearly communicated in the thesis document and the oral presentation?

10 Fixating scope and task

Reaching a win-win-win situation for all parties involved usually requires making trade-offs. I highly recommend fixating all relevant fundamentals in a written draft of the thesis description, usually a one-pager. Even half-baked drafts can serve a discussion much better than ideas merely discussed orally in meetings. It is not of major importance of who takes the initiative to write the first draft. This can be done by any of the parties.

During the inception phase, the draft can be refined into a suitable document. This often requires two, three or even more iterations. However, in the end all involved parties reach an agreement establishing the basis for both execution and grading of the actual project.

11 Work contracts and side jobs

Students and external project partners are free to negotiate contacts between each other. This also includes monetary or other compensations for conducting the Master's thesis. There is no minimum or maximum payment enforced by Bingen UAS. Other regulations might apply.

Successfully completing a master's thesis requires enormous dedication and tight focus on the topic. Hence, doing other work aside of the thesis is clearly discouraged. This applies to both work at the external project partner with no benefit for the Master's thesis project as well as any other side jobs.

12 Disclosure of results

As a public state university, Bingen UAS has a strong interest in making all results achieved in master's theses available to the general public upon completion. However, there are cases when external project partners might run into conflicts with trade secrets or other company assets. In such cases, there is the option of signing a time-limited non-disclosure agreement with Bingen UAS.

In general, proof-reading the thesis or other artifacts such as source code for potential disclosure issues is desirable. However, this must be considered when planning the project. External project partners must ensure that in such cases all required resources (such as the legal departments) are available. Otherwise, students could end up in the dilemma of either delivering their thesis without approval from the external project partner or formally failing their project due to not submitting it timely. Such situations should be avoided at all costs.

13 Formalities

All professors at Bingen UAS get familiarized with the internal process of formally registering a master's thesis as part of their own on-boarding process. Hence, they can guide the student and project partner in the following phase. If all works well, the exam board will approve the thesis together with its official start and delivery deadline. Yet, there are some aspects to be considered beforehand:

- Master's theses can be started at any time and are not liable to semesters.
- As each thesis must be approved by the exam board, the thesis cannot be

started directly after the student, supervisor and external project partner agree on it. It is advisable expect an estimated two weeks period between registering and starting the thesis.

- All forms for the formal registration of a thesis can also be found in the Olat course of the exam board (internal platform with access restricted to students and staff).

14 During the thesis

Students are advised to maintain regular contact with their supervisors during the thesis. This is especially true in cases when something goes wrong or unexpected events occur. In case of illness, students are strongly advised to obtain medical certificates - once handed in, they will be automatically treated as requests for extension. Extensions are also possible in other extraordinary cases (e.g. death of a family member) - but they must be requested correctly. As extensions are almost never allowed after the submission deadline for the thesis is over, I can not stress enough how important it is to get in touch with the supervisor and/or the exam office in case of unexpected events.

The thesis document must be formatted according to the requirements by Bingen UAS. Links to suitable templates can be found in our Olat course. Students should be aware of the strict requirement of submitting printed copies of the thesis document.

The thesis must be defended in a presentation with subsequent discussion open to all students and university staff. External project partners can be invited to join the event. In case external partners cannot attend, I strongly recommend to give a

presentation at the external project partner beforehand.

Further guidelines for planning and executing the project are beyond the scope of this guide.

15 Acknowledgement

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