

# Guidelines for MS Thesis and Project Work

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## Step 1. Understand the difference between a Thesis and a Project

Before choosing between a Thesis and a Project, you should understand the fundamental differences between the two. While both involve a written document and oral presentation (or defense) to a committee, a thesis is generally larger in scope, has a more theoretical basis, and a deeper contribution to the field. A thesis must include a substantive literature review, a set of hypotheses or research questions, the development of a research framework (often a software or methodology), and an analysis of results that ties back to the initial hypotheses.

A project will be more contained and focused, and often involves creating a piece of software to resolve some specific issue or problem. Projects typically have a narrower literature review, more restrictive hypotheses, and less intensive analysis of results. However, a project's contributions to the field should still be significant and result in a well engineered software product as demonstrated by a complete description and supporting evidence of the use of an accepted development process.

The thesis option requires that students take 24 credits (not including thesis/project credits), while the project option requires 30 credits (not including thesis/project credits).

## Step 2. Find an advisor

Both thesis and project options require that you work with a main advisor, also called your committee Chair, from within the CS department. Your choice of advisor is an important one and should be decided carefully. The primary consideration when choosing an advisor is that he or she has the necessary expertise in the area of interest you have chosen for your research. Note that there might not be a faculty member with the expertise needed to fully support the research topic you have chosen, in which case you will have to find a different topic. You should arrange a meeting with the faculty member you believe is best suited to support your work and come prepared to discuss your ideas of potential topics. Faculty members may also contribute additional suggestions for you to consider. After this initial meeting, the faculty member may either agree to work with you or recommend that you visit with other department members that might be more suitable.

Generally, if you are working with an advisor that is supporting you with a Research Assistantship (RA), the advisor may have specific expectations for your thesis or project scope and subject matter. If you are self-supporting, or supported with a Teaching Assistantship (TA), you may have more freedom in selecting your thesis topic.

### **Step 3. Write your proposal**

A written proposal is required for both thesis and project options and is a critical part of the overall process. Proposals should be viewed as a contract of sorts between you and the department as to the agreed upon course of study. Your proposal should be between 3-5 pages long, and should contain the following components roughly in the order given: Introduction, literature review, description of the problem, hypothesis, research methodology, timeline and bibliography. Thesis proposals might additionally contain relevant hypotheses, research questions, and evaluation methods. You should discuss an appropriate outline for your proposal with your advisor prior to developing it. Once the proposal has been accepted by your advisor, a copy signed by both you and your advisor should be placed in your academic folder in the department's main office. Any subsequent major changes to the proposal must be re-submitted and re-approved by the advisor.

### **Step 4. Assemble the rest of your committee**

You must now work to assemble the rest of your committee. In addition to your advisor, you must also find a secondary reader from the CS department, and a 3<sup>rd</sup> faculty member from outside the department. All committee members must be tenure-track faculty members. Your advisor may make suggestions for people to ask, but it is your responsibility to meet with these faculty members and ask them to be on your committee. All committee members **must** be selected at least **10 weeks** before your scheduled defense. When you meet with them for the first time, be prepared to explain your research and give them a copy of your proposal to read. If they agree to serve on your committee, you should give them regular updates of your progress.

### **Step 5. Get familiar with University deadlines and required paperwork**

As you near completion of your research, you should remain aware of the deadlines and requirements established by the Graduate School. A good website to look at for this is: <http://life.umt.edu/grad/name/mresources1>. It is your responsibility to make sure that the necessary paperwork is filed on time and in the proper order.

### **Step 6. Remain in close contact with your advisor as you complete the work**

Your advisor is the primary contact for the work you are completing, and as such you should meet with him/her frequently to make sure you are progressing as planned. It is a good idea to schedule regular meetings with your advisor to ensure that you are on track. If there are any significant changes to your work from what was established in your original proposal, they must be approved by your advisor. If you fail to complete your thesis or project within two years of having your initial proposal approved, you must re-submit it and have it approved again. At this time, your advisor may choose to discontinue his/her role as your committee Chair and recommend a new faculty member for you to work with.

## Step 7. Complete written document

Both thesis and project options require a written document to be submitted to the Graduate School upon completion of the research. As mentioned above, the length and scope of this document depends on whether you are completing a thesis or a project. The Computer Science department keeps copies of thesis and project documents completed by previous graduate students, and it is a good idea to look through a few of these in the area of your research so that you have a better understanding of what is expected. Completing your written document usually requires a number of iterations between you and your advisor whereby you submit an initial draft, he or she gives you feedback and changes to make, and you re-submit the updates again for approval. You should work with your advisor to discuss the appropriate level and amount of work to submit each time. For example, some advisors might like you to submit one chapter at a time in the correct sequence, whereas others might be more flexible or have different requirements. Depending on the quality of the original draft, this process may require multiple iterations and a significant amount of time. You should plan your schedule carefully to ensure that your advisor is available during this process, and assume that he or she will need a few weeks at a time to read your work and give you feedback. You must deliver your thesis to all committee members at least **3 weeks** prior to your defense.

## Step 8. Defend

Once you have completed your research and your written document to your advisor's approval, it is time to schedule your oral defense. All committee members must be present at your defense, which will also be advertised by the department and open to the public. During the defense, you should take the first 30-40 minutes to present your work to the assembled audience, after which you will field questions from the public audience. Once this initial questioning is complete, the public will be asked to leave the room and questioning will continue from members of your committee. The entire defense usually takes between 90-120 minutes.

## Step 9. Submit formatted document to Grad school by deadline

When you pass your oral defense, the final step in the process is to revise your written document one more time by including any additional comments offered by your advisor and other committee members. You must then format it and submit it to the Graduate School by the appropriate deadline.