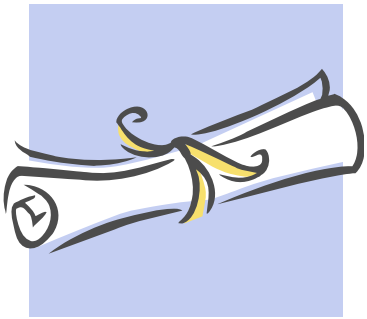
CHALMERS | UNIVERSITY OF GOTHENBURG

A compressed guide for your

Master Thesis work

at

Computer Science and Engineering



MASTER THESIS

The master thesis is the final part of the Master of Science programme and is intended to give a deeper knowledge of the subject at hand and to give an insight into the working processes used within a company, other institutions or within the department. The work is done as an independent project, in most cases in groups of two students. Some important points are:

- Gather new insights and apply acquired knowledge.
- Independently plan and solve a problem within a selected field.
- Work with a concrete and well defined problem within a realistic engineering situation.
- Produce a well written report of the work.
- Present the work orally.

The goal is to prepare the student for future independent work as a *Master of Science*

Chalmers have central rules, and in case there is a conflict in the information, the information on our pages is valid.

Responsible for the thesis work at the department:

Sven Knutsson
E-post: svenk@chalmers.se
Tel: 031-772 5727

STUDENT PAGES

The master thesis is the final, vital part of the Master of Science programme. The work is done as an independent project, in most cases in groups of two students.
There are two levels of master thesis, 30 hec and 60 hec:

1. The **30 hec** master thesis is the normal one. In most cases it is conducted at a company and in groups of two students. The work is scheduled to last for 20 weeks.
2. The **60 hec** master thesis is more of an exception. It is not only supposed to last longer and take 40 weeks instead of 20, but it should also contain a higher degree of research related work. This kind of master thesis should be conducted in close contact with one of the research groups at the department and should in most cases take place within one of these groups although an external company might also be involved.

PREREQUISITES

For students at Chalmers

Students pursuing the five-year Master of Science training must have acquired at least 225 hec before beginning work on a master thesis. Students who only take part in a Master programme must have acquired at least 45 hec within the programme before starting the master thesis work. For a specific thesis proposal there might also be additional prerequisits concerning which courses that have to be taken before starting the master thesis work.

For students at GU

To be eligible for this course, the equivalent of 90 hec is required, not counting credits from an earlier, first cycle (Bachelor) degree. At least 60 hec (or more) must come from courses on the advanced (Master) level, out of which 45 hec (or more) must come from courses within the Computer Science area. A first cycle (Bachelor) degree is assumed in general. In particular, a Bachelor thesis (15 hec) is required as a prerequisite. Not only the number of points is important, the courses taken should also be suitable for the project at hand.

GETTING STARTED

The first steps on the route from finding a master thesis to being assigned an examiner, are:

- Make sure that you have the required prerequisites
- Find a project for the master thesis

- Make a description of the proposed project
- Download and fill in the registration form
- Submit the proposal to the master thesis coordinator for approval. The proposal should be accompanied by a registration form
- On approval the project group will be assigned a supervisor and an examiner at the department and the project will be registered
- The master thesis coordinator informs the student of the approval and the assigned examiner.

HOW TO FIND A PROJECT

Projects for master theses can be found externally in the industry or other organizations, or internally within the department. We recommend that you try to find the project in the industry since the industrial surrounding is a good start for a forthcoming working life.

Many students find their projects by themselves through earlier contacts or by contacting companies. Many companies publish master thesis proposals on their home pages. Some proposals from the industry are presented on our home page. The proposals might need some polishing before they can be approved by the department. Project proposals can also be found from within the department. You will find these proposals listed on the department's master thesis homepage.

If you have an idea in what field you would like to do your master thesis but you have no finished proposal you should contact some staff member within the department who is working on these topics and try to work out a proposal. But as stated earlier, in most cases it is better if you can find a project in the industry.

You can also look in the *Nationella exjobbspoolen*, at www.xjobb.nu.

ACCEPTANCE FLOW

This is the expected flow from the time the student has found a suitable project for his/her master thesis to the registration of the project

- The student submits the proposal to the master thesis coordinator. The proposal should be accompanied by a registration form.
- The master thesis coordinator makes sure that the student has the required number of hec to start the thesis work.
- The proposal is handed over to the coordinator of the relevant master program for approval.

- After approval the Director of undergraduate studies appoints an examiner or makes sure that this is done on his/her behalf.
- The Director of undergraduate studies will also appoint a supervisor at the division. In most cases the examiner and the supervisor is one and the same person.
- The examiner checks that the student has taken the relevant courses to be able to accomplish the project and, if this is the case, gives the final approval.
- The examiner hands the papers back to the master thesis coordinator.
- The master coordinator hands the papers over to the Student Office for final registration.
- The master coordinator notifies the students of the approval and of their examiner and supervisor.

WORK FLOW

The master thesis work should be carried out in a structured way and this is ensured by a well formed planning report that sets the time plan and decides on the important steps on the way.
Your thesis work could be divided into a number of activities like

- Planning
- Preparation, finding and studying background material
- Work on the assignment
- Report of the work, both orally and in written form

Although your time plan could be built on these points you should not treat them as separate time slots. The activities interact and are therefore often to a great extent carried out in parallel.

- As part of the preparation for your own presentation you should listen to the **oral presentation of two other master theses**. This should preferably be carried out in the later part of the first half of your own work, to give you an idea of how your own presentation should be carried out and this could also assist you in the writing of your own report.
- You should also **act as an opponent** to another master thesis. This master thesis should be within the field of the department of Computer Science and Engineering. You should do this opposition in the first part of the second part of your work. Once again as a preparation for your own presentation and report.
- Finally, you should **present your own work in an oral presentation and a written report**. The oral presentation should not be carried out until the report

is written and only might need some polishing to go to print. This means that your need the approval of you examiner to do the oral presentation.

Not counting any kind of product that might come out of your thesis work, the written report is the lasting result from the work and therefore it should be planned, prepared and written in a thorough way. To ensure this you should start writing your report early on, and continue to write throughout the work, although some of it might need an update later on when more pieces have fallen into place. Make the writing of the report a part of your thesis work.

The master thesis work card will follow you through the project and you will get signatures on this when you have done one of the required tasks:

- You have an approved planning report for your master thesis
- You have listened to someone else oral master thesis presentation (you should have two of these)
- You have acted as the opponent to someone else master thesis
- You have done your own oral presentation
- The written report has passed through *Urkund*
- The written report has been approved by the examiner
- You get a final signature from the examiner when all is done

Print the master thesis card and bring it to the presentations to get it signed.

WRITTEN REPORT

Instructions on how to write the master thesis report

All research should be carried out using a scientific method and this should be reflected in your report and a certain scientific level will be required.

- The report must not only describe your **results**. It should also describe how you have reached these results. You must describe your **method** of work. The method and the results should be presented separately.
- Include **problems** that you have encountered during your work. How were the problems solved? Did you bypass them or did you not reach a solution? This information makes it possible to understand why you did, or did not choose a certain method. In many cases the reader of the report can learn just as much from your sidetracks and mistakes as from your success.
- **Experiments** should be carried out and described in a way that makes it possible to reproduce them.
- If possible, relate your work to your **reference literature** and to scientific knowledge.
- Statements that are not obvious should be clarified. **Motivate and argue** for your statements. If needed, **refer** to other sources.
- Make sure that you separate actual facts from your interpretations of these facts.
- There must be a **source reference** to all information that you get from elsewhere.
- Separate carefully between your own material and quoted material. **Quotations** should preferably be sparse and clearly marked. Plagiarism is prohibited.

How to write

You may find it hard to get started with writing your report. It is especially hard to find a good way to structure the material. On the web there are lots of good recommendations from institutions all over the world. We recommend that you browse for these. We can also recommend Chalmers Open Communication Studio WIKI. (http://wiki.portal.chalmers.se/CHOCS/pmwiki.php/Resources/Writing)

How to handle your sources

It is important that the text in your report is your own. Direct reference to other literature should be sparse and clearly noted. Plagiarism is prohibited. Read more on the handling of sources at *Academic Honesty and Integrity at Chalmers*.

Cover page

Your report should have a common front page. This comes in three different versions depending on your thesis work

- Master thesis at Chalmers
- Master thesis at the University of Gothenburg
- Collaborative master thesis between Chalmers and Gothenburg University

Please find the templates at our home page “Rules and templates”. In some cases the company where you do your thesis work will want their own cover page. In these cases this cover page should be placed behind the common cover page.

URKUND

Your master thesis report will be checked for plagiarism. This is done using the automated computer tool *Urkund*, which is a web based service to check documents for plagiarism, that is to check if parts of the material has been taken from other sources. Your report should pass through Urkund without being flagged.

You submit your report to *Urkund* by sending it to a user account at *Urkund*. Your examiner will give you the address.
The result of the analysis will be sent to your examiner and he/she will evaluate if the document has passed or not. In most cases it is unavoidable that some part of the report will have strong similarities to some text that is used in the comparison. It is for the examiner to decide the relevance of this similarity.

The document you submit could be in the following formats:

- .doc
- .docx
- .sxw
- .pdf
- .txt
- .rtf
- .html
- .htm
- .wps
- .odt

The document can not contain any document protection or encryption. Files compressed with WinZip or BinHex are supported though.

ORAL PRESENTATION AND OPPOSITION

Oral presentation

The oral presentation of your master thesis should be presented in English in front of your examiner, the students who have prepared an opposition to your presentation, and other interested students and staff.

The presentation should last for no more than 30 minutes. It should cover the full thesis work and be presented in a way that makes it easy for students with similar background as your own to follow the description although they have not read the written report.

The presentation should preferably be supported by the use of visual aids like computer presentations. In some cases demonstration of hardware and software might be appropriate.

After the presentation the student should be prepared to answer questions and comment on statements both from the opposition and from the audience. The opponents need to have access to the written thesis report not less than one week before the oral presentation in order to do their job.

Opposition

The oral presentation is followed by opposition from one or two students who are in the process of doing their own master theses.

The opposition group has 10-15 minutes to present their opinion on how the presentation was performed, to ask questions on the material and to discuss it with the presenter. The questions and discussion should not focus on details but be more general so the rest of the audience who have not read the written report can be able to follow the discussion and maybe give their own input.

Useful points to consider when performing the opposition are:

- The planning and structure of the report
- Definition of the problem at hand
- Method and realization
- Deliminations
- Theory
- Analysis
- Results and the handling of the results
- The shaping of the report and formal points like references