

# **Directions for the Master's Thesis**



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## Schedule for carrying out the project

The schedule below indicates important dates, periods and distribution of responsibility for both students and supervisors during the master's project

<b>Period</b>		<b>Students</b>	<b>Staff</b>
<b>Spring (1st year)</b>	-	Start thinking about master's thesis	Organize a seminar where research areas and potential research projects are presented
<b>June</b>	-	Attend thesis presentations given by final year MSc students to get ideas and inspirations	Tenure staff attends the presentations if possible
<b>Summer</b>		Keep thinking about thesis	Outline possible thesis proposals for students
<b>Aug/Sept</b>			Present thesis proposal on web page and in the Research Design course
<b>Sept</b>	End	Choose an initial topic for Research Design course	
<b>Dec/Jan</b>	Mid	Hand-in final pre-thesis report including a description of the chosen topic and a project schedule. Students planning to submit their theses in Nov 1 instead of July 1, send notice to administrator.	
<b>Jan</b>	End		Staff meeting to approve proposed topics
<b>Feb</b>	Beg	Hand in progress report to supervisor	
	Mid	Present project status at master's thesis seminar	Participate in the thesis seminar and provide feedback to students
<b>March</b>			Staff meeting to discuss progress reports
<b>May</b>	Beg	Trial presentation at master's seminar	Participate in the thesis seminar and provide feedback to students
<b>May</b>	End	Hand in final draft of thesis for June presentation	Administrator distribute submitted theses randomly among students to select "peer opponents"
<b>June</b>	Beg		
	Beg	Presentation of thesis work; participate as "peer opponent" for one fellow student	Tenure staff attends the presentations if possible
	2nd part	Prepare final version of thesis	
<b>July</b>	1/7	Hand in final version	
<b>July/Aug</b>	31/8		Supervisors and examiners grade the theses
<b>Nov</b>	1/11	Part time students only: Presentations second week in October. Hand in final version Nov 1	Supervisor and examiner grade in November.

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# 1 General

These directions describe the running and supervising of master's projects as well as the composition and layout of the master's thesis. Since the formal name of the course is IMT4901 Master's Thesis this is chosen as basis for the name of the directions.

Projects may be performed at – or in close collaboration with – an organization outside of GUC. Masters theses will be graded according to the ECTS (marks A-F) with input from the supervisors. External examiners approved by GUC will grade the theses.

Students are encouraged to read the course description for Master's Thesis (IMT4901).

## 1.1 Administration

The administrator of the master's projects is the Head of the department. Information will be communicated to students via email, web and Fronter. Hence, students are expected to read email and visit the web and Fronter regularly.

## 1.2 The Master's Project

A master project is the work of an individual student. Different students may solve problems that are closely related, but they must write individual reports. The master project consists of two parts: the investigation the students make and the report they write. Both parts are important. The following requirements relate to the investigation part, and must be fulfilled during the course of the project:

- The work on the project can only start after the students have made a detailed specification of the project including a time schedule and a reading list. They also have to sign the Master's Thesis Agreement with a supervisor.
- The written report must be approved by the supervisor for presentation at the concluding master seminar.
- The student must have made an acceptable oral presentation of the master thesis at the concluding master seminar
- The student must have read one other student's draft thesis, written an opposition protocol, and acted as opponent for the other master project student in an acceptable manner

## 1.3 Resources

The web pages at <http://www.hig.no/imt/master> contain information concerning the master's thesis, such as hints as to where to find an idea for a project proposal and schedules for the master thesis seminars. Theses that have been submitted will be posted on the web provided that the mark is C or better. This website should be a valuable resource for students working on their own master projects.

## 1.4 Role of the Supervisor

Each student has a supervisor at GUC, and this person judges whether the proposed project is suitable for a master thesis. If the master project is an external one, the student probably will have most frequent contact with an external supervisor. It is still recommended that the GUC supervisor visits the student and the external supervisor at the work place. Such meeting gives both parts a better understanding of the GUC-demands and the external working-conditions.

Supervising students is just one of many tasks of the GUC supervisor. Hence, it is up to the student to keep in touch with their supervisor and to give the supervisor reasonable time to read the report. As a general rule it is reasonable to count at least one week for a thorough reading.

## **2 The Master's Project**

Projects must be devoted to a problem within the subject of the master programme. They often involve investigating and analyzing a problem, followed by suggesting, building and testing a prototype solution. Focus should be on the investigating and analyzing parts. If programming is involved, its purpose should be to help finding viable solutions to the problem (product quality software development is usually beyond the scope of a master project). The work should be performed and documented in a scientific or research-oriented way. The project must thus be clearly defined and delimited so that it can be successfully completed in six months at full time study.

### **2.1 Preparing for the Project**

Students must have passed all subjects in the master programme prior to the master thesis. If a student lacks one or more subjects and apply for an exemption must be delivered to the head of the department. The supervisor will give an advice whether the student satisfies the prerequisites necessary for running the project.

#### **2.1.1 Choosing a Topic**

Projects may be found at IMT, either based on proposals from the staff or as a response to students' request. Students may also contact external parties (companies, organizations, public offices, etc.) to solicit projects. Students working together with external parties need to be aware that a master thesis has to be open to the public. It is the student's responsibility to inform the external party and to get approval for writing a publicly available report.

#### **2.1.2 Finding a Supervisor**

All students must have a supervisor at GUC. Students can contact the available GUC supervisors listed on the web to discuss the wanted project and to ask for supervision by this person during the master's project.

Students working on their project outside of GUC should also have an external supervisor, whose main task is to assist the student in comprehending the problem and its environment.

### **2.2 Working on the Project**

#### **2.2.1 Getting Started**

The project period starts the first working day in January. By January 20 the students must have revised the detailed project plan including a time schedule and a reading list, established contact with one of the available supervisors, and signed the Master's Thesis Agreement.

#### **2.2.2 Conducting the Study**

The students usually have the closest contact with their supervisors in the beginning and at the end of the project. In the actual work phase, most students who do external master projects just report regularly to their GUC-supervisor how the work is progressing. If the work is performed at GUC, the student must keep a closer contact. It is advisable to arrange regular meetings with the supervisor and to make notes from these meetings.

If the work is not progressing the way it should, it is important that the student discusses this thoroughly with the supervisor. It is much easier to discuss such issues when meeting face to face or even over the phone than by e-mail.

The student is responsible for making an agreement with the GUC-supervisor to what stages the supervisor should read the student's report. Supervising students is just one of many tasks of the GUC supervisor. Hence, it is up to the student to keep in touch with their supervisor and to give the supervisor reasonable time to read the report. As a general rule it is reasonable to count at least one week for a thorough reading.

## **2.3 Writing the Thesis**

### **2.3.1 Writing the Draft Thesis**

Throughout the semester, students are expected to work in close consultation with the main supervisor, forming a coherently-argued thesis that demonstrates scholarly research skills and knowledge of the selected area of study. It is recommended to have a discussion of the disposition of the thesis with the supervisor before starting to write on the report.

### **2.3.2 Presenting the Thesis**

All master projects must be well-presented orally at the concluding master project seminar at GUC, three weeks before the submission of the thesis. The presentations are public, and the students are responsible to invite external supervisors.

The 20-minutes presentation of the Draft Thesis should include an introduction to the problem, a description of the actual project, the results achieved, the student's interpretation of the results, and a discussion of what influence the results may have.

The presentation notes must be uploaded to Fronter before 7.00 the presentation day.

### **2.3.3 Opposition**

Critique brings the world forward. The goals of the opposition are that the students should practice in reading a report critically to find parts that are unclear, questionable, poorly motivated, differing, precise, thoroughly considered and conscientiously.

Oppositions are scheduled by the master thesis administrator before the concluding master project seminar.

Instructions for the opposition as well as a list of questions to answer are found on the web page, opposition protocol. The protocol should focus on the main points; why certain method was chosen or rejected, why a result was interpreted in a certain way, what consequences it may have, etc. The opponent should try to initiate an interesting discussion – interesting also to those who have not read the report – and refrain from commenting on details. The students have to upload their opposition protocol in Fronter before 7.00 the first day of the seminar. The opponent should also carefully follow the actual presentation and be ready to change some of the questions or comments written down considering what has been said during the presentation. Some questions may already have been answered, new questions may have arisen.

Since the opposition only takes 5-10 minutes the opponent must start with the most important questions. The author should try to give short and concise answers to the questions – not to give long monologues about circumstances he/she did not have time to talk about during the presentation.

An opposition that is too poor is not accepted, and the opponents Thesis will not be approved.

### **2.3.4 Finalizing and Submitting the Thesis**

Students are expected to study the comments recommendations given by the opponents. They may induce changes in the final version of the report. Spelling errors and similar errors and inaccuracies that the opponent has noted should be corrected. If the opponent has suggested another method to be used in the project, the student should not redo the work using that method. It is, however, a good idea for the student to motivate why the alternative method was not used. If any doubts as to what to change, the student should ask the supervisor.

Three weeks after the concluding master project seminar, students should submit the final version of their theses. The final version must be approved by the supervisor before it is delivered in Fronter. The submitted theses will be examined by an external examiner. It will be graded within three months.

## **2.4 Failing to Pass**

A medical certificate postpones the deadline correspondingly.

A master thesis will fail and be graded F (for further details about grading look to the chapter 3.3 Grading) if:

- It is not submitted in time,
- The student did not fulfil the requirements listed in section 1. 2, or
- The quality of the submitted thesis is below what is considered as sufficient to pass.

A student who fails to pass the master's thesis has the right to a second attempt. The student will have to find a new topic for the second attempt and must write an application, including a new project plan, for the second project. The same or a different supervisor will be appointed, depending on the new topic. The student forfeits the rights to complete the master's program if failing to pass on the second attempt.

## **3 The Master's Thesis**

In doing the master's project, the students utilize the knowledge and maturity acquired during the master programme. Writing the master's thesis is a kind of a Grand Finale for the students. The purpose of the thesis is to test the students' ability to combine their knowledge and skills in solving challenging problems in a scientific way.

In addition, the work on the master project and thesis will give valuable experience from – and develop their ability to:

- Independently and under realistic circumstances, solve a concrete, well defined problem within the area of the subject (e.g., media technology or information security),
- Document this work in a report that describes the student's achievements and that demonstrates his/her abilities to present the project in a thoroughly and easy-to-comprehend manner, and
- Orally present their work.

The master thesis gives 30 ECTS credits, which correspond to six months of full time work.

### **3.1 Scientific work**

The following demands must be fulfilled in a scientific report:

- Statements that are not evident should be substantiated. This may be done by logical reasoning or by referring to a source.
- The work and the achievements must be compared and related to relevant work reported in the literature and to results that have been published in research literature.
- Facts must clearly distinguish from interpretations of facts.
- Reported results must clearly be distinguished from results that other persons have achieved.
- Reported work must clearly distinguish from what has been done by other people.
- The source of facts and information found elsewhere must be referenced correctly and completely. This is also true when summarizing someone's work or ideas.
- The report must describe not only the achieved results but also how results were achieved. The description of the methods must be clearly separated from the description of the results.
- Problems that are encountered must be described honestly; the report must document how the problems were overcome, were worked around, or were left unsolved because no solution was found or because time ran out before a solution was found.

### **3.2 The Report**

The report should be written for fellow students as well as for people working in the field. It should contain a description of the problem and the problem area as well as the methods used and the theory behind them. Large blocks of theory may be presented very briefly if a reference to a text book is included.

The report should be written in preferably English or Norwegian and it should have a title and an abstract in both languages. It may have title and abstract in other languages as well.

The report is public and GUC will publish the report on the web.

There is no fixed number of pages for the report. Most reports have about 50–70 pages plus appendixes, but the length of the report depends not only on the type of work that has been done but also on the writing style of the author.

The title of the report is important. It should give a good description of the work, be understandable, and preferably sound interesting. Abbreviations not commonly spread must be avoided and terminology not commonly known must be explained

### **3.2.1 Formal Requirements**

The following formal requirements are put on the report:

- The report should give an introduction to the problem area as well as an introduction to relevant theory. It should clearly state the problem being studied, describe the methods used to solve it and criteria used to choose those methods, describe the results achieved, present the student's conclusions based on these results, and what likely effects the study may cause. The order may be different than the above.
- The report should be written in correct English or Norwegian.
- The report should have a suitable typographical layout and be delivered in PDF in Fronter.
- The report should be carefully proofread. The number or typing mistakes etc. should be very low. Hyphenations must be correct.
- The report must clearly state that it is a master thesis at GUC, where the work has been performed and who has been the supervisor(s).
- The report must have an English title and abstract if the report is written in Norwegian.
- The report should have a table of contents and the pages must be numbered.
- Illustrations and diagrams should have a legend under the illustration/diagram. Give each illustration a number.
- Tables should have table headers and should be numbered.
- Illustrations, diagrams, and tables should be placed close to the corresponding text. The text should refer to the illustration so that the reader knows when to look at it and what it illustrates (e.g. see figure 2). All illustrations must be of good typographic quality suited for presentation on paper. The author should bear in mind that printouts usually are made in grey scale.
- When presenting facts read elsewhere the author must give a reference. A reference is needed also if one gives a summary of someone's work.
- There must be a consistent and complete literature list.
- If program listings are included, they should be put in appendix.
- Material that gives additional details to the work but is not needed to understand the work may be put in appendices (questionnaires, instructions that the student has written etc.). Appendices must be numbered (Appendix 1, Appendix 2 etc.). All pages must also be numbered. Each appendix may start from page 1, or there may be a consecutive numbering through the report and all appendices.
- The reports will be published on the web. This means that they will be printed either one-sided or double-sided depending on the printer used. So the layout must work in both cases. Thus do not number the introductory pages (abstract etc.) and let the first page of the first chapter be page number one.

### 3.2.2 Layout and Structure

A complete and approved version of the report in PDF shall be handed in when the necessary corrections are made after the oral presentation. The layout should be as follows, where each item should start on a new page:

- Cover provided by GUC
- Title page
- Abstract
- Preface (optional)
- Table of contents.
- The chapters of the report ending with the bibliography
- Appendix A, B, etc.

### 3.2.3 References

Scientific work is usually based on the results achieved by others. It is therefore necessary to obtain a thorough understanding of what others have done in the field. A good starting point for master students at IMT is the web page of GUC Library and the databases that can be access to from here. The supervisor may give the students hints on where to search for literature.

There are several different reference standards. IMT recommends the following (article, book, anthology, and web publication):

- [1] Askvall, S. 1985. Computer supported reading vs. reading text on paper: A comparison of two reading situations. In *International Journal on. Man-Machine Studies*, 4(22), 425–439.
- [2] Card, S. K., Moran, T. P. & Newell, A. 1983. *The psychology of human-computer interaction*. Erlbaum.
- [3] Lancaster, F. W. & Warner, A. 1985. Electronic publication and its impact on the presentation of information. In *The technology of text: Principles for structuring, designing, and displaying text*, 292–309. D. H. Jonassen, ed. Educational Technology Publications.
- [4] Meldon, W. 1997. *Reading from the web*. Report from MIT human factors lab. <http://www.mit.edu/compsci/humanfactors/report9734.html> (Visited Nov. 2000).

References to information found on the web should be as exhaustive as possible (i.e., author, title, etc. must be included if possible). Also state when the page was last visited. In the text, we recommend giving the reference number brackets ([x]).

### 3.3 Grading

GUC uses the same grading scale for master thesis as for other subjects. *According to this scale a generally good thesis will be graded a 'C'.* As shown in the following table, grades 'A' and 'B' will be reserved for theses which results are considered publishable in a peer-review channel – possibly after minor modifications.

<i>Symbol</i>	<i>Description</i>	<i>General, qualitative description of valuation criteria</i>
A	Excellent	An excellent performance, clearly outstanding. The candidate demonstrates excellent judgement and a high degree of independent thinking. (Considered publishable in a peer-review conference or journal.)
B	Very good	A very good performance. The candidate demonstrates sound judgement and a very good degree of independent thinking. (Contains results which are publishable with minor revisions.)
C	Good	A good performance in most areas. The candidate demonstrates a reasonable degree of judgement and independent thinking in the most important areas.
D	Satisfactory	A satisfactory performance, but with significant shortcomings. The candidate demonstrates a limited degree of judgement and independent thinking.
E	Sufficient	A performance that meets the minimum criteria, but no more. The candidate demonstrates a very limited degree of judgement and independent thinking.
F	Fail	A performance that does not meet the minimum academic criteria. The candidate demonstrates an absence of both judgement and independent thinking.

"The grade is set by the supervisor and the external examiner according to the rules described in ["Studieforskrift for Høgskolen i Gjøvik. Forskrift om opptak, studier og eksamen ved Høgskolen i Gjøvik"](#) (in norwegian).

### 3.4 Copyright

The student holds the copyright to the master thesis, but GUC has the right to publish it on the web and at the library. The results from the work belong to the student and the supervisor if no other agreement exists. The work can be published as a paper, by the student, supervisor or another person closely related to the work, individually or jointly.