UMEÅ UNIVERSITY

Thesis work for a Master of Science in Engineering Physics, 30.0 ECTS – Instructions for the supervisor

1 Introduction

You have taken upon yourself to be the supervisor of a student in his or her thesis work for a master of science (M.Sc.) degree in Engineering Physics—meaning that you are the one that primarily will support and assist the student in his or her everyday work. This responsibility means that you will be the middleman between the examiner and the student, and thereby a key person in the project. We are so glad to have you on-board!

Note: *If you are familiar with our routines you do not need to go through the entire instruction row-by-row since you can find a quick check-list in appendix A, that covers the responsibilities of each involved person.*

Your role as a supervisor will differ a bit depending on if you are the main supervisor, i.e. the supervisor primarily available at the site where the work will be conducted, or the co-supervisor, i.e. a Department of Physics associated supervisor assigned primarily to ensure the academic quality of the thesis. With that said, your role, independent of prefix, is still highly important for the progress of the thesis and the final outcome.

This document has been put together in order to facilitate your work, to guide you through the course outline, its routines, and what we expected from you. It starts out by setting the scene, introducing the course syllabus and what the student will be examined on, as well as introducing the persons involved in the course. Thereafter you will get more details about what is expected of you as a supervisor, both in the case of being the main supervisor and the co-supervisor.

1.1 Syllabus

As in any other course there is a course syllabus, which you can find in appendix B (only available in Swedish). The syllabus emphasises that one aim of the course is that the student should be able to lead and execute a time-limited project, in a context that resembles a potential work environment. This is in order to gain insight in the conditions necessary to execute an effective and a safe working process that also leads to satisfactory results.

As stated, one can clearly see that the process to achieve the results is equally, or more, important than the final results. The key concept is that the student should show that he or she actually is capable of leading and finalising a project within the framework of the time- limited course. This concept is also a major part of both the national and the locally determined, degree objectives, see appendix C (only available in Swedish).

1.2 Examination

According to the syllabus there are three core elements of the course that the student will be examined on. These are:

i. a written thesis,
ii. an oral presentation and defence,

iii. an opposition, i.e. an evaluation of another thesis work in connection to when it is presented.

For each of these elements the student will either Pass (G) or Fail (U). In order to pass the entire course all elements must be approved.

However, it is worth emphasising that although there are elements in the course that are not examined directly, they are mandatory in the sense that the thesis work can only be carried out to satisfaction—while fulfilling the course objectives—if they are properly dealt with. These elements, should hence be indirectly examined by you, and include e.g., planning, response to feedback, reconciliation, and time management.

1.2.1 Evaluation criteria

The thesis work of the student will be evaluated by the examiner (i.e. not you). However, for you as a supervisor, it is important to be familiar with the evaluation criteria. This general assessment template is shown in table 1, and it aims to emphasise the key points of each element and the importance of not only the final thesis but also the way the work was carried out. Since the template shown in table 1 has its heritage in a Swedish version, it might be interesting to check both if any confusion arises. You can find the original Swedish phrasing in table 2, appendix B.

Table 1: A general assessment template guiding the thesis evaluation.

Moment	**Element**	**Evaluation criteria**
Planning	Project plan	Clarity, thoroughness, plausibility, limitations, etc.
	Time plan	Thoroughness, disposition, plausibility, etc.
	Other policy documents[1]	Attention to detail , risk awareness, etc.
Execution	Regular updates	Long-term planning, regularity, feedback and revision, follow up, time management, etc.
	Half-time presentation	Disposition of information and time, clarity, basis, discussion material, insight in the field, etc.
	Engineering / Scientific approach	Independence, problem solving and analysis skills, professionalism, etc.
Finalisation	Popular scientific summary	Easiness, is the text intriguing, relevance, language, disposition of information, etc.
	Written thesis	Disposition, layout, language, clarity, coherence and cohesion, balance, subject specialization, scientific correctness, analysis, reasonable conclusions, insight in the limitations of the work, the work from a broader perspective, etc.
	Oral presentation	Disposition of information and time, clarity, intelligibility, adaptation to audience, emphasis on own contribution and its basis, insight in the field, discussion material, professionalism when presenting and defending, etc.
Opposition[2]		Insight in the field, professionalism, constructiveness, phrasing of questions, disposition, relating to both thesis and presentation, etc.

[1] Only if necessary for realizing the project.
[2] Assessed by the candidate's examiner.

1.3 Persons involved in the course

There are basically (at least) four persons involved in the course: (i) the student carrying out the work, (ii) at least one supervisor, (iii) an examiner, and (iv) the course administrator. A short description of the role of each person in the course follows below.

1.3.1 The student

The student is the main responsible person that will lead and execute the thesis work. When accepted to the course the student is on his or her way to finalising his or her master's degree in Engineering Physics, and thereby has (at least) 270 ECTS worth of knowledge in his or her portfolio. The topic of the thesis, and where the work will be conducted, has been determined by the student.

1.3.2 The supervisors

To facilitate the student's work he or she will be assigned at least one supervisor. This supervisor will be assigned by the working place and is there to assist the student in his or her daily work. If the work is conducted outside of the department, an additional supervisor might be assigned by the Department of Physics. However, the department-associated supervisor stays with the student and embraces the role as co-supervisor in order to ensure a high academic level of the work.

It is primarily to the supervisor/supervisors that the student should turn when facing difficulties, or when in need to ventilate problems and/or questions. It is therefore important that you and the supervisor/supervisors keep an open dialogue throughout the entire course, so that your communication and feedback to the student is clear and coherent.

1.3.3 The examiner

The examiner's work is to evaluate the student, from initialisation to finalisation. The examiner will be the person that has the final say in whether or not the student has passed the course criteria, and thereby if he or she deserves a M.Sc. degree in Engineering Physics. The role of the examiner is to passively survey the progress, giving his or her input when asked for or if noticing something that would hinder the realization of the project. At the end the examiner will also be the chairman of the thesis presentation and the one that iterates the final thesis to the student until it is of high-enough quality.

The primary feedback to the student from the examiner will be given via the supervisor/supervisors, ensuring the impartiality of the examiner. However an open communication to everybody involved is also plausible as long as interventions from the examiner are kept at an acceptable level.

1.3.4 The course administrator

The course administrator is the person that has the administrative responsibility. The course administrator is the main responsible one and thereby the one that assigned you and the department-associated supervisor. If you experience any problems or unclarities regarding routines, practicalities etc. during the course it is to the course administrator that you should turn.

2 What we expect from you

The following subsections will cover more or less everything we expect from you as an examiner. The information is aimed to be rather short and concise. With that said you can always tend to the instructions handed out to the student, if you want to know more about what information the student is given. In those, more complete, instructions you will find e.g. what is suggested to be covered in the project plan, suggested structure, disposition and layout of the final thesis, details regarding the final presentation and publishing.

2.1 Main supervisor

As previously mentioned, it is the main supervisor that will be the students primarily support during his or her work. As a main supervisor you will actively follow and support the student from initiation to realisation of the project. Your task is to guide and support your student, without taking over the role of project leader, since the student must be given the opportunity show that he or she can work independently, lead, and execute the project. How much you should assist your student depends a lot on where the work is carried out and the topic at hand, but aim on making the work environment as realistic as possible, i.e. you should not be at the students disposal at all times. Make sure that the student has thought his or her questions through carefully before addressing you and preferably that he or she has to prioritise which questions to address first.

At the initial phase of the course, the student will initialise the contact between the persons involved in the course by establishing a communication plan and platform. The student will then start his or her work by carrying out a pre-study, upon which he or she should formulate a detailed and thorough project plan. During this work you might need to give the student some extra attention so that the initialisation of the project goes smoothly. The project plan will then be evaluated by the examiner, whereupon adjustments might be needed before approval. When all parties are on agreement of what the aim of the thesis work is, and how it should be conducted, the project may start for real. Remember that it is during the initial phase that you have to address confidentiality agreement, if necessary. No course work should start before a consensus regarding such an agreement have been signed by all persons involved (for more information see section 2.3).

During the actual work your task is to actively follow how the work progresses, and give feedback when needed or asked for. You should keep an extra eye on the project plan, so that the student does not get off track. At half-time the student will give a presentation to the examiner and preferably also the supervisor/supervisors. In this presentation the student will present what he or she have done so far, what upcoming steps he or she plans, as well as the risks or problems he or she foresee. Based on this information the plan for the remaining time should be discussed and the outcome should be a clear and collective agreement on what is next.

At the end of the course the student will have to write a thesis on his or her work. This thesis should be scientifically correct and at a high academic level. You should therefore also guide and advise your student when it comes to his or her writing. When both the student and you (after consulting the examiner) agree on that the thesis is more or less complete, the student may sign up for an available occasion for presentation. At this point your work as a supervisor is more or less complete and the only thing left to do is to support the student with small adjustments in the thesis and the outline of the upcoming presentation.

2.2 Co-supervisor (when applicable)

If the student has decided to carry out his or her thesis work outside the Department of Physics, he or she might be given an additional supervisor. In that case the Department of Physics associated supervisor takes on the role of co-supervisor. The role is then to support the student from an academic point of view, with key focus on the final thesis. You should of course also actively follow the student's work, the progress of the project etc. However you do not have to be involved in the daily work throughout the course.

2.3 Confidentiality agreement

In some cases, when the thesis work is carried out externally, the external collaborator might ask for a confidentiality agreement. This could hinder, or at least make it more difficult, to publish and evaluate the thesis. Hence, no confidentially agreement should be signed by anyone involved in the course before the matter has been discussed between everyone involved. In the case that a confidentiality agreement is required, *it has to be addressed before initialising the project*. That means that everyone (including the course administrator) must be in agreement on how to handle confidential data without e.g. hindering evaluation of the work.

2.4 If problem arises

Things do not always go smoothly and in those cases it is extra difficult to be the middleman. In order to avoid problems it is important that you as the supervisor keep an open and continuous dialogue with the examiner, and make sure that you have a common view on what to expect from the project and in which direction you should guide your student. Throughout the entire course you are always welcome to contact the examiner (primarily), as well as the course administrator (secondarily) if you have questions or problems, so that you together can tend to the problem. With that said there are some situations when it is of extra importance to get in contact: (i) if a confidentiality agreement is needed, (ii) if the thesis work tend to drag on, (iii) if you detect that parts of the thesis is plagiarised.

2.5 Course evaluation

When everything is done, the examiner has reported whether or not the student passed, and if/when passed the student has uploaded and printed the thesis, you will receive a web-based course-evaluation form. This is sent out to everyone involved in the project so that we can continue our continuous work with enhancing the course quality. Therefore we would greatly appreciate it if you took the time to carefully fill it in (so that we know where to focus our time and energy).

Good luck supervising and thanks for your hard work!

… and remember to fill in the evaluation.

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A. A common check-list for main persons involved Check-list: who does what?

The student

- ☐ Initializes contact with supervisor/supervisors and examiner.
- ☐ Establishes a communication plan and platform (e.g. via Canvas).
- ☐ Makes the pre-study and project plan.
- ☐ Leads the project forward and makes sure that the work progresses.
- ☐ Continuously monitors and revises the project plan.
- ☐ Maintains the communication plan and platform.
- ☐ Calls for half-time presentation.
- ☐ Writes the thesis.
- ☐ Signs up for final presentation.
- ☐ Prepares and presents the presentation.
- ☐ Evaluates the thesis work of another student—both in written form and orally as an opponent.
- ☐ Uploads the thesis to DiVA and sends it to print.
- ☐ Fills in a course evaluation.

The supervisor

- ☐ Supports and assists the student in his or her daily work, from the beginning to the end.
- ☐ Attends the half-time presentation (preferably).
- ☐ Takes part in the communication at the communication platform.
- ☐ Advises the student in terms of choice of method.
- ☐ Keeps an extra eye on the project plan and time plan.
- ☐ Gives feedback and support in the thesis writing.
- ☐ Fills in a course evaluation.

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The co-supervisor at the Department of Physics (if applicable)

- Actively follows the progress and gives support when necessary and/or asked for.
- Takes part in the communication at the communication platform.
- Attends the half-time presentation (preferably).
- Is the main responsible for advising the student in writing: to ensure high academic quality.
- Fills in a course evaluation.

The examiner

- Is the main responsible to ensure that the thesis is specialized enough.
- Evaluates the pre-study, both in terms of specialization and time management.
- Passively follows the progress and gives support when necessary and/or asked for.
- Keeps an open dialogue with the supervisor/supervisors.
- Attends the half-time presentation.
- Gives approval to present when the thesis is complete enough.
- Acts as chairman during the final presentation.
- Examines the opponent at the presentation.
- Runs the written thesis for plagiarism control.
- Examines the written thesis and the oral presentation of the student.
- Reports whether or not the student has passed the course criteria.
- Fills in a course evaluation.

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The course administrator

- Administrates the thesis work.
- Assigns the examiner and department-associated supervisor.
- Hands out the necessary information for initialisation of the project to all parties involved.
- Assists when asked for throughout the entire progress.
- Handles the administration of the final presentation (date, room, etc.).
- Checks that the examiner has made a plagiarism control.
- Reminds the student, the supervisor/supervisors, and the examiner to fill in the course evaluation.

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B Evaluation criteria in Swedish

Table 2: The original phrasing, in Swedish, of the general assessment template that summarizes the points that the examiner is to assess for each element.

Moment	**Delmoment**	**Bedömningspunkter**
Planering	Projektplan	Tydlighet, utförlighet, rimlighet, begränsningar, etc.
	Tidsplan	Utförlighet, disposition, rimlighet, etc.
	Övriga styrdokument[3]	Detaljprecision, riskmedvetenhet, etc.
Genomförande	Löpande rapportering	Framförhållning, regelbundenhet, återkoppling och uppdatering, uppföljning, tidshållning, etc.
	Halvtidsavstamning	Disposition av information och tid, tydlighet, underlag, ämneskunskap, diskussionsunderlag, etc.
	Ingenjörsmässighet / Vetenskaplighet	Självständighet, problemlösningsförmåga, analysförmåga, professionalism, etc.
Framläggning	Populärvetenskaplig sammanfattning	Lättsamhet, intresseväckande, relevant, språk, disposition av information, etc.
	Skriftlig slutrapport	Disposition, layout, språk, tydlighet, ”coherence and cohesion”, balans, ämnesfördjupning, vetenskapligt hållbara resultat, analysförmåga, rimliga slutsatser, insikt i arbetets begränsningar, placering av arbetet i ett större perspektiv, etc.
	Muntlig presentation	Disposition av information och tid, tydlighet, förståelighet, anpassning för åhörare, underlag och belysning av egen insats, ämneskunskap, diskussionsunderlag, professionalism vid såväl presentation som respondering, etc.
Opponering [4]		Ämneskunskap, professionalism, konstruktivitet, frågeformulering, disposition, anknytning till rapport och presentation, etc.

[3] Endast om nödvändiga for att realisera projektet.
[4] Bedöms av respondentens examinator.

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C Ruling syllabus at Umeå University

Kursplan
Examensarbete för civilingenjörsexamen i teknisk fysik, 30.0 hp
Master´s Thesis in Engineering Physics, 30.0 Credits

Högskolepoäng: 30.0 hp
Kurskod: 5FY123
Ansvarig institution: Institutionen för fysik
Datum för fastställande: 2011-06-28
Beslutad av: teknisk-naturvetenskapliga fakultetsnämnden
Giltig från: 2011-06-27
Giltig till: Tillsvidare
Nivå: Avancerad nivå
Huvudområden och successiv fördjupning:
Fysik: Avancerad nivå, innehåller examensarbete för masterexamen
Betygsgrader:
För denna kurs ges endast betyget G Godkänd eller U Underkänd

Innehåll
Kursen innebär att studenten får tillfälle att visa sin förmåga att tillämpa och utveckla kunskaper och färdigheter som förvärvats under studietiden. Detta innebär konkret att studenten ska kunna leda och genomföra ett behovsbaserat projekt med anknytning till utbildningen och i ett sammanhang som liknar en möjlig framtida arbetssituation för en civilingenjör i näringslivet eller akademin. Det innebär även att studenten efter kursens slut ska ha förstått vilka villkor som måste vara uppfyllda för att arbetsprocessen ska vara effektiv, säker och leda till ett tillfredsställande resultat.

Examensarbetet kan göras inom ett av de områden som ingår i civilingenjörsprogrammet teknisk fysik eller inom en kombination av dessa. Under examensarbetet bör arbetet delrapporteras via en projektplattform för att möjliggöra för handledare, examinator och student att effektivt kunna följa arbetsprocessen. Vid arbetets slut presenterar studenten resultatet av arbetet i en slutrapport som redovisas och granskas vid ett seminarium. I kursen ingår också att fungera som opponent på redovisningen av ett annat examensarbete inom teknisk fysik.

Förväntade studieresultat
Efter genomgången kurs ska den studerande kunna: • genomföra ett större projekt på ett både ingenjörsmässigt och vetenskapligt sätt inom givna ramar, • med helhetssyn, kritiskt, självständigt och kreativt identifiera och formulera komplexa frågeställningar, • hantera frågeställningar inom projektet genom att skapa, analysera och kritiskt utvärdera olika ingenjörsmässiga eller vetenskapliga lösningar, • visa förmåga att delta i forsknings- eller utvecklingsarbete och därigenom bidra till kunskapsutvecklingen, • kritiskt och systematiskt integrera kunskap förvärvad under utbildningen med för projektet relevant information hämtad ur annan facklitteratur, • självständigt identifiera relevanta

informationskällor, utföra informationssökningar, värdera informationens relevans samt använda sig av korrekt referenshantering, • muntligt och skriftligt kommunicera resultat och den kunskap och de argument som ligger till grund för dessa, • kritiskt och konstruktivt bedöma sitt eget och andras examensarbeten med hänsyn till relevanta vetenskapliga, samhälleliga och etiska aspekter.

Behörighetskrav

Examensarbetet skall normalt utföras under det femte utbildningsåret. För tillträde till kursen krävs att studenten har minst 270 hp totalt samt uppfyller samtliga krav under rubrik ”4.3 Övriga krav” i examensbeskrivningen. I undantagsfall kan dispens ges av programansvarig för civilingenjörsprogrammet i Teknisk fysik. Beroende på examensarbetets inriktning kan krav på särskilda förkunskaper krävas. Engelska A och svenska för grundläggande behörighet för högskolestudier.

Undervisningens upplägg

Arbetet genomförs i samverkan med en handledare i nära anslutning till pågående forsknings- eller utvecklingsprojekt och kan utföras såväl inom högskolan som i privat eller offentlig verksamhet utanför högskolan. Arbetet ska omfatta tjugo veckors heltidsarbete och studenten ska ges förutsättningar att planera, leda och slutföra arbetsuppgiften inom denna tidsram.

Under arbetet ska studenten hålla regelbunden kontakt med handledaren och examinatorn. Studenten ansvarar även för att kommunikationen mellan parterna fungerar. Handledaren ska finnas tillgänglig för arbetets dagliga fortskridande under större delen av projektet. Examinatorn ska, som underlag till sitt bedömningsarbete, likaledes kontinuerligt informeras om hur arbetet utvecklas. Examinatorn ska i inledningen av projektet försäkra sig om att alla parter har samma uppfattning om projektets mål och tillvägagångssätt.

Vid projektarbetets slut ges studenten, handledaren och examinatorn tillfälle att utvärdera kursens mål samt värdera och bedöma hur kursen administrerats, om arbetsprocessen varit effektiv, hur formerna för kunskapsredovisningen fungerat och hur samarbetet mellan projektets intressenter fungerat. Vid denna utvärdering ska dessutom studenten värdera sin arbetsinsats.

Examination

De i examensarbetet ingående momenten betygsätts med betygen Godkänd (G) eller Underkänd (U). För att bli godkänd på kursen krävs att studenten:

framlagt ett eget projektarbete i en rapport med betyget G och genomfört en godkänd muntlig presentation, kritiskt och konstruktivt granskat metoder och resultat från ett annat examensarbete och presenterat i samband med den muntliga presentationen.

Projektarbetet ska redovisas både i en rapport och vid ett seminarium. Rapporten ska beskriva problem, tillvägagångssätt och resultat samt innehålla en utvärdering av resultatet. Den ska vara genomarbetad, väl strukturerad och språkligt korrekt. Studenten kan välja att skriva på svenska eller engelska. Om rapporten skrivs på svenska ska ett

särskilt blad bifogas med titel och sammanfattning översatt till engelska. Vid seminariet presenteras arbetet muntligt. Studenten har möjlighet att välja mellan ett antal olika seminarietillfällen varje läsår. Presentationen görs i samband med minst en annan students presentation, där de studenter som redovisar sina examensarbeten samtidigt fungerar som granskare av varandras presentationer. Det är examinatorns ansvar att inhämta information om hur dennes student klarat opponeringen av en annan student från dennes handledare. Under presentationen ges studenten tillfälle att redovisa erfarenheter och lärdomar av det egna och andras examensarbeten. Granskarens uppgift är att kritiskt och konstruktivt granska metoder och resultat och meddela sina iakttagelser skriftligt till examinator och rapportförfattaren. Vid redovisningstillfället är granskarens uppgift att diskutera det presenterade arbetets förtjänster och brister. Granskningen bör omfatta följande huvudpunkter: uppläggningen av det muntliga framförandet, arbetets principiella uppläggning, formella och stilistiska synpunkter på rapporten, källbehandling, detaljgranskning av den valda lösningen och sammanfattande slutomdöme.

En student som är utan godkänt resultat efter att handläggarens åtaganden är slutförda har rätt att få en annan examinator utsedd, om inte särskilda skäl talar emot det (HF 6 kap. 22 §). Begäran om ny examinator ställs till prefekten för Institutionen för fysik.

TILLGODORÄKNANDE Tillgodoräknande prövas individuellt.

Övriga föreskrifter

Litteratur

Giltig från: 2011 vecka 27

Litteratur som är nödvändig för kursens genomförande bestäms i samråd mellan studerande, handledare och examinator.