APPENDIX A: Diploma Work in Physics at Bachelor and Master Levels

(A streamlined version of this attachment is available online; however, for any issue, please refer to the present document as the basic one)

To Prepare, Perform and Present a Diploma Thesis

A. The Process

The diploma work is one of the final steps in your academic education. It is intended to provide an opportunity for you to showcase your academic skills, your independence and your maturity. Some key points to think of when you work on your diploma thesis are given in the following.

The diploma work is part of a process. An education in physical science is typically rather broad and you should therefore consider early during your studies what you would like to do in your professional life and eagerly try to develop the necessary background. For a physics student this typically includes scientific understanding, ability to analyse and interpret results, and your effectiveness in communicating knowledge and results to others. The diploma work consequently relies on what you have learnt during all your previous education, from school up to university. It relies on the skills you have developed in science, mathematics and numerical methods and on your ability to analyse scientific problems, to write reports and to give seminars.

Formally, learning outcomes and skills are described and regulated by the diploma work course plan and in other documents. It is therefore important that everyone involved in any diploma work activity is up to date about the course plan, especially understanding the learning outcomes of the diploma work. These are the outcomes that we have to examine against. The outcomes are also described in a separate checklist (available at the course homepage), which will be filled by the examiners.

The Physics Library is a valuable reference and resource for the student regarding issues such as literature search and academic conduct, including matters of plagiarism and citation issues. You can contact the librarians for further information about these issues.

B. Eligibility and Grades

The diploma work is a course within the program and in general only students studying in the program can be admitted to do a diploma work in physics.

The information and guidelines in this document pertain to the students of the Natural Science Faculty at the Department of Physics. The divisions belonging to the Natural Science Faculty at the Department of Physics are: Particle Physics, Synchrotron Radiation, a part of Mathematical Physics, and a part of Nuclear Physics.
The diploma work is graded as a percentage, which is translated to the following grades:

i) 80 – 100% is Pass with honours (Väl Godkänd),
ii) 50 – 79% is Pass (Godkänd),
iii) 0 – 49% is Fail (Underkänd).

These grades are related to the European A-F scale according to [http://www.fysik.lu.se/fileadmin/fysik/UDIF/translation.pdf](http://www.fysik.lu.se/fileadmin/fysik/UDIF/translation.pdf)

C. Finding a Subject and a Supervisor, Signing the Registration Form and Attending the Introductory Meeting

Independence is important when you approach the final stages of your university education. You therefore need to contact, on your own initiative, the department or company where you would like to perform your diploma work. Personal contacts can be recommended during this stage. Diploma work openings can be found e.g. on the homepages of the Department of Physics and its divisions, at MAX-lab, at other departments at the faculty of science, at LTH and at many companies. Proposals of your own might also be realistic. If you chose to do your diploma work outside of the Department of Physics, the diploma-work committee will first have to approve the topic as a genuine topic in Physics. In that case you should also find a formal supervisor at the Department of Physics.

Students requiring special attention or support should contact the Study Support and Advising Services (Pedagogiskt stöd) in good time before the start of the diploma work to find out the best support available. Discuss this with the study advisors at the Department of Physics if you are not familiar with the process. You decide what part of the advice from the Services you would like us to act upon and we will do our best to fulfil this.

You must be present at the introductory meeting for the diploma work course, arranged by the course leaders, and already be admitted to register for the course at that time. After the meeting you will be registered to do your thesis during the current semester. If your work is extended into one more semester, you have to re-register at the beginning of such semester. If you forget to do so it could result in e.g. you being uninsured and possibly liable to damages caused by an accident in a laboratory. To make sure that you do not loose any time, your registration form (available at the homepage) should be ready when you attend the introductory meeting, signed by you and including the name and e-mail of your supervisor(s). The form contains important information about the duties and the rights of anyone involved in the project and should be handed in to the course leaders. If the supervisor is a postdoctoral researcher (not docent or professor) or external to the Department of Physics, an additional supervisor who is a senior scientist in the same division where the project is done is needed.

The subject of your diploma work should be concrete and well defined, and an approximate time/date for a half-time meeting should be proposed which is suitable for all parties involved. However, setting the exact date/time is the duty of the examiner and course leaders. The date for the half-time meeting should be finalized soon after the introductory meeting. At the half-time meeting it is advisable to present preliminary material of your thesis, to show the status of progress. For bachelor degree, it is strongly recommended that you carry out your diploma work at half speed.
In case of a project extension, or delay, the exam can take place during the next available examination period, as shown in the schedule below (the start/finish/exam dates are indicated by vertical arrows). In this case, you should explicitly tick the box for project extension in the registration form and provide a motivation for the extension, agreed with the supervisor and the course leaders.

![Schedule Diagram]

D. Progress diary, time and credits

Integrating well in your working group is important. You should therefore keep a “progress diary” during your work where you note progress and the challenges you encounter during the work in order to help you to complete the task in a timely manner. All parties/persons involved – the student, the supervisor, the examiner, the course leaders – should be aware of and agree that the thesis work, including writing the report, can be accomplished within the allotted credit frame, provided that the work is well prepared and is seriously performed. If the task is changed or amended underway, this should be communicated to the course leaders as soon as possible.

The half-time meeting is intended to confirm that the work is proceeding properly. At this time, and/or at later times, at the discretion of the course leaders and/or the examiners, the student may most likely be asked to show the progress diary (≤5 pages) and especially pages of the thesis report. For 60-point courses, or for 30-point courses at half-speed, the half-time meeting involves an oral presentation of the progress. In this way a partial number of credits can be officially attributed to the student for record purposes. The date of the half-time meeting is jointly decided by the examiner and the supervisor, who is expected to attend the meeting. The venue of the meeting is organized by the supervisor or the examiner.

E. The Report

It is recommended to start writing the thesis report early on in the project. One reason is that there should be a general introduction to the subject, and that writing this part usually requires some time. This section should include a survey of the field and discuss potential technical applications, ethical issues, and cultural and social implications.

E.1) Language matters

Theses at the Department of Physics are written in English. The student is responsible for writing the thesis in a style suitable for the subject. The supervisor is responsible for interacting, i.e. reading and iterating the report, with the student, in the way done in any research group. This is part of the student’s learning process. At the beginning of the
semester, as discussed in the introduction meeting, specialist lectures are provided on language and library matters. These lectures are mandatory. For lectures about English and scientific writing, the students will be asked to provide the lecturer(s) with an excerpt of a recent lab report (for BSc students) or their BSc thesis (for MSc students), or other scientific text. Details will be agreed with the lecturers.

E.2) Thesis cover page

The cover page should include the following items:

1. Title of the work,
2. Name of the author,
3. Degree sought (Master or Bachelor)
4. Project duration (full-time equivalent, i.e., 8 months at half-speed equals 4 months of full-time)
5. Name(s) of the supervisor(s),
6. The Division and/or Department name and logotype (LU logotype, normally),
7. Date of examination (month/year or term/year).

The reverse page of the cover shall be left blank.

The above and supplementary information is provided in a title page example available at the diploma course homepage. Such a page will therefore contain all details necessary to register/document the outcome of the exam.

E.3) Number of pages

The following number of pages should be aimed at:

2. 30 credits M.Sc. report: 40 pages max.
3. 60 credits M.Sc. report: 50 pages max.

The number of pages is NOT a quality marker.

A report that is substantially longer than needed to treat the scientific matter at hand may suffer from this fact when graded.

E.4) General formatting

The following general formatting rules should be followed for the report:

1. Font size and margins: For theses written in MS Word or similar software, the main text font should be 12pt Times, Times New Roman or Palatino; for Latex the 12pt fonts Computer Modern (default) is recommended. Line spacing should be single or 1.5. The thesis pages should be formatted with 25 mm margins.
2. The thesis should adhere to standard scientific format in the field of study as communicated to the student by the supervisor as part of the learning process.
3. The language of the report must be English.
4. A scientific abstract, written in English, should be included (such an abstract should also contain the main conclusions about the work/research performed).

5. There must be a table of contents and a list of abbreviations and acronyms if such are used.

6. The initial chapter should be devoted to an introduction and a brief survey of the field. The title of the first chapter should be “Introduction”. The aim and limitations of the work should be stated in this chapter.

7. The report must have a chapter with the title “Results” that is expressly devoted to the results obtained in the study. This chapter may, if suited for the study at hand, should include a discussion of the conclusions that can be drawn from the material. Such a discussion can also be deferred to a separate chapter.

8. A final chapter, entitled “Outlook”, should conclude the report and include a brief discussion of directions that future work could follow.

9. A reference bibliography must be included, formatted following the practice of the field of study.

10. It is common practice to include a section with acknowledgements.

11. Other reference information, that is not essential for reading, such as computer codes or detailed/lengthy algebraic derivations, should be given in appendices.

In addition take note of the following when preparing the report:

1. If the outcome of the work has been published or will be the source of future publication(s), this should be explicitly stated in the report.

2. Apart from the standard content discussed above, the report should be written to serve the purpose of the individual research subject.

3. The thesis should be written in such a way that makes evident that the learning outcomes have been clearly and successfully addressed.

E.5) Corrections

The examiner assesses and evaluates the linguistic status of the report, and may suggest or require improvements, before or after the exam. However, providing a systematic correction and improvement of the linguistic status of the thesis is not the examiner’s duty. Nevertheless, the assessment of the language of the thesis can enter the grading of the project. If, during the reading of the thesis, the examiner encounters spelling errors, typos, etc. that could have been avoided easily by using computer spell checking tools, the reading of the thesis will be suspended immediately and the thesis will be sent back to the student. The latter will then have at most 48 hours to amend all errors of this kind, and send back the thesis to the examiners. If, after the corrections, the examiners determine that the work cannot be approved, the student will be given the opportunity to complete the work within half a semester for re-evaluation. However, this extended time to complete the work should not
violate the fulfillment of the learning outcomes. If, after this extension, the work does not still meet the learning outcomes, the examiner may decide to fail the work. This can imply that the work should be re-done in order to meet all learning outcomes.

F. Other Documents

In addition to the thesis report a few other documents must also be submitted to the examiners. These are described below.

F.1) Popular description

A one A4 page popular description, intended for the general public, should be prepared and be ready for the seminar. The popular description has to be approved by the supervisor. It must be in Swedish for native speaking students but can otherwise be written in English. It should have the format similar to the one given in the following document:


The purpose of the popular description is to inform the general public of the physics contents of the thesis and to make the student acquainted with the techniques of scientific divulgation.

F.2) Self-reflection document

A short separate document, entitled “Self-reflection” is required. It should be devoted to the question “What did I learn?” When writing this section, refer to the guidelines given in the document entitled “Learning outcomes”.

F.3) URKUND

Before submitting the report to the examiners, it is the responsibility of the student to submit the report to URKUND (http://www.urkund.com/en/student) via supervisor’s URKUND address.

URKUND is an online tool that is useful for plagiarism control and for establishing the validity of professional papers. The report from URKUND should be received directly by the supervisor. After having passed the URKUND test, the thesis can be finally submitted to the examiners with a statement by the supervisor that the paper has passed the URKUND test. For doing this, your supervisor must have/start an account with URKUND (it is suggested that the account request is done at the beginning of your thesis). Detailed instructions on how to use URKUND can be obtained from i) the Physics Library, ii) the general lecture about library matters and iii) a set of instructions available at the course homepage.

G. Submission

What to think of when submitting your thesis for examination is summarized below.

G.1) Material to submit

The submission must contain the following material described above:

1. The thesis report,
2. The popular description,
3. A written or e-mailed statement by the supervisor that the thesis passed the URKUND evaluation,

G.2) Whom to submit to

The thesis and its related material shall be submitted to the examiner and the co-examiner in two identical copies. The student opponent shall, if such a person has been appointed, receive a copy of the same material at the same time as the examiner and co-examiner.

G.3) Submission format

The submission should be done in electronic form (via e-mail) using PDF format if not otherwise agreed. Other formats may be accepted after consulting the examiners.

G.4) Deadline for submission

The thesis and related material given below shall be submitted by the deadline specified in the registration form. The examiners will be given ten working days (usually two weeks) to read the submissions, after which the examination seminar will take place. For practical reasons, such as e.g. availability of key people, some seminars may be scheduled to later dates, which nevertheless does not affect the deadline.

H. The Exam: The Seminar

The examination is in the form of a seminar. All Master and Bachelor seminars for a given semester will be typically given within a two-three weeks seminar activity at the end of the semester.

The dates will be established within a few weeks after the introduction meeting. The supervisor(s), examiner and the co-examiner should be present at the presentation of the thesis and participate in the evaluation of it. Just before the exam, a preliminary informal meeting can take place between the examiner and the supervisor(s).

The seminar program will be announced at the department/division level. Preferably the seminars will be open to the general public. Popular abstracts can be included in the seminar invitation.

The co-examiner can be a topic-specialist and appointed by the examiner from the same division as the supervisor. The examiner (not the supervisor) chairs the exam event and sets the rules. At examiner’s discretion, there can be questions and (a few) interruptions during the talk.

The seminar normally consists of a 25-30 min presentation of the work by the student, followed by a 15-20 min Q&A session started by the examiner. Copies of the thesis may be made available at the presentation, and a PDF of the thesis should also be available on the screen, to provide a reference to questions about the thesis text. The public may ask questions at the invitation of the examiners at the end of their question time. This will be followed by a 10-15 min discussion between examiners and supervisor(s) only.

I. Completion and Reporting
The diploma work is fully completed after a corrected report has been handed in and approved by the supervisor and the examiner. Such approval concerns scientific contents, language and the popular description. This phase may require iteration with the examiner before final approval of all documents. However, the number of iterations should be small; if, after few iterations, the thesis still need substantial changes, then the examiner can postpone the acceptance to the next exam session, giving the student more time to correct the text. The final grade is subject to correcting and not approved until all language corrections are done.

Finally, all documents should be uploaded to the LUP Student Papers portal according to the modalities communicated in the registration form. We recommend that the uploaded material is made public, but it is not required. The approved report and the popular description should be uploaded by the student before the grade becomes visible to the student in LADOK\textsuperscript{1}.

Please contact the Physics Library for support on issues regarding LUP Student Papers. After the steps above have been completed, the grade is registered by the UDF administrator, Yvonne Kedström.

\textbf{J. Summary}

In summary, the tasks involved to complete your diploma work are:

1. The plan that was established in the beginning of the project,
2. The half-time report, which has been passed by the examiner,
3. Completing an accepted thesis report,
4. Presenting the work in a seminar,
5. Uploading of the popular abstract and the report,
6. Completing and handing in of the self-reflection document to the examiner,
7. Attending the mandatory lectures on library and language matters.

For more information for Bachelor and Master Courses, please consult the following web page: \texttt{http://www.science.lu.se/education}

Good luck with your diploma work!

\textit{Course Leaders}

\textit{email: diploma\_office@fysik.lu.se}

\textsuperscript{1} Control that your LADOK status is properly updated