

Instructions for Degree Project (självständigt arbete) in Materials/ Physical/Inorganic Chemistry 30 hp, 45 hp, and 60 hp, advanced level (avancerad nivå)

The Degree Project can be performed in the Department of Materials and Environmental Chemistry in one of the research groups, with one of the teachers/scientists as supervisor or as an external project. The choice of project is made by the student, prior to the beginning of the project. The best way to do this is to contact the scientists in the Department and discuss possible projects. If the project is performed "outside" the Department, an external supervisor must be appointed who should provide a project plan (1-2 pages) describing a short background to the project, the aim of the student's project, the methods to be used by the student and the academic background of the person supervising the student. The plan must be approved by the examiner before the start of the project. Your examiner is prof. Alexander Lyubartsev when he is not your supervisor. If he is your supervisor, your examiner is prof. Gunnar Svensson.

Other relevant documents

- Syllabus of the course with the learning outcomes
- Marking criteria for the degree project
- Reflection instructions
- Feed-back document for the oral presentation

Prerequisites

Materials chemistry

För tillträde till kursen krävs kunskaper motsvarande minst 180 hp på högskolenivå, där Moderna material - oorganisk kemi, GN (7,5 hp, KZ4006) eller motsvarande ska ingå, samt minst 15 hp på avancerad nivå i materialkemi.

Physical chemistry

För tillträde till kursen krävs kunskaper motsvarande minst 180 hp på högskolenivå, där Fysikalisk kemi, GN (15 hp, KZ4008) eller motsvarande ska ingå, samt minst 15 hp på avancerad nivå i fysikalisk kemi.

Institutionen för material- och miljökemi

Inorganic chemistry

För tillträde till kursen krävs kunskaper motsvarande minst 180 hp på högskolenivå, där Moderna material - oorganisk kemi, GN (7,5 hp, KZ4006) eller motsvarande ska ingå, samt minst 15 hp på avancerad nivå i oorganisk kemi.

Obligatoryies

- Participation in the presentations of Master degree projects in materials chemistry if the project is performed in Stockholm.
- Participation in at least 50% of the units seminars.

Procedures

Before start

Contact your examiner (X or Y) and discuss the project, to make sure it fulfills the requirements. Agree on a time schedule, including the time for your presentation.

After 2 weeks

A short (10 to 15 minutes) open presentation of the project together with a risk assessment

After 4 weeks

Show your lab book to your examiner.

Towards the end

Controll the date of the presentation, room, computer and projector.

At the end

Your written report should be handed in before or as soon as possible after the seminar, but always within 30 days after the seminar. Before giving the report to the examiner, the report must be approved by your supervisor (guarantees at least the mark **E**), with respect both to the science presented and the general layout, language etc. The supervisor should fill out the evaluation form and email it to the examiner (presently X or Y.) Note that failing to meet this deadline implies that you cannot get marks **A** and **B**.

Hand in also a paper copy of your report to our administrator in charge (Z).

Role of supervisor

The supervisor

- provides basic literature or references at the start of the project
- discusses your project with you typically once a week. You have the right to 20, 30 and 40 h supervision for 30, 45, 60 hp projects, respectively
- is responsible to provide you with tasks that correspond to *all* assessments stated in the *marking criteria* and high quality supervision of the project
- is available most of the time during the project period



- supports the preparation of the oral presentation:
 - discusses structure and content
 - is present during the presentation and gives feedback
- supports writing of the project report:
 - discusses the structure before first draft is written.
 - suggests improvements within 2 weeks of submission (typically 1-2 iterations) but does not rewrite the text
 - corrects language problems
- check for plagiarism using the antiplagiarism tool *Turnitin*
- sends the evaluation form to the examiner at around the time of your oral examination

If you run into conflicts with your supervisor contact one of the examiners.

Your role in the project

We expect that you

- drive the project forward
- feel responsible for the time schedule
- document your studies so that others can reproduce your results
- seek help if you are stuck
- are the one who is most critical towards your results and interpretations
- report all data in your discussions and your report, not just those which support a certain view
- do a first interpretation of your results
- search literature yourself
- make yourself sure that your use of the English language is correct

Lab book

The lab book documents your studies. It officially belongs to the department of your supervisor and has therefore to be written in a way and in a language that your supervisor can read and understand.

It should contain:

- the date
- the aim of the experiment/computation
- experimental or computational details (so that someone can reproduce your study)
- your conclusions

The lab book needs to be shown to your examiner after 4 weeks.

Examination

To pass the course the student has to present the studies in a seminar and in a written report.



Students should also attend and take active part in all degree project seminars during the project period and in the seminars.

Oral presentation

The oral presentation of your project should be 20 to 30 min followed by a discussion. The presentation should be directed towards your fellow students, i.e. not to the members of your research group. Great effort should be put into the preparation of the presentation, with respect to both science and form of presentation. The presentation should include an introduction to the research area and into the method(s) used. Other students are expected to take active part in the discussions following the presentation. Please consult the *marking criteria* to guide you in the preparation.

The seminar should be given in English.

Supervisor(s) and your examiner are expected to be present at the seminar.

Written report

Time line

Your final version of the written report should be handed in before or as soon as possible after the seminar, but always within 30 days after the seminar. The examiner must however see a preliminary version of the written report 5-7 days before the seminar. Around the time of your oral presentation, the supervisor should fill in the evaluation form and email it to the examiner.

General instructions and formalities

The report should be organized and written like a scientific publication, not like a text book. Use factual, clear and simple English. Avoid adjectives or adverbs that value the subsequent nouns or verbs (like good and bad). Be precise!

The following general specifications apply:

- accepted formats are doc and pdf files: use the template provided at the SUs homepage
- the number of words should be at least 7000 (20-25 pages) for 30 hp, at least 8500 (25-30 pages) for 45 hp and at least 10000 (30-35 pages) for 60 hp. The report should never contain more than 15000 words.
- tables and figures should be included in the text.

The report should be written by **you** and you need to give reference to the work by others. The use of quotes should be avoided or limited to a minimum. If you want to quote an expression, you must put it within quotation marks and give the reference. Using text or illustrations from any publication without giving the reference is plagiarism, which obviously is not allowed, and can lead to that you are expelled from the university for some time period. We will check, using the university's program to

detect plagiarism. In addition, illustrations might be protected by copyright laws. In this case, you have to get the permission of the copyright owner and you have to add in the figure legend "Taken from ref x with permission from y."

Content

The report should be organized as follows:

First page The first page should have the title of the project, the name of the student, the supervisor(s) and Department of Materials and Environmental Chemistry, Stockholm University (for external projects, additionally the name of the institution where the work was performed), the year when the seminar was given. You will get a file from the examiner that should be used as a template for the first page, do not change or add anything!

List of content

List of abbreviations All abbreviations should be listed here. Additionally, upon first usage in the text of an abbreviation, the full expression should be given in the main text and the abbreviation in brackets, e.g. nuclear magnetic resonance (NMR).

Popular science description (1 page) This popular science description of your work should be addressed to someone with school knowledge in the natural sciences but without university studies in the natural sciences.

Abstract (0.5-1 page) The abstract is a summary of your work and should be understandable without reading the rest of the report. It should contain the main results of your work.

Introduction (0.5-1 page) Very briefly state the scientific background and the aim of the project.

Introduction to the system studied (~5 pages) Summarize the current state of knowledge regarding the system studied. Use reviews and original research articles to give evidence for the statements that you make.

Introduction to the method(s) used (~5 pages) Describe the scientific background of the method(s) used and previous results obtained using this/these methods on the studied or similar systems. For the latter, use reviews and original research articles to give evidence for the statements you make.

All the Introductions stated above should be included in the **Introduction** section.

Materials & Methods This section describes what materials you used and how you performed the measurements or simulations.

Results Describe your results and interpret your data. Describe all your results, not only those that fit with a certain assumption. If applicable, briefly describe also those parts of your work that were unsuccessful. Make a clear distinction between the results obtained and the interpretation.

Discussion This section contains three parts, each of which should have its own heading:

- A discussion of your results in the context of previous work.

- A critical discussion of the strengths and limitations of the approach used and of possible alternative interpretations of the results (2 pages)
- An outline about how this project could be continued, i.e. which questions are of interest to be investigated in the future and how this can be done (2 pages)
- A reflection about the role of similar approaches and research topics for the society and possible ethical aspects (1 page)

Results and Discussion may be combined when appropriate. In this case your need to be particularly careful to distinguish between your results and ideas and those of others.

Acknowledgements Here you acknowledge the contribution of others to your project, e.g. people you have collaborated with, people who provided samples, people who did measurements for you, and people who helped you in other ways.

References References can either be ordered alphabetically (a) or according to the sequence of their appearance in the text (b).

(a) Use the name of the first author or the first two authors and the publication year to refer to the reference in the text, e.g. (Arrhenius et al. 1888a). The "a" after the year indicates in this case that you cite a second publication by Arrhenius et al. from the same year. This approach is to be recommended if you do not use bibliography software.

(b) Refer to the reference in the text by numbers in [], where the number is the sequence of occurrence in the text.

In both cases, consult for details the instructions for authors of a journal that uses the chosen type of referencing.

Evaluation

The evaluation (on a form that will be provided by the examiner) will be done by the supervisor and the examiner, taking the seminar, the written report and your performance in the lab into consideration. The final grade will be decided by the examiner. Grading will be done using the marking criteria that you get together with these instructions. Use the marking criteria for a self-assessment during the project.

Reflection

Independently from your written report you should submit to the examiner a reflection document (*see separate instructions in the Reflection instructions*) where three topics are specifically addressed:

- 1) Reflection over how the project work is related to the learning outcomes for the Master programme in Materials Chemistry
- 2) Reflection over your own work with the project
- 3) Reflection over the topic specific knowledge, proficiency and attitude important for carrying out the project work.



In order to be approved, the reflection document must contain text (2-4 A4-pages) with the above mentioned headlines.