



## **Degree Project (självständigt arbete) in Materials/Physical/Inorganic Chemistry 30 hp, 45 hp, and 60 hp, advanced level**

This informational package contains all necessary documents concerning advanced (master) level degree project carried out at the Department of Materials and Environmental Chemistry, Stockholm University. These documents are also available at the departmental web site <http://www.mmk.su.se>, under My Department -> Study Forms.

### **Content**

- Instructions for Degree Project (självständigt arbete) in Materials/Physical/Inorganic Chemistry 30 hp, 45 hp, and 60 hp, advanced level
- Marking criteria
- Reflection Instructions
- Feed-back form
- Master thesis template
- Syllabus for the master degree project in material chemistry, with learning outcomes
- Syllabus for the Masters Programme in Materials Chemistry

2015-08-20

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

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, a local deputy supervisor must be appointed from the teachers of the Department. Before the start, a project plan (1-2 pages) describing a short background to the project, the aim of the student's project and the methods to be used by the student should be written and signed by the student and supervisor. 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**

- Education plan for the Master Program
- 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***

Knowledge equivalent to 180 higher education credits, of which at least 15 hp in materials chemistry at advanced level, is required in order to be eligible for admission to the course.

#### ***Physical chemistry***

Knowledge equivalent to 180 higher education credits, which includes "Physical Chemistry" 15 hp (KZ4008) or equivalent, and at least 15 hp in physical chemistry at advanced level, is required in order to be eligible for admission to the course.

#### ***Inorganic chemistry***

Knowledge equivalent to 180 higher education credits, which includes "Modern Materials - Inorganic Chemistry" 7.5 hp (KZ4006) or equivalent, and at least 15 hp in inorganic chemistry at advanced level, is required in order to be eligible for admission to the course.

## **Obligatories**

- 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 and discuss the project, to make sure it fulfils the requirements.

Agree on a time schedule, including the time for your presentation. Write down a research plane describing a short background to the project, the aim of the student's project and the methods to be used (1-2) pages. The plan should be approved by the director of study before the project start.

### *After 2 weeks*

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

### *After 4 weeks*

Show your lab book to your examiner.

### *Towards the end*

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

### *At the end*

A preliminary (but close to final) version of your written report should be handed in to your examiner and reviewer at least one week before the seminar. Before giving the report to the examiner, the report must be approved by your supervisor, with respect both to the science presented and the general layout, language etc. The final report should be handed in before or as soon as possible after the seminar, but always within 30 days after the seminar. Note that failing to meet the deadline implies that you cannot get marks A and B.

Hand in also a paper copy of your report to the administration office. Fill and hand out to the examiner the reflection document.

## **Role of supervisor**

The supervisor

- work out the research plan for the project
- 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 presentation; participates in the evaluation committee after oral presentation and submission of the final version of the thesis.

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

### **Your role in the project**

It is expected that you

- drive the project forward
- feel responsible for the time schedule
- document your studies in your lab book 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 4 weeks after the start and towards the end of the project

### **Examination**

To pass the course the student has to present the project work 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 other group and departmental seminars.

### **Oral presentation**

There are four fixed days per year for presentations of the degree project which fall typically in the end of each half-semester. The oral presentation of your project should be 20 to 30 min followed by a discussion. The presentation should be directed towards to a wider

auditory (your fellow students), i.e. not only 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*

The examiner and reviewer must see approved by the supervisor preliminary (but close to final) version of the written report 7 days before the seminar at latest. Your final version of the written report should be handed in before or (by agreement with the examiner) as soon as possible after the seminar, but always within 30 days after the seminar.

### *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 not 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 can get a file from the examiner that should be used as a template for the first page.

### **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. Give references to the relevant works in the area. 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.

**Conclusions** Here you give the main conclusions from your work

**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**

A reviewer (opponent) of the thesis is appointed who is not a member of the supervisor's group. The evaluation (on a form that will be provided by the examiner) will be done by a committee consisting of the supervisor, reviewer and examiner, taking the seminar, the written report and your performance during the work on the project into consideration. The final grade will be decided by the examiner after consultation with the supervisor and the reviewer. 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.



BESLUT 2014-03-19

## Marking Criteria Degree Project in Materials Chemistry (Advanced Level)

For passing the degree project at least 1 point is required in all assessments.

### *Understanding the project (weight 1)*

<i>Points</i>	<i>Assessment</i>	<i>Criteria</i>
1	Yes/No	The student is able to restate the aims of the project in her/his own words and to discuss how the chosen approach relates to them.
3	Yes/No	The student is able to explain why the approach is suitable for the aims of the project and how all phases of the project relate to the aims.
5	Yes/No	The student is able to discuss the approach in a wider perspective, in addition to the requirements for 3 points.

### *2. Execution of the project (weight 5)*

<i>Points</i>	<i>Assessment</i>	<i>Criteria</i>
All of the criteria below must be fulfilled to obtain 1 point		
1	Yes/No	The student executes the project thoroughly
	Yes/No	The student documents the project in a laboratory notebook such that it can be repeated by others. the notebook must be written in a language that the supervisor understands.
	Yes/No	The student applies experimental techniques / computational or theoretical approaches adequately.
	Yes/No	The student is able to search and critically interpret relevant literature.
	Yes/No	The student is able to plan adequate experiments/computations.
Each fulfilled criterion below gives one additional point, but only if all criteria for 1 point above have been fulfilled		
2-5	Yes/No	The student actively drives the project forward.
	Yes/No	The student documents the project in a clear and structured way.
	Yes/No	The student is able to identify problems with the chosen approach or the planned experiments / computations.
	Yes/No	The student shows great experimental / computational skills.



### *Theoretical background /knowledge (weight 3)*

<b>Points</b>	<b>Assessment</b>	<b>Criteria</b>
All of the criteria below must be fulfilled to obtain 1 point		
1	Yes/No	The student has extended knowledge regarding the chemical context of the project
	Yes/No	The student has extended knowledge regarding the methods used in the project
	Yes/No	The student has insight into current research related to the project
Each fulfilled criterion below gives one additional point, but only if all criteria for 1 point above have been fulfilled		
2-5	Yes/No	The student has done an extensive literature search and has deep insight into current research in the field of the project.
	Yes/No	The student has deep insight into the relevant system
	Yes/No	The student has deep insight into the method(s) used in the project and is able to reflect about the choice of the method(s)
	Yes/No	The student is able to discuss strengths and limitations of the used methods regarding application to the chemical system studied

### *Evaluation and analysis of results (weight 3)*

<b>Points</b>	<b>Assessment</b>	<b>Criteria</b>
All of the criteria below must be fulfilled to obtain 1 point		
1	Yes/No	The student is able to discuss strengths and limitations of the approach
	Yes/No	The student draws correct conclusions from the obtained results
Each fulfilled criterion below gives one additional point, but only if all criteria for 1 point above have been fulfilled		
2-5	Yes/No	The student analyses the data thoroughly.
	Yes/No	The student is able to explain also those aspects of the results that are difficult to interpret or has otherwise critically evaluated the data.
	Yes/No	The student builds relevant hypotheses bases on her/his data.
	Yes/No	The student develops evaluation methods or tests several methods.

### *Independence (weight 5)*

<b>Points</b>	<b>Assessment</b>	<b>Criteria</b>
All of the criteria below must be fulfilled to obtain 1 point		
1	Yes/No	The student is able to perform the experiments / computations independently after an introduction
	Yes/No	The student is able to plan adequate experiments / computations
Each fulfilled criterion below gives one additional point, but only if all criteria for 1 point above have been fulfilled		
2-5	Yes/No	The student is able to deal with upcoming problems in an independent way.
	Yes/No	The student contributes with own ideas that are relevant for the execution of the project or suggests approaches to solve particular problems.
	Yes/No	The student shows initiative in the practical execution of the project.
	Yes/No	The student takes a leading role in the planning of the second half of the project.

### *Keeping the time schedule (weight 1)*

<b>Points</b>	<b>Assessment</b>	<b>Criteria</b>
1	Yes/No	The student keeps the agreed time schedule in the experimental / computational work
3	Yes/No	In addition, the student holds the oral presentation in time
5	Yes/No	In addition, the student hands the different versions of the written report in time

### The oral presentation (weight 5)

Points	Assessment	Criteria
All of the criteria below must be fulfilled to obtain 1 point		
1	Yes/No	The presentation introduces the system studied AND the method(s) used. The information given is correct.
	Yes/No	Relevant results are presented and correct conclusions drawn from the obtained results.
	Yes/No	The results are discussed in the context of previous research from the literature.
	Yes/No	Most illustrations are relevant, clear and have correct axis labels.
	Yes/No	The presentation is clear and structured.
	Yes/No	The presentation lasts between 20 and 30 min.
	Yes/No	Language and pronunciation are understandable
	Yes/No	Language and technical terms are largely correct
Yes/No	The student answers correctly to most relevant questions.	
Each fulfilled criterion below gives one additional point, but only if all criteria for 1 point above have been fulfilled		
2-5	Yes/No	The introduction places the project into a wider context
	Yes/No	The presenter holds good contact with the audience
	Yes/No	The presentation has a clear structure, language and technical terms are correct and the pronunciation is clear.
	Yes/No	The student gives qualified answers to all questions

### The written presentation (weight 5)

Points	Assessment	Criteria
All of the criteria below must be fulfilled to obtain 1 point		
1	Yes/No	The report contains the required number of pages
	Yes/No	The report is written entirely in the student's own words without plagiarism.
	Yes/No	The text is clear and spelling, grammar, and formalities are largely correct.
	Yes/No	The <i>Popular science description</i> puts the project in a wider perspective, can be understood by someone with school knowledge in science and has

		the required length
	Yes/No	The <i>Abstract</i> is understandable on its own
	Yes/No	The <i>aims</i> are clearly stated in the <i>Introduction</i>
	Yes/No	The <i>Introduction to the system</i> has the required length; correctly states the present knowledge and is based on scientific reviews and articles
	Yes/No	The <i>Introduction into the method(s)</i> has the required length; correctly states its/their scientific background and summarizes previous results obtained with this/these methods on the studied system or similar systems. The later is based on scientific reviews and articles
	Yes/No	The <i>Materials and Methods</i> section is detailed enough for other scientists to repeat the study.
	Yes/No	The <i>Results</i> section reports the obtained results in a clear way and gives a reasonable interpretation based on the obtained data. All figures are referred to in the text, they have correct axis labels and units. All work is mentioned, i.e. also those parts of the project that did not work. If results were obtained by others, this is clearly stated.
	Yes/No	The <i>Discussion</i> section discusses appropriately the obtained results in the light of previous original research articles.
	Yes/No	<i>Benefits and limitations of the approach</i> as well as possible <i>alternative interpretations</i> are appropriately discussed and the respective section has the required length
	Yes/No	The <i>role of similar approaches and research topics for the society and possible ethical aspects</i> are appropriately discussed and the respective section has the required length
	Yes/No	The report identifies <i>further questions</i> worth studying and outlines how this can be done.
	Yes/No	The report cites and lists relevant literature correctly and references are given for all figures not produced by the student her/himself.
Each fulfilled criterion below gives 1/2 additional point, but only if all criteria for 1 point above have been fulfilled		
1.5-5	Yes/No	The above criteria for 1 point were already met in the first draft handed in to the supervisor
	Yes/No	The text contains little irrelevant material.
	Yes/No	The results are discussed in a wider context.
	Yes/No	The text discusses whether the aims were reached or not.
	Yes/No	The analysis and discussion of the results is thorough.
	Yes/No	The text is well structured.
	Yes/No	Spelling, grammar, and technical terms are correct throughout the text.
	Yes/No	The text is easy to read
	Yes/No	The illustrations are helpful for the understanding and are easy to perceive

## Final mark

The final mark is calculated as follows:

- 1x points for Understanding the project
- + 5x points for Execution of the project
- + 3x points for Theoretical background/knowledge
- + 3x points for Evaluation and analysis of results
- + 5x points for Independence
- + 1x points for Keeping the time schedule
- + 5x points for The oral presentation
- + 5x points for The written presentation

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= Total number of points (min 28, max 140)

<i>Mark</i>	<i>Total number of points</i>
E	28 - 41
D	42 - 69
C	70 - 97
B	98 - 125
A	126 - 140

In addition: In order to qualify for marks A and B, the final version (accepted by the examiner) must be handed in at latest 30 days of term time after the oral presentation (not counting the time it takes the examiner to read the supervisor accepted version)

## Reflection Instructions

### "Reflection document" on degree project

In addition to the written Master thesis, a reflection document concerning the knowledge and skills acquired during the work on the degree project should be handed in to the examiner. The aims with the reflection are the following:

- reflect how the individual skills have developed under the degree project
- give a feedback to the examiner and the department on how well the process of carrying out the degree project worked and how the student own efforts affected the project execution and final result.
- give a feedback to the department on how well the masters programme as a whole succeeded with fulfilling the goals of the education

### Instruction on how to write reflection document

Reflection document should consist of three parts:

1) Reflection on how the degree project is related to the goals of the masters programme: Use the programme curriculum to discuss how your degree project corresponds to the programme goals.

2) Reflection over your own work

Planning:

- Was the plan (research programme) of the project a good help for the work?
- Was enough time allocated for the planning?
- Were the conditions satisfactory?

- A degree project should correspond to some work contribution (1.5 hp = 1 week of full time work), how well that corresponded to your project?

Execution and report writing:

- was the time allocated in a satisfactory way?
- what was problematic and why?
- what you succeeded more than expected?
- were you adequately prepared to write a comprehensive report?
- did you have sufficient knowledge of language (English, other) ?
- are you happy with how you managed to do your thesis?

3) Reflection over subject content, knowledge, skills and attitude which were most useful during the work on the thesis

- which areas and courses during your education were most useful for the work on your degree project?

- which new knowledge and skill were necessary to acquire to perform the work on the thesis?



- do you feel well prepared for your future career?

The reflection document, to be accepted, should answer all the questions above and contain 2-4 pages. The student should send the reflection document in an electronic form to the examiner around the time of presentation of the master thesis.



## Individual feed-back on oral presentation:

### Speaker:

(Circle the most appropriate alternative and write a few words of constructive criticism, below and on the reverse side)

**Was it easy for you to follow the main theme(s) of the presentation?**

YES                      RELATIVELY WELL                      WITH DIFFICULTY                      NO

**Would you be able to explain the contents of the presentation to someone who did not hear it?**

YES                      RELATIVELY WELL                      WITH DIFFICULTY                      NO

**Was the presentation well organized?**

YES                      MOST OF IT                      NO

**Was the amount of information presented, appropriate for the time given?**

TOO MUCH                      JUST RIGHT                      TOO LITTLE

**Were the technical terms described adequately?**

YES                      MOST OF THEM                      NO

**What do you think about the rate at which the speaker spoke?**

TOO FAST                      JUST RIGHT                      TOO SLOW

**What do you think about the volume (voice) of the presentation?**

TOO SOFT                      JUST RIGHT                      TOO LOUD

**Did the speaker maintain good contact with the audience?**

YES                      RELATIVELY WELL                      NO

**Did the speaker convey enthusiasm and interest to the audience?**

YES                      RELATIVELY WELL                      NO

**Comments concerning the use of visual aids:**

**What was the best and the worst aspect(s) of the presentation?**

**Additional comments:**

# Thesis title

Subtitle if any

Author's name

Department of Materials and Environmental Chemistry

Master Degree Project in Material / Physical /Inorganic Chemistry

xx HE credits

Autumn/Spring term 20XX

Supervisor: Name



Stockholms  
universitet

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# Syllabus

for course at advanced level

**Materials Chemistry, Degree Project**

**Materialkemi, självständigt arbete**

**45 Higher Education Credits  
45 ECTS credits**

<b>Course code:</b>	KZ9004
<b>Valid from:</b>	Spring 2010
<b>Date of approval:</b>	2009-12-21
<b>Department</b>	Department of Materials and Environmental Chemistry
<b>Subject</b>	Chemistry

## Decision

This syllabus has been approved by the Board of the Faculty of Science at Stockholm University.

## Prerequisites and special admittance requirements

### Course structure

Examination code	Name	Higher Education Credits
HELA	Materials Chemistry, Degree Project	45

### Course content

The project work is intended to provide experience in and enhanced knowledge of scientific standards and research work in materials chemistry. Central aspects are planning, implementation and reporting of the scientific research. Training in literature search, writing a scientific report in English, and oral presentation of scientific results as seminars is furthermore comprised. The course provides knowledge and skills that form a useful foundation for both postgraduate studies and a professional career.

### Learning outcomes

It is expected that the student after taking the course will be able to:

- \* Demonstrate experimental/theoretical competence (planning, implementing and documenting experimental/theoretical work).
- \* Evaluate and analyze obtained results and draw correct conclusions from them.
- \* Demonstrate a valid scientific attitude to the project.
- \* Read and understand relevant literature, and utilize theory needed for the project.
- \* Carry out a goal-oriented literature search.
- \* Compile and write a scientific report in English.
- \* Orally report and present research results.

### Education

The degree project including the laboratory work is carried out within the various research groups at the divisions of inorganic or structural chemistry or at an external research/development laboratory.

The education consists of compulsory seminars and independent work directed by a principal supervisor or assistant supervisor.

After consultation with the relevant teacher, an examiner may rule that a student is not obliged to participate in

certain compulsory seminars, if there are special grounds for this.

### **Forms of examination**

a. Measurement of knowledge takes place through:

\* Written or oral presentation of scientific work and by evaluation of experimental skill.

b. Grading is carried out according to a 7-point scale related to learning objectives:

A = Excellent, B = Very Good, C = Good, D = Satisfactory,

E = Sufficient Fx = Fail F = Fail.

c. Grading criteria for the course will be distributed at the start of the course.

d. A minimum grade of E is required to pass the course, together with:

\* Participation in compulsory seminars

e. Students who fail to achieve a pass grade in an ordinary examination have the right to take at least further four examinations, as long as the course is given. The term "examination" here is used to denote also other compulsory elements of the course. Students who have achieved a pass grade on an examination may not retake this examination in order to attempt to achieve a higher grade. Students who have failed to reach a pass grade on two occasions have the right to request that a different teacher be appointed to set the grade of the course. A request for such appointment must be sent to the departmental board.

### **Interim**

Students may request that the examination is carried out in accordance with this syllabus even after it has ceased to apply. This right is limited, however, to a maximum of three occasions during a two-year-period after the end of giving the course. A request for such examination must be sent to the departmental board.

### **Required reading**

The literature is constituted by scientific publications and reports within the relevant field, found by the student through literature search, and literature distributed by the principal or assistant supervisor.



# Utbildningsplan

för

**Masterprogram i materialkemi**  
**Master's Programme in Materials Chemistry**

**120.0 Högskolepoäng**  
**120.0 ECTS credits**

<b>Programkod:</b>	NMAKO
<b>Gäller från:</b>	HT 2014
<b>Fastställt:</b>	2006-10-18
<b>Ändrad:</b>	2013-11-18
<b>Värdinstitution:</b>	Institutionen för material- och miljö kemi

## Beslut

Denna utbildningsplan är fastställd av Naturvetenskapliga fakultetsnämnden vid Stockholms universitet 2006-10-18 och reviderad 2013-11-18.

## Förkunskapskrav och andra villkor för tillträde till programmet

För tillträde till programmet krävs kunskaper motsvarande kandidatexamen, där minst 90 högskolepoäng i kemi ingår. Engelska B eller motsvarande.

## Programmets uppläggning

Programmet innehåller ett block bestående av två obligatoriska kurser om totalt 30 högskolepoäng och en valbar del om 75 högskolepoäng. Den valbara delen består av ett självständigt arbete som kan vara 30, 45 eller 60 högskolepoäng samt kurser som ges av värdinstitutionen. Dessutom finns det utrymme för valfria kurser (högst 15 högskolepoäng) som kan vara inom eller utom ämnesområdet. Programmet erbjuder ett strukturerat utbud av kurser till en sådan omfattning och ett sådant djup att den studerande genom lämpligt val av kurser ska kunna uppfylla fordringarna för masterexamen med fördjupning inom ämnesområdet materialkemi.

## Mål

För masterexamen ska studenten visa

- kunskap och förståelse inom huvudområdet materialkemi, inbegripet såväl brett kunnande inom området som väsentligt fördjupade kunskaper inom vissa delar av området samt fördjupad insikt i aktuellt materialkemiskt forsknings- och utvecklingsarbete
- fördjupad metodkunskap inom materialkemi
- förmåga att kritiskt och systematiskt integrera materialkemisk kunskap och att analysera, bedöma och hantera komplexa företeelser, frågeställningar och situationer även med begränsad information
- förmåga att kritiskt, självständigt och kreativt identifiera och formulera frågeställningar med materialkemisk relevans, att planera och med adekvata metoder genomföra kvalificerade uppgifter inom givna tidsramar och därigenom bidra till kunskapsutvecklingen samt att utvärdera detta arbete
- visa förmåga att i såväl nationella som internationella sammanhang muntligt och skriftligt klart redogöra för och diskutera sina slutsatser och den kunskap och de argument som ligger till grund för dessa i dialog med olika grupper
- sådan färdighet som fordras för att delta i forsknings- och utvecklingsarbete eller för att självständigt arbeta i annan kvalificerad verksamhet
- förmåga att inom området materialkemi göra bedömningar med hänsyn till relevanta vetenskapliga, samhälleliga och etiska aspekter samt visa medvetenhet om etiska aspekter på forsknings- och

utvecklingsarbete

- insikt om vetenskapens möjligheter och begränsningar, dess roll i samhället och människors ansvar för hur den används
- förmåga att identifiera sitt behov av ytterligare kunskap och att ta ansvar för sin kunskapsutveckling.

### **Kurser**

*Obligatoriska kurser inom huvudområdet*

Fasta tillståndets kemi, AN, 15 hp (KZ7003)

Introduktion till materialkemi, AN, 15 hp (KZ8012)

*Valbara kurser*

Självständigt arbete i materialkemi, AN, 30, 45 eller 60 hp

Utbudet av valbara kurser beslutas av institutionsstyrelsen. Listan på samtliga valbara kurser uppdateras inför varje nytt läsår. Inför varje ny programstart finns en lista, som visar ett minsta utbud av valbara kurser, på vilka undervisning garanteras under programperioden.

*Valfria kurser*

Valfria kurser inom eller utom ämnesområdet om högst 15 hp

### **Examen**

Masterexamen.

### **Övrigt**

Studerande, som antagits till programmet och ej slutfört det inom de planerade två studieåren, kan begära att få slutföra programmet även efter det att utbildningsplanen upphört att gälla. Därvid gäller de begränsningar som anges i kursplanerna för de i utbildningen ingående kurserna.

Utbildningen kan komma att ges på engelska.

Inom programmet är omfattningen av kurser på grundnivå begränsad till högst 30 hp.

För valfria kurser gäller de begränsningar att använda kursen i examen som framgår av kursplanen för respektive kurs.