

Degree course scheme

"New Materials with Tailored Properties"

Course of Study of the Graduate program

Hannover, January 2006

In cases of doubt the regulations of the German version
"Studienplan des Promotionsprogramms"
apply.

Course of Study for the Graduate Studies in the Graduate Program "New Materials with Tailored Properties"

Introductory remarks

In addition to the thesis work of the graduate student, the graduate studies are a major component of the graduate program. It serves to improve the competence of the students and thus to qualify them to interesting candidates for the job market. As a counterpoint to the scientific specialization within the topic of the thesis, a broad range of lectures and courses is offered. The successful completion of the graduate studies is - in addition to the award of the doctoral title, which occurs according to the "Promotionsordnungen" of the participating departments - acknowledged by the award of a certificate.

The course of study presented here leaves a lot of room to the graduate students for the individual organisation of their studies. Correspondingly, there are no strictly

prescribed lectures and courses, but there is a system of credit points (CPs), which allows the students to gather their CPs in different areas, among them also the area of conference contributions and publications. Furthermore, a stay abroad is a fixed part of the course of studies.

1. Conditions for admission

The prerequisites for the admission to the graduate program are:

- a) The admission to the doctorate work occurs according to the "Promotionsordnungen" of the participating faculties ("Fakultäten"). These are

"Gemeinsame Ordnung der naturwissenschaftlichen Fachbereiche für die Promotion zum Doktor der Naturwissenschaften (Dr. rer. nat.) an der Universität Hannover" ("Joint regulations of the departments of the natural sciences for the graduation to the Doctor of Natural Sciences (Dr. rer. nat.) at the University of Hannover"),

"Promotionsordnung für den Fachbereich Maschinenbau an der Universität Hannover" ("Regulations for the graduation at the department for mechanical engineering at the University of Hannover"),

and the

"Promotionsordnung des Fachbereichs Chemie und Pharmazie der Technischen Universität Carolo-Wilhelmina zu Braunschweig für die Verleihung des Grades Doktorin oder Doktor der Naturwissenschaften (Dr. rer. nat.) an der Technischen Universität Braunschweig". ("Regulation of the department of Chemistry and Pharmaceutics of the Technical University Carolo-Wilhelmina at Braunschweig for the award of the title Doctor of Natural Sciences (Dr. rer. nat.) at the Technical University of Braunschweig").

When the appropriate department has made the admission dependent upon certain additional achievements, the candidate can be admitted to the graduate studies on a provisional basis. The corresponding tests must be passed within two years. When the candidate is not able to provide the additional achievements within this deadline, he or she will have to leave the graduate program.

- b) The subject of the doctoral thesis must fit to the aims of the graduate program. The decision is made by the directory.
- c) The instructor of the thesis must be a project manager within the graduate program according to the regulations of the graduate program.
- d) The student must be a member or an associated member of the graduate program according to the regulations of the graduate program.
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2. Fields of study

For the organization of the studies any member must be assigned to a certain field of study. The following fields of study are participating in the graduate program:

- a) chemistry
- b) geosciences
- c) mechanical engineering

The field of study where the graduate student has made his or her university degree is designated as the "own field of study". The graduate student can also apply to choose another field as the "own field of study". The directory of the graduate program decides about this application.

Graduate students who have obtained their university degree in another field as those participating in the program, must choose an "own field of study" in agreement with the directory of the program.

3. Study achievements

The achievements within the graduate studies come from three different areas:

- Area A. Compulsory seminars for all students;
- Area B. Special Lectures
- Area C. Publications and conference contributions.

A student has to achieve at least 25 CPs during his graduate studies. In the different areas, a certain minimum of CPs must be achieved:

- Area A: 7 CPs;
- Area B: 8 CPs;
- Area C: 4 CPs.

The knowledge presented within the lectures in the areas A and B has to be examined for each lecture. The type of examination can be chosen by the lecturer, as far as the regulations under #4 are not affected. The production of the corresponding result is acknowledged by the lecturer and is communicated to the directory of the graduate program after the lecture has finished. The directory of the graduate program then assesses the number of credit points achieved according to the regulations given under #4.

The achievements are not bound to any temporal sequence. When the student has participated in the graduate course of studies for two years, at least half of the necessary credit points must have been acquired. When this is not the case, the directory of the graduate program can expel the student from the further participation in the graduate studies. The total of 25 CPs must be acquired within maximally 3 years.

4. Lectures, publications and conferences, stay abroad, credit points

The subject of the lectures described in sections 4.1 and 4.2 must fit to the scientific aims of the graduate program. The graduate program works on subjects of materials science in the fields of sorption, catalysis, transport of atoms and corrosion. Basic knowledge is required in the areas of inorganic and physical solid-state and materials chemistry, of materials science, of solid-state and materials analysis as well as materials testing, of crystallography, of mineralogy and crystal chemistry, of polymer sciences, of the theoretical description of solid-state compounds and of their

synthesis and preparation as well as of the properties and applications of solid-state compounds and materials.

The directory decides about the lectures and courses which are part of the curriculum of the graduate studies. Before the beginning of each term, the spokesman of the graduate program announces these lectures and courses. Given that the minimum number of credit points in the different areas A, B and C is achieved (see #2), the members of the graduate program can compile their curriculum freely.

The lectures in areas B are held in English language.

4.1 Area A: General seminars for all graduate students

Seminar for graduate students: In this seminar the graduate students present the results of their own work and discuss it with the other members of the graduate program and with the project managers. The lecture of the student lasts 45 minutes.

The language of the seminar is English. Each graduate student shall give one lecture and shall conduct one seminar per year. It is expected that all members participate in the discussion.

This event is organized by one of the project managers of the graduate program. The organizer changes each half year.

Scientific Colloquium: In the scientific colloquium of the graduate program, scientists from universities, academies and industry hold lectures about recent research results. The lecturers come from Germany and from abroad. The lectures can be given in German or in English.

It is expected that the graduate students participate actively in the discussions following the lectures. Apart from these discussions, the lecturers are available for additional scientific discourse with the graduate students.

This event is organized by one of the project managers of the graduate program. The organizer changes each half year.

Every year ca. 15 lectures are given. The active participation, e.g. by contributions to the discussion, in six events is credited by one CP. The participation is recorded.

4.2 Area B: Special lectures

These lectures are specially held for the graduate program and are not part of the curriculum of the course of studies which gave the corresponding participant access to the graduate program. In cases of doubt, the final decision is made by the directory of the graduate program.

The topic of the lectures must fit to the aims of the graduate program. Before the beginning of each term, the spokesperson of the graduate program publishes a list of the possible lectures for the graduate students of the different fields of study.

The number of CPs which can be obtained by certain lectures and seminars, corresponds to the number of "Semesterwochenstunden" (SWS, hours per week), with which these are announced in the program of lectures ("Vorlesungsverzeichnis"). The number of CPs which can be obtained by attending practical courses corresponds to

half the number of SWS, with which these are announced in the program of lectures. By the successful participation (see #3) at one event maximally three credit points can be obtained.

4.3. Area C: Publications and Conference Contributions

The graduate students shall actively participate in conferences and in the publication of their scientific results. To this purpose the graduate program supports and demands

- a. the participation at national and international conferences by poster or oral contributions. The topic of the scientific contributions must come from the own research project which is pursued in the doctoral work or it must fit to the scientific aims of the graduate program. The graduate student and the project manager have to satisfactorily show that the contribution has been presented. CPs deriving from conference contributions can only be awarded after the corresponding conference has taken place. In cases of doubt the final decision is made by the directory of the graduate program.
- b. the publication of scientific results as short communications and as full papers in journals with a refereeing system. The topic of the paper must come from the own research project which is pursued in the doctoral work or it must fit to the scientific aims of the graduate program. The corresponding CPs can be awarded as soon as an unambiguous statement of the editor of the journal is available, stating that the manuscript has been accepted for publication. In cases of doubt the final decision is made by the directory of the graduate program.

The credit points are distributed according to the following guidelines:

two poster contributions at national conferences	1 CP
one poster contribution at an international conference	1 CP
one oral contribution at a national conference	1 CP
one oral contribution at an international conference:	2 CPs
one short paper (letter, communication) in a refereed journal	2 CPs
one long paper (article, full paper) in a refereed journal	3 CPs

4.5 Stay abroad

To foster the international character of the graduate program and in order to provide the graduate students the opportunity to perform their research work in a different

environment and so to open new point-of-views, a stay abroad is a fixed and necessary part of the graduate studies. This stay abroad should last at least three and maximally six months. If possible, the duration given shall not be combined from several shorter stays. Non-German participants at the graduate program shall not carry out their stay abroad in their home country. In no case may they carry out their stay abroad at their home university.

The project managers give their graduate students advice with regard to the choice of the scientific group where to carry out the stay abroad. Those graduate students who receive a scholarship will obtain the corresponding bonus during their stay abroad according to the guidelines of the scholarship program. Within the frame of the given financial possibilities, the graduate program can finance part of the travel costs upon application.

The graduate student has to inform the directory of the graduate program at least one month before starting a planned stay abroad. After returning, a confirmation from the leader of the research group where the stay abroad has been carried out, stating the time of the stay and shortly describing the work performed, has to be submitted to the directory of the program.

5. Certificate

The graduate program awards a certificate about the successful participation in the graduate program, when the following conditions are fulfilled:

1. Within the graduate course of studies, the achievements according to #3 and #4 have been fulfilled. The candidates have to prove the credit points obtained and have to submit the confirmation concerning their stay abroad.
2. The candidate has graduated according to the corresponding graduation guidelines ("Promotionsordnung"). The candidate has to submit a confirmation from the corresponding department ("Fachbereich").
3. Three copies of the thesis have been handed over to the directory of the graduate program.

A detailed list of the achievements of the graduate, which also comprises the titles of the lectures visited and details regarding the stay abroad, is part of the certificate.