

# STUDY REGULATIONS

for the  
Doctorate Course of Studies in Chemistry/Biochemistry

at the  
Ruhr-Universität Bochum

of the 01.10.2002

On the basis of § 2 Sec. 4 and of § 86 Sec. 1 and of § 97 Sec. 3 Clause 1 of the Law of the Universities of the Land of North Rhine-Westphalia (Hochschulgesetz-HG) in the version of the bulletin of the 14<sup>th</sup> March 2000 (GV.NW. S. 189), the Ruhr-Universität Bochum, on the proposal of the Faculty of Chemistry, has issued the following study regulations:

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## § 1 Jurisdiction

These study regulations regulate the course of studies belonging to the doctorate course of studies in chemistry/biochemistry at the Ruhr-Universität Bochum on the basis of the doctorate regulations of the Faculty of Chemistry of the Ruhr-Universität Bochum of the 01.10.2002.

## § 2 Admission Requirements

- (1) The qualification for admission to the doctorate procedure is regulated by § 97 Sec. 2 HG.
- (2) For admission to the research course of the doctorate course of studies, evidence of the following must be provided:
  - a) a course of studies completed by a diploma examination in a scientific course of studies in chemistry or biochemistry with a regular duration of at least eight semesters at an academic university or college, or
  - b) a completed Master's degree course of studies in chemistry or biochemistry as defined by § 85 Sec. 3 Clause 2 HG, or
  - c) a completed course of studies with an overall grade of very good (1.5) or better in a scientific course of studies in chemistry or biochemistry with a regular duration of at least six semesters at an academic university or college as well as 60 credit points with an overall grade of very good (1.5) or better for courses of the preparatory course of studies (Annex 1), or
  - d) in exceptional circumstances, a completed course of studies corresponding to letter a) or b) in other

- natural science subjects or in engineering sciences, or
- e) a completed course of studies comparable to letters a) to d) at a foreign university or college, or
  - f) a completed course of studies in a scientific course of studies in chemistry or biochemistry with a regular duration of at least eight semesters at an academic university or college as well as 60 credit points and an average grade of 1.3 or better for courses of the Master's degree course in biochemistry or chemistry at the Faculty of Chemistry of the Ruhr-Universität Bochum or
  - g) a completed course of studies with an overall grade of very good (1.5) or better at a technical college, which can be related to the courses of studies at the Faculty of Chemistry as well as 60 Credit Points with an overall grade of very good (1.5) or better for classes in the preparatory course for the doctorate course of studies.
- (3) The doctorate committee may make conditions for applications for which letters c) to g) apply.
  - (4) A further requirement for admission is evidence of functional knowledge of the English language.
  - (5) In addition, a course of studies requirement for the admission of students with a completed course of studies at a foreign university or college comparable to letter c), is evidence of sufficient knowledge of the German language, e. g. 2 x TDN 3 (Level step 3) in TestDaf (Test of German as a foreign language). In certain justified exceptional circumstances, in which successful completion of a course of studies is to be expected, application may be made by a candidate for a course of studies to dispense with evidence of knowledge of the German language if the doctorate committee is able to ascertain the existence of sufficient knowledge of the German language.

### § 3

#### Commencement of Studies

The preparatory course of studies and the research course for the doctorate course of studies may be commenced in either the winter semester or the summer semester.

### § 4

#### Overall Regular Course Duration and Volume of Studies

- (1) The study regulations only regulate the specialised part of the training, as far as it is necessary for the orderly proceeding of the course of studies and as far as it is required for guaranteeing a level of university education comparable with both domestic and foreign universities. They establish minimum requirements.
- (2) Any further occupation with other topics of the field of study, as well as the study of complementary disciplines is placed within the personal decision and responsibility of each individual student.
- (3) The regular course duration until the completion of the doctorate course of studies including the doctorate examination (disputation) is six semesters. The doctorate committee shall decide upon the admissibility of shorter course durations.
- (4) The volume of the studies in the compulsory and required elective part of the one-year preparatory course of studies is a total of approximately 49 hours per semester week (18 hours per semester week of lectures and exercises/seminars as well as 31 hours per semester week of practicals) for students with a chemistry subject area, and a total of approximately 56 hours per semester week (18 hours per semester week of lectures and exercises/seminars as well as 38 hours per semester week of practicals) for students with a biochemistry subject area.
- (5) The volume of the studies in the compulsory and required elective part of the research course is between approximately 30 to 40 hours per semester week (H/SW). The contents of the studies as well as the subject matter and volume of the research work are to be chosen and limited in such a manner as to allow the completion of the doctorate course of studies within 4 – 6 semesters. Nevertheless, it should be guaranteed that students are able to determine the subsidiary subject of their own choice within the limits of the provisions of § 9 Sec. 2 of the doctorate regulations and of § 9 Sec. 4 of these study regulations.

## § 5 Aims of the Course

The doctorate procedure is comprised of the research course for the doctorate course of studies in chemistry/biochemistry and the doctorate examination. It is designed to communicate the ability to,

- develop a research plan and formulate it in writing,
- carry out independent scientific research,
- execute a research project successfully within a given time frame,
- document the obtained results and to put them in a form suitable for publication,
- present and defend the obtained results before an informed audience.

## § 6 Organisation of the Course

- (1) The doctorate course of studies is organised into a one-year preparatory course of studies as well as a three-year research course for the doctorate course of studies in chemistry/biochemistry. The doctorate committee shall decide upon the admission to the preparatory course of studies or the immediate admission to the research course itself.
- (2) The one-year preparatory course of studies is intended to create the requirements for independent scientific work in the subsequent doctorate procedure as well as to broaden the specialised knowledge required. For students with a chemistry subject area, three compulsory courses in inorganic, organic and physical chemistry are offered as well as three elective Master's courses as required elective courses, two six-week in-depth practical courses and a three-month specialisation practical. Students with a biochemistry subject area require the Biochemistry Seminar, Bio-Information Technology and Biochemistry IV as compulsory courses, four required elective courses as well as the three-month specialisation practical. The results and knowledge obtained from the specialisation practical, which is carried out in the subject area of the forthcoming doctorate thesis, must be presented and defended before an informed audience.
- (3) The two to three-year research course is intended for scientific research and the compilation of the dissertation. In the accompanying lecture courses that are to be taken, the students are to acquire the capability for the successful planning and efficient execution of independent scientific research as well as the compilation and defence of the dissertation. In addition, in-depth specialist knowledge in a subsidiary subject is to be acquired.

## § 7 Types of Teaching Classes

- (1) The teaching classes on offer in this course of studies take place in courses of the following type:
  - a) Lectures and guest lectures (V),
  - b) Exercises (Ü),
  - c) Seminars (S),
  - d) Doctoral lectures and poster presentations (K),
  - e) Project development and applications (E),
  - f) Reports and discussions regarding the pieces of independent scientific work.
- (2) Compulsory courses (Pf) are teaching courses that are compulsory for the proper execution of the doctorate course of studies.
- (3) Required elective courses (WPf) are teaching courses, from which a specific number are to be elected from a larger number on offer.
- (4) Lectures and guest lectures (V) are intended to communicate knowledge of content and methodical knowledge by the interconnected representation of specialist areas and open up the way for the broadening and extension of knowledge by means of self-study.
- (5) Exercises (Ü) are offered in conjunction with lectures. They are intended to offer students the opportunity to apply and extend the knowledge they have acquired and to self-test their level of knowledge by dealing with example problems.
- (6) Seminars (S) are devoted to the treatment of specialised methods of looking at problems. In the seminars, the students will learn to work out complex scientific questions independently and to report properly on them, as well as acquiring the ability to carry out critical scientific discussion.

- (7) Doctoral lectures and poster presentations (K) cover obligatory yearly lectures, presentations and discussions within the framework of work group courses (literature and methodology seminars) as well as in the general context of workshops and lecture series in the subject areas, special research areas and Graduate Schools.
- (8) Project development and applications (E) include the accompanying compilation of the progress report after one year of studies by the supervisor of the dissertation, as well as the development and written formulation of a project application for the following two years of study.

## § 8

### Participation Certificates and Achievement Certificates

- (1) A participation certificate (PC) is a certificate of regular active participation in a class, which is not graded. At the beginning of the respective class, the organisers shall stipulate the conditions that must be satisfied for a participation certificate to be issued. Repeats of these teaching courses are permitted.
- (2) An achievement certificate (AC) is the certification of an individually recognised piece of study or examination work in accordance with the requirements set by the doctorate regulations. Conditions for this could be e. g. holding a lecture, compilation and presentation of a poster article, the completion of a written report or project application or an oral examination. At the beginning of the respective class, the organisers shall stipulate each of the individual conditions that must be satisfied for an achievement certificate to be issued. Repeats of these teaching courses are permitted.
- (3) The achievement certificate for the subsidiary subject (4 – 6 H/SW) takes place by way of a 30 to 45 minute oral examination, which is to be minuted and is graded. In the case of failure, this examination may be repeated up to two times. The date for the examination is to be agreed freely with the examiner. All further achievement certificates are not graded.

## § 9

### Content of the Course

- (1) For students with a chemistry subject area, compulsory and required elective courses amounting to a total of 18 H/SW of lectures or exercises/seminars and 31 H/SW of practicals are to be absolved in the preparatory course of the doctorate course of studies. These are distributed among the individual subjects as follows:

Class	Hours per Semester Week			Type	Credit Points (CP)
	V	Ü/S	Pr		
Physical Chemistry V	2	1	-	Pf	5
Inorganic Chemistry IV	2	1	-	Pf	5
Organic Chemistry IV	2	1	-	Pf	5
Master's Course Elective I	2	1	-	WPf	5
Master's Course Elective II	2	1	-	WPf	5
Master's Course Elective III	2	1	-	WPf	5
In-Depth Practical Part I	-	-	8	WPf	7,5
In-Depth Practical Part II	-	-	8	WPf	7,5
Specialisation Practical with Public Lecture	-	-	15	WPf	15
<b>49 H/SW</b>	<b>12</b>	<b>6</b>	<b>31</b>		<b>60</b>

Elective classes and in-depth practicals from the Master's course of studies in chemistry may be elected for this. The specialisation practical must deal with the subject field of the intended doctorate thesis and is intended to serve as preparation thereof. Evidence of the 60 Credit Points for this preparatory course of studies is to be provided for admission to the doctorate procedure in accordance with § 2 Sec. 2 Letter c) or g).

- (2) For students with a biochemistry subject area, compulsory and required elective courses amounting to a total of 18 H/SW of lectures or exercises/seminars and 38 H/SW of practicals are to be absolved in the preparatory course of the doctorate course of studies. These are distributed among the individual subjects as follows:

Class	Hours per Semester Week			Type	Credit Points (CP)
	V	Ü/S	Pr		
Biochemistry Seminar	-	2	-	Pf	3
Bio-Information Technology	2	1	-	Pf	5
Master's Elective Lecture Chemistry	2	1	-	WPf	5
Modular Practical Biochemistry of Focal Points	-	3	18	WPf	4 x 4
Biochemistry IV	2	-	-	Pf	7
Special Lecture from the Subject Area of the Focal Point Development	2	-	-	WPf	5
Ring Lecture in Focal Point	2	-	-	WPf	5
Focal Point and Specialisation Practical with Public Lecture	-	1	20	WPf	14
<b>56 SWS</b>	<b>10</b>	<b>8</b>	<b>38</b>		<b>60</b>

Elective classes and in-depth practicals from the Master's course of studies in biochemistry may be elected for this. The focal point and specialisation practicals must deal with the subject matter of the intended doctorate thesis and are intended to serve as preparation thereof. Evidence of the 60 Credit Points for this preparatory course of studies is to be provided for admission to the doctorate procedure in accordance with § 2 Sec. 2 Letter c) or g).

(3) The research course of the doctorate procedure includes the following compulsory classes:

- Interdisciplinary Lecture Programme (4 x 2 V), 2 hours per semester week/semester, 4 participation certificates,
- Modern Aspects of Chemistry and Biochemistry (2 x 2 V), 2 hours per semester week/study year, 2 participation certificates,
- Scientific Communication (2 S), 2 hours per semester week, 1 participation certificate,
- Literature and Methodology Seminar (2 x 2 K), 2 hours per semester week/study year, 2 achievement certificates for seminar lectures,
- Doctoral Research Seminars and Workshops (2 x 2K), 2 hours per semester week/study year, 2 achievement certificates for seminar lectures/poster presentations,
- Subsidiary Subject Classes (2 x 2V, 2 x 1 Ü), 6 hours per semester week, 1 achievement certificate in the form of an oral examination,
- Project Planning and Execution (2E), 2 hours per semester week, 1 achievement certificate for a written interim report and research application (after one study year).

In the case of application for admission to the doctorate examination, the course completion certificate, which is to be issued in accordance with § 10 Sec. 1 for the 6 achievement certificates and 7 participation certificates listed here, is to be included. Should the application for admission to the doctorate examination be made before the end of the fourth semester of the research course, the number of participation certificates as well as the required number of achievement certificates for the classes "Literature and Methodology Seminar" or "Doctoral Research and Workshops" can be reduced upon application dependent on the decision taken by the doctorate committee.

(4) The subsidiary subject classes may be chosen from the elective lectures for the Master's courses of studies in chemistry/biochemistry. Upon application, suitable classes that are offered by other faculties may also be elected. The intended subject area must not have a close affinity to the subject area of the doctorate thesis and must be stated by the candidate in their application for admission as a doctoral candidate in accordance with § 5 Sec. 2 of the doctorate regulations. In accordance with these study regulations, classes in the following subject areas often have a close affinity:

- Organic and inorganic chemistry, functional materials,
- Analytical, physical, technical and theoretical chemistry,
- Partial subject areas of biochemistry.

The doctorate committee shall decide upon the admissibility of the elected teaching courses in the subsidiary subject.

§ 10  
Course Completion Certificates

- (1) A course completion certificate for the doctorate course of studies is required for entry to the doctorate examination. The certificate is issued by the chairperson of the doctorate committee if the required achievement certificates and participation certificates for the research course of studies listed in § 9 Sec. 3 have been presented.
- (2) The course completion certificate, which includes details of the achievement certificates and also the subject area and grade of the subsidiary subject, can only be issued as a rule in the course of the 4<sup>th</sup> semester of the doctorate course of studies at the earliest. The doctorate committee shall decide upon exceptions. It should be possible to issue the course completion certificate at the end of the 6<sup>th</sup> semester at the latest.
- (3) Students, who have successfully completed the preparatory course of studies by giving evidence of the 60 Credit Points required in accordance with § 9 Sec. 1 or Sec. 2, shall receive a course completion certificate and a transcript of the preparatory course of studies, which shall be issued by the chairperson of the doctorate committee. The certificate must be included with the application for admission as a doctoral candidate at the start of the doctorate procedure in accordance with § 5 Sec. 2 of the doctorate regulations. If the required overall grade of very good (1.5) or better is not achieved, upon application by the candidate, the Credit Points obtained shall be recognised in their full extent as achievement certificates for the Master's course of studies in chemistry or biochemistry at the Ruhr-Universität Bochum.
- (4) If the subsidiary subject examination is not passed after being repeated twice, then the doctorate course of studies and therefore the doctorate procedure also count as not being passed. The candidate shall receive written notification of this from the chairperson of the doctorate committee which is to include a statement of rights of redress.

§ 11  
Doctorate Examination

- (1) The doctorate examination takes place in the form of a disputation open to the university in accordance with § 13 of the doctorate regulations of the Faculty of Chemistry of the Ruhr-Universität Bochum.
- (2) Upon entry to the doctorate examination in accordance with § 10 of the doctorate regulations, apart from the dissertation, the certificate of completion of the doctorate course of studies in accordance with § 10 Sec. 1 of these study regulations is to be presented.
- (3) The doctorate examination consists of the dissertation as well as an oral examination in the form of a disputation to be held in the English or German language, which should take approximately 60 to 75 minutes including a 15 to 20-minute lecture. The disputation can extend to all subjects of the specialist field of study that are factually and methodically related to the dissertation, as well as to the content of selected classes of the research course, with the exception of classes in the subsidiary subject.

§ 12  
Dissertation

- (1) The dissertation, written in the English or German language, shall demonstrate that the candidate has the ability to carry out independent scientific research and to deal with a research project set to them within three years, including the compilation of documentation suitable for publication.
- (2) With their written consent to supervise the dissertation, the supervisor is obliged to guarantee that the subject matter and extent of the experimental work will allow the completion of the dissertation in a maximum of 6 semesters.

§ 13  
Curriculum

- (1) The curriculum is included with these study regulations at Annex 1 and gives detailed information concerning the classes as well as the organisation of the course of studies. Decision may be taken by the doctorate committee to deviate from it for compelling reasons.

- (2) In the preparatory course of studies, Master's elective courses and in-depth practicals for the Master's course of studies in chemistry may be chosen by students with a chemistry subject area. For students with a biochemistry subject area, elective and focal point classes for the Master's course of studies in biochemistry may be chosen in the preparatory course of studies.

§ 14  
Coming into Force

These study regulations come into force with effect from 01.10.2002.

Drawn up on the basis of the resolutions passed by the faculty council of the Faculty of Chemistry of the 24.06.2002.

Bochum, the 12<sup>th</sup> December 2002

The Rector  
of the Ruhr-Universität Bochum  
University Professor Dr.-Ing G. Wagner

Annex 1

## Curriculum for the Doctorate Course of Studies in Chemistry

The following curriculum is valid in conjunction with the study regulations for the doctorate course of studies and the doctorate regulations of the Faculty of Chemistry.

- (1) The organisation of the curriculum is based on the study year with studies commencing in the winter semester.
- (2) It is recommended that classes be visited in the order listed in Sec. (4).
- (3) CP = Credit Points for the respective achievement certificate  
AC = Achievement Certificate, PC = Participation Certificate
- (4) V = Lecture or guest lecture, Ü = Exercise, S = Seminar, K = Doctoral candidate lectures and poster presentations, E = Project development and applications

### I. Preparatory Course of Studies (for B.Sc. Graduates)

Semester	Class	V	Ü/S	Pr	CP
<b>(A) for students specialising in chemistry</b>					
WS	Physical Chemistry V	2	1	-	5
	Master's Course Elective I	2	1	-	5
	Master's Course Elective II	2	1	-	5
	In-Depth Practical Part I	-	-	8	7,5
	In-Depth Practical Part II	-	-	8	7,5
25 H/SW	Total: WS	6	3	16	30
SS	Inorganic Chemistry IV	2	1	-	5
	Organic Chemistry IV	2	1	-	5
	Master's Course Elective III	2	1	-	5
	Specialisation Practical with Public Lecture	-	-	15	15
24 H/SW	Total: SS	6	3	15	30
<b>(B) for students specialising in biochemistry</b>					
WS	Biochemistry Seminar	-	2	-	3
	Bio-Information Technology	2	1	-	5
	Master's Lecture Elective Chemistry	2	1	-	5
	Modular Biochemistry Practical of Focal Points	-	3	18	4 x 4
29 H/SW	Total: WS	4	7	18	29
SS	Biochemistry IV	2	-	-	7
	Special Lecture from the Subject Area of Focal Point Development	2	-	-	5
	Ring Lecture for the Focal Point Programme	2	-	-	5
	Focal Point and Specialisation Practical with Public Lecture	-	1	20	14
	27 H/SW	Total: SS	6	1	20

## II. Research Course of Studies

Semester	Class	Type	Certificate
1.	Interdisciplinary Lecture Programme	2 V	PC
	Literature and Methodology Seminar	2 K	AC
	Modern Aspects of Chemistry and Biochemistry	2 V	PC
	Scientific Communication	2 S	PC
8 H/SW	Total: 1 <sup>st</sup> Semester	8	2 PC, 1 AC
2.	Interdisciplinary Lecture Programme	2 V	PC
	Doctoral Research Seminars and Workshops	2 K	AC
	Project Planning and Execution	2 E	AC
6 H/SW	Total: 2 <sup>nd</sup> Semester	6	2 PC, 2 AC
3.	Interdisciplinary Lecture Programme	2 V	PC
	Literature and Methodology seminar	2 K	AC
	Modern Aspects of Chemistry and Biochemistry	2 V	PC
	Subsidiary Subject Lecture I <sup>a</sup>	3 V	
9 H/SW	Total: 3 <sup>rd</sup> Semester	9	2 PC, 1 AC
4.	Interdisciplinary Lecture Programme	2 V	PC
	Doctoral Research Seminars and Workshops	2 K	AC
	Subsidiary Subject Lecture II <sup>a</sup>	3 V	AC <sup>a</sup>
<sup>a</sup> AC as oral qualification examination at the end of the 4 <sup>th</sup> Semester (30 - 45 min.)			
7 H/SW	Total: 4 <sup>th</sup> Semester	7	1 PC, 2 AC
5.	Interdisciplinary Lecture Programme	2 V	(PC)
	Literature and Methodology seminar	2 K	(AC)
	Modern Aspects of Chemistry and Biochemistry	2 V	(PC)
6 H/SW	Total: 5 <sup>th</sup> Semester	6	
6.	Interdisciplinary Lecture Programme	2 V	(PC)
	Doctoral Research Seminars and Workshops	2 K	(AC)
4 H/SW	Total: 6 <sup>th</sup> Semester	4	
<b>40 H/SW</b>	<b>Total: 1<sup>st</sup> – 6<sup>th</sup> Semester</b>	<b>40</b>	<b>7 PC, 6 AC</b>