Examination regulations for the Master's Program in Chemistry in the Department of Biology, Chemistry and Pharmacy at Freie Universität Berlin

Non-official Translation of the Study Regulations and the Examination Regulations for the Master's Program in Chemistry from 14 March 2013

(only the German version of these regulations - published in FU-Mitteilungen [Gazette of the Freie Universität Berlin] No. 38 / 2013 - is valid)

Preamble

On the basis of Section 14 paragraph 1 no. 2 of the Teilgrundordnung (Erprobungsmodell) [Partial University Constitution (Trial version)] of Freie Universität Berlin of 27 October 1998 (FU Mitteilung [Gazette of the Freie Universität Berlin] 24/1998), the Department Council of the Department of Biology, Chemistry and Pharmacy of Freie Universität Berlin issued the following examination regulations for the Master's Program in Chemistry of the Department of Biology, Chemistry and Pharmacy of Freie Universität Berlin on 14 March 2013•):

Contents

Annexes

•) The executive board of the Freie Universität Berlin confirmed these regulations on 26 August 2013.

Section 1
Area of application

These regulations supplement the framework study and examination regulations of Freie Universität Berlin [Rahmenstudien- und -prüfungsordnung (RSPO)] and apply to the requirements and procedures for attainments in the Master's Program in Chemistry in the Department of Biology, Chemistry and Pharmacy at Freie Universität Berlin (Master's program).

Section 2
Examination committee

The examination committee [Prüfungsausschuss] appointed by the Department Council of the Department of Biology, Chemistry and Pharmacy of Freie Universität Berlin for the Master's program in Chemistry is responsible for organizing the examinations and other tasks listed in the RSPO.

Section 3
Usual period of study

The usual period of study for the Master's program is four semesters.

Section 4
Scope of attainments

(1) A total of 120 credit points (CP) must be attained in examinations and study (attainments) of which

1. 35 CP are to be gained in the compulsory elective phase in accordance with Section 4 paragraph 2 of the study regulations
2. 20 to 30 CP are to be gained in the project phase in accordance with Section 4 paragraph 3 of the study regulations
3. 10 to 20 CP are to be gained in the specialization phase in accordance with Section 4 paragraph 4 of the study regulations
4. 15 CP are to be gained in the elective phase in accordance with Section 4 paragraph 5 of the study regulations
5. 30 CP are to be gained for the master's thesis and master's lecture in accordance with Section 6 of these regulations

(2) Information on the examination attainment to be achieved in the course of individual modules of the Master's program, the admission requirements for the individual modules, the obligation to attend the teaching and learning units regularly and the credit points allocated to each module can be found in Annex 1 of the examination regulations for the Master's program. You are referred to the examination regulations for the Bachelor's program in Chemistry at the Department of Biology, Chemistry and Pharmacy at Freie Universität Berlin for the modules Principles of Radiochemistry, Introduction to Macromolecular Chemistry, Molecule Dynamics, Environmental Chemistry: Air, Water, Soils. You are referred to the examination regulations for the Bachelor's program in Biochemistry at the Department of Biology, Chemistry and Pharmacy at Freie Universität Berlin for the modules Principles of Biochemistry and Current Topics in Biochemistry. You are referred to the examination regulations for the Master's program in Biochemistry at the Department of Biology, Chemistry and Pharmacy at Freie Universität Berlin for the module Introduction to Advanced Biochemistry. You are referred to the relevant examination regulations for the modules you can select in accordance with Section 4 paragraph 5 of the study regulations; you will be informed about the relevant regulations when you are informed about the modules you can select.

Section 5
Electronic examinations

(1) Electronic examinations are carried out and assessed using digital technology.

(2) Before an examination using digital technologies, two examiners must establish the suitability of these technologies in relation to the examination tasks.

(3) The candidate's authenticity and the integrity of the examination results must be ensured. To achieve this, examination work in the form of electronic data is clearly identified and allocated to the student unmistakeably and permanently. When the examination is assessed, the examiners will check if the electronic data are unchanged.

(4) An automatically prepared electronic assessment of an examination is to be checked by an examiner on application by the student who took the examination.

Section 6
Submitting written examinations

In the case of written examinations which are not to be completed in the form of a test paper, students may be required to submit their examination work in electronic form in Portable-Document-Format (PDF).

Section 7
Master's thesis

(1) The master's thesis comprises two components, one written and one oral, in either German or English. The master's thesis is intended to demonstrate that the student is capable of working independently on an issue in the field of chemistry at an advanced scientific level using scientific methods, and of presenting the findings in writing and orally in an appropriate form, of placing them in their scientific context and documenting them.

(2) Students are admitted to the master's thesis based on an application. In their application they must demonstrate that they:

1. are currently registered on the Master's program at Freie Universität Berlin
2. have already completed modules totalling at least 60 CP in the Master's program

(3) The application for admittance to the master's thesis must include proof that the conditions of paragraph 2 have been fulfilled, as well as written confirmation by an authorized examiner of his/her willingness to supervise the master's thesis. The relevant examination committee will decide on the application. If confirmation of a lecturer's willingness to supervise the thesis in accordance with clause 1 is not included, the examination committee will appoint a supervisor.

(4) The examination committee sets a topic for the master's thesis in agreement with the supervisor. The topic and scope of work must be such that they can be completed within the time permitted. The Issue of the topic and compliance with the completion deadline must be recorded.

(5) The estimated time required for working on the master's thesis is 900 hours; six months are allowed for its completion. If a student is prevented from working on their thesis for more than three months for a good reason, the examination committee will decide whether the master's thesis must be started afresh. If the examination committee decides that the thesis must be restarted, the work done so far is considered nullified.

(6) The date for the beginning of work on the master's thesis is the date on which the topic was issued by the examination committee. The topic may be returned once within the first four weeks and is considered not to have been issued in this case. When they submit their thesis,

students must also confirm in writing that they have written the thesis personally and independently and have used no aids other than the sources and aids listed. Three bound copies of the master's thesis and a digital copy in Portable-Document-Format (PDF) are to be submitted.

(7) If the examination committee agrees, the master's thesis may also be carried out externally in an institution outside the Institute of Chemistry and Biochemistry at Freie Universität Berlin. In this case the application must include written confirmation by a full-time instructor and authorized examiner in the Department of Biology, Chemistry and Pharmacy at Freie Universität Berlin of their willingness to supervise the master's thesis. The examination committee will decide on the application.

(8) The written part of the master's thesis is to be evaluated in written reports by two authorized examiners appointed by the examination committee within four weeks. One of the two authorized examiners should be the supervisor of the master's thesis. At least one of the examiners' reports should be from an authorized examiner who is a full-time instructor in the Department of Biology, Chemistry and Pharmacy at Freie Universität Berlin.

(9) The master's lecture is approximately 30 minutes long, followed by a discussion; it is graded. The lecture takes place in the last third of the working phase for the master's thesis before the examiners according to paragraph 8. The date for the master's lecture is set in agreement with the student. It is recommended that the lecture take place towards the end of the laboratory work and before writing the thesis. The master's lecture is only open to all university members if the candidate agrees.

(10) The grade for the written component of the master's thesis is calculated as arithmetic average of the grades given by the two examiners. If the difference between the two grades is 2.0 or more, the examination committee will appoint a third examiner to carry out an evaluation. In this case the average of the three individual grades for the written component will be taken.

(11) The grade for the written component of the master's thesis counts for three-quarters of the overall grade; the grade for the master's lecture counts for one quarter of the overall grade.

(12) The master's thesis gains a 'pass' if the overall grade is at least 'sufficient' (4.0). In case of a fail, students may repeat their master's thesis once.

Section 8
Retaking examinations to improve the grade

If the student takes a written examination immediately after completing the relevant course and passes with the grade 'sufficient' (4.0) or better, they may retake the examination once at the beginning of the following semester at the latest.

The better grade will be counted. A repeat examination may not be retaken a second time to improve the grade.

Section 9
Final degree

(1) The prerequisite for the awarding of the final degree is proof that the attainments required in accordance with Section 4 of the study regulations in conjunction with Sections 4 and 7 of these regulations have been achieved.

(2) The final degree cannot be awarded if the student has finally failed to achieve the attainment or has finally failed the examination or is in a pending examination procedure at another university in the same program of studies or in a module which is identical to or comparable with a module to be taken in the Master's program and for which the grade is to be included in the overall grade.

(3) The application for confirmation of the final degree must include proof of the fulfilment of the

requirements of paragraph 1 and a statement that none of the cases of paragraph 2 applies to the applicant. The relevant examination committee will decide on the application.

(4) Students who have passed the examinations are awarded the university degree Master of Science (M.Sc.). They receive a report and a certificate (Annexes 2 and 3) and a diploma supplement (in English and German versions). A further diploma supplement with information on individual modules and their parts (transcript) will also be issued. English versions of the report and certificate will also be issued on application.

Section 10
New and interim regulations

(1) These regulations take effect on the day after their publication in the FU Mitteilung [Gazette of the Freie Universität Berlin].

(2) At the same time the examination regulations for the Master's program in Chemistry from 10 July 2002 (FU Mitteilung No. 25/2002) amended on 24 May 2006 (FU Mitteilung No. 55/2006) expire.

(3) These regulations apply to students who enroll in the Master's program at Freie Universität Berlin after these regulations have taken effect. Students who were enrolled in the Master's program at Freie Universität Berlin before these new regulations took effect should complete their attainments on the basis of the examination regulations in accordance with paragraph 2, unless the student applies to the responsible examination committee to complete their attainments on the basis of the new regulations. On the occasion of their re-registration following their application, the examination committee decides to what extent the modules completed or started at the time of the application will be counted or how they are to be credited in accordance with these new regulations. The requirements of protection of confidence and non-discrimination will be observed in this process. The decision on the application for re-registration will be announced at the beginning of the lecture phase of the semester following submission of the application. The re-registration cannot be revised.

(4) It will be possible to gain a degree on the basis of the study regulations in accordance with paragraph 2 up to the end of the summer semester 2015.

Annex 1: Attainments, admission requirements, attendance obligation, and credit points

Explanation:

The following gives information about all the modules for the Master's program, except where you are referred to other regulations:

- Admission requirements for each module
- The examination forms
- Regular attendance obligation
- Credit points allocated to each module

Where compulsory regular attendance at the teaching and learning units is stipulated in the following, it is a requirement for the attainment of the credit points for each module alongside active participation in the learning and teaching units and successful completion of the examination. Regular attendance entails at least 85% attendance at the teaching and learning units in the module for which attendance is compulsory. If regular attendance at a module's teaching and learning units is not compulsory, it is nevertheless strongly recommended. Lecturers may not specify compulsory attendance for teaching and learning units if participation is merely recommended.

The credit points allotted to a module are determined by the total number of study hours estimated to be necessary to complete the module successfully. This includes both hours of attendance and phases of individual study (preparation and follow-up, examination preparation etc.). One credit point is equivalent to approximately 30 hours' study.

The module examination must be taken for each module for which an examination is scheduled. The module examination must be related to the module's qualification aims and tests a sample of these aims. The examination scope is limited to the amount necessary to do this. In modules where alternative forms of examination are scheduled, the lecturer responsible for the module must specify the examination form for each semester at the latest during the first scheduled teaching unit.

Credit points are awarded for the successful completion of the whole module – after regular active participation at learning and teaching units and successful completion of the module examination. For modules for which no examination is required, active participation and regular attendance at the teaching and learning units are the prerequisites for the awarding of the credit points allotted to the module.

Information on contents and qualification aims, module teaching and learning units, the student workload estimated as necessary to complete the module successfully, forms of active participation, the usual module duration and the frequency with which it is offered may be found in Annex 1 of the Study Regulations for the Master's program.

Information on the following modules in the Master's program can be found in the examination regulations of the programs of the Department of Biology, Chemistry and Pharmacy of Freie Universität Berlin mentioned in Section 4 paragraph 2 and repeated here:

Compulsory elective modules

- Module: Principles of Radiochemistry: Bachelor's program in Chemistry

Specialization modules

- Module: Principles of Biochemistry: Bachelor's program in Biochemistry
- Module: Current Topics in Biochemistry: Bachelor's program in Biochemistry
- Module: Introduction to Advanced Biochemistry: Master's program in Biochemistry
- Module: Introduction to Macromolecular Chemistry: Bachelor's program Chemistry
- Module: Molecular Dynamics: Bachelor's program Chemistry
- Module: Environmental Chemistry: Air, Water, Soils: Bachelor's program Chemistry

The following information is given on the other modules in the Master's program:

A. Compulsory elective modules

1. Topic area: Inorganic Chemistry

Module: Coordination Chemistry		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Test (120 minutes); The test may also be in the form of an electronic examination	Attendance recommended
Tutorial		Attendance recommended
Credit points: 5		

Module: Organometallic Chemistry		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Test (120 minutes); The test may also be in the form of an electronic examination	Attendance recommended
Tutorial		Attendance recommended
Credit points: 5		

Module: Modern Methods of Structure Determination		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Oral presentation (approx. 15 minutes)	Attendance recommended
Tutorial		yes
Credit points: 5		

2. Topic area Organic Chemistry

Module: Advanced Synthesic Methods		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Test (120 minutes); The test may also be in the form of an electronic examination	Attendance recommended
Tutorial		Attendance recommended
Credit points: 5		

Module: Physical Organic Chemistry		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Oral examination (approx. 30 minutes)	Attendance recommended
Seminar		Attendance recommended
Credit points: 5		

Module: Stereoselective Synthesis		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Oral examination (approx. 30 minutes)	Attendance recommended
Tutorial		Attendance recommended
Credit points: 5		

Module: Natural Products Chemistry and Advanced Bioorganic Chemistry		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Test (120 minutes); The test may also be in the form of an electronic examination	Attendance recommended
Seminar		Attendance recommended
Credit points: 5		

3. Topic area Physical and Theoretical Chemistry

Module: Quantum Chemistry		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Test (150 minutes); The test may also be in the form of an electronic examination	Attendance recommended
Tutorial		Attendance recommended
Credit points: 5		

Module: Solids and Interfaces		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Test (150 minutes); The test may also be in the form of an electronic examination	Attendance recommended
Tutorial		Attendance recommended
Credit points: 5		

Module: Statistical Thermodynamics		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Test (150 minutes); The test may also be in the form of an electronic examination	Attendance recommended
Tutorial		Attendance recommended
Credit points: 5		

Module: Modern Methods in Spectroscopy		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Test (150 minutes); The test may also be in the form of an electronic examination	Attendance recommended
Tutorial		Attendance recommended
Credit points: 5		

4. Cross-topic area

Module: Scientific Lectures and Presentations in Chemistry		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Seminar	Lecture in a research group in the institute (20 minutes; not graded in detail)	yes
Credit points: 5		

Module: Teaching Chemistry		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Seminar	none	yes
Supervision of Tutorial groups		yes
Credit points: 5		

B. Project area

Module: Research project in a scientific research group		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Seminar	Written documentation of research findings (15-40 pages)	yes
Practical		yes
Credit points: 5		

Module: Research project in a scientific research group		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Seminar	Written documentation of research findings (20-60 pages)	yes
Practical		yes
Credit points: 10		

Module: Research project in a scientific research group		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Seminar	Written documentation of research findings (25-80 pages)	yes
Practical		yes
Credit points: 15		

C. Specialization area

1. Topic area Analytical Chemistry

Module: Scientific Measurement Data Collection and Processing		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Test (90 minutes); The test may also be in the form of an electronic examination	Attendance recommended
Tutorial		Attendance recommended
Credit points: 5		

Module: Instrumental Analysis for Structure Assignment in Organic Chemistry		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Test (120 minutes); The test may also be in the form of an electronic examination	Attendance recommended
Tutorial		Attendance recommended
Credit points: 5		

2. Topic area Inorganic Chemistry

Module: Applied Radiochemistry and Radiation Protection Course		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Test (120 minutes); The test may also be in the form of an electronic examination	Attendance recommended
Practical		yes
Credit points: 5		

Module: Bioinorganic Chemistry		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture I	Test (90 minutes); The test may also be in the form of an electronic examination	Attendance recommended
Lecture II		Attendance recommended
Credit points: 5		

Module: Modern Aspects of Non-metal Chemistry		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture I	Test (90 minutes); The test may also be in the form of an electronic examination	Attendance recommended
Lecture II		Attendance recommended
Credit points: 5		

3. Topic area Biochemistry: see information in Section 4 paragraph 2 and on the first page of the module information

4. Topic area Macromolecular Chemistry

Module: Advanced Macromolecular Chemistry		
Admission requirements: Introduction to Macromolecular Chemistry		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Test (120 minutes); The test may also be in the form of an electronic examination	Attendance recommended
Seminar		yes
Credit points: 5		

5. Topic area Organic Chemistry

Module: Total Syntheses and Synthesis Design		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Oral examination (approx. 30 minutes)	Attendance recommended
Seminar		Attendance recommended
Credit points: 5		

Module: Supramolecular Chemistry		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Oral examination (approx. 30 minutes)	Attendance recommended
Seminar		Attendance recommended
Credit points: 5		

Module: Homogenous Transition Metal Catalysis		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Oral examination (approx. 30 minutes)	Attendance recommended
Seminar		Attendance recommended
Credit points: 5		

Module: Systems Chemistry		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Oral examination (approx. 30 minutes)	Attendance recommended
Seminar		Attendance recommended
Credit points: 5		

6. Topic area Physical Chemistry

Module: Chemical Processes on Surfaces and Interfaces		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Oral examination (approx. 30 minutes)	Attendance recommended
Credit points: 5		

Module: Applied Electrochemistry: Batteries, Fuel Cells and other applications		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Seminar lecture (approx. 30 minutes)	Attendance recommended
Seminar		Attendance recommended
Credit points: 5		

Module: Electron structure methods		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**

Lecture	Practical examination (simulation on the computer)	Attendance recommended
Seminar on the computer using special software		yes
Credit points: 5		

7. Topic area Theoretical Chemistry

Module: Quantum Chemistry Correlation Methods		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Practical examination (simulation on the computer)	Attendance recommended
Seminar on the computer using special software		yes
Credit points: 5		

Module: Density Functional Theory		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Practical examination (simulation on the computer)	Attendance recommended
Seminar on the computer using special software		yes
Credit points: 5		

Module: Relativistic Quantum Chemistry		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Practical examination (simulation on the computer)	Attendance recommended
Seminar on the computer using special software		yes
Credit points: 5		

Module: Quantum Reaction Dynamics		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture	Practical examination (simulation on the computer)	Attendance recommended
Seminar on the computer using special software		yes
Credit points: 5		

8. Topic area Environmental Chemistry

Module: Environmental Chemistry: Energy and Special Atmospheric Chemistry		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture I	Test (180 minutes); The test may also be in the form of an electronic examination	Attendance recommended
Lecture II		Attendance recommended
Credit points: 5		

D. Elective area

Module: Modern Aspects of Chemistry		
Admission requirements: none		
Teaching and learning units	**Module examination**	**Attendance obligatory**
Lecture I	none	Attendance recommended
Lecture II		Attendance recommended
Credit points: 5		

Annex 2: Certificate of Academic Record (sample)

Freie Universität Berlin

Department of Biology, Chemistry and Pharmacy

Certificate of Academic Record

Ms/Mr [first name/surname]

born on [day/month/year] in [place of birth]

has successfully completed the Master's programme

Chemistry

In accordance with the examination regulations of 14 March 2013 (FU-Mitteilungen No. [XX]/2013) with the final grade

[grade as number and text]

and has proved the attainment of 120 credit points.

The examination attainments were graded as follows:

Area(s) of study	Credit points	Grade
Compulsory electives	35 (35)	[XX]
Project, specialization and elective areas	55 (35-55)	[XX]
Master's thesis	30 (30)	[XX]

The topic of the master's thesis was: [XX]

Berlin, [day/month/year] (seal)

Dean Chair of the

Grading scale: 1.0 – 1.5 very good; 1.6 – 2.5 good; 2.6 – 3.5 satisfactory; 3.6 – 4.0 sufficient; 4.1 – 5.0 insufficient

The credit points comply with the European Credit Transfer and Accumulation System (ECTS)

Not all achievements are graded; the credit points listed in brackets denote those credit points taken into consideration in the final grade.

Annex 3: Degree certificate **(sample)**

Freie Universität Berlin

Department of Biology, Chemistry and Pharmacy

Degree Certificate

Ms/Mr [first name/surname]

born on [day/month/year] in [place of birth]

has successfully completed the Master's programme in

Chemistry

In accordance with the examination regulations of 14 March 2013 (FU-Mitteilungen No. [XX]/2013)

the university degree of

Master of Science (M. Sc.)

is hereby awarded.

Berlin, [day/month/year] (Seal)

Dean

Chair of the
Examination Committee