



Study and Examination Regulations

Master of Science

Biological Chemistry

Please note that this is an **unofficial translation** of the Study and Examination Regulations.
In case of inconsistency between the German and the English version, the German version of the agreement prevails.

	AMBI.
Study and Examination Regulations	18/2015
1st Amending Regulations	28/2017
Application and Admission Regulations	28/2018

Please note that this is an **unofficial translation** of the Study and Examination Regulations for the Master's Program in Biological Chemistry from 28 January 2015 (AMBI. TU 18/2015, p. 149ff) and the Amending Regulations of 18 October 2017 (AMBI. TU 28/2017, p. 400ff)

In case of inconsistency between the German and the English version the German version of the agreement prevails.

Study and Examination Regulations for the Master's Program in Biological Chemistry at Faculty II – Mathematics and Natural Sciences – of Technische Universität Berlin

Reading version of the Regulations of 28 January 2015 and the Amending Regulations of 18 October 2017

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I. General regulations

Section 1 – Scope of application

These Study and Examination Regulations govern both the objectives and organization of studies, and the requirements and conduct of examinations in the Master's Program in Biological Chemistry. The program-specific provisions included herein supplement the Regulations Governing General Study and Examination Procedures (*AllgStuPO*) of Technische Universität Berlin with stipulations relating specifically to this study program.

Section 2 – Entry into force

These Regulations shall enter into force on the day after their publication.

II. Objectives and organization of studies

Section 3 – Learning outcomes, program content, and professional fields

(1) Globally, the demand for sustainable production processes and resource-conserving value chains is continuously increasing. In almost every field, as a result, new developments are focused on renewable raw materials and bio-based materials. Furthermore, it has become apparent that knowledge of chemical synthesis methods is becoming increasingly crucial in (academic) basic research in areas touching on Biology and Biochemistry. This is evidenced by the ever-growing importance of Synthetic Biology. It is therefore of fundamental importance that university education focuses on interdisciplinary communication and cooperation. As part of the Master's Program in Biological Chemistry, students shall learn the theoretical basics and methods, as well as their practical applications, that meet the requirements of deepening the molecular understanding of material structure and reactivity, while enabling the optimization of processes. In order to meet the demands of researching and developing biologically inspired strategies in a responsible manner, knowledge of chemical interrelationships and reactions in the biological context, as well as methodological-technological skills, are required.

(2) Students of the Master's Program in Biological Chemistry shall deepen and expand the knowledge, skills and competencies that they have previously acquired during a relevant Bachelor's program or equivalent professional qualification. This shall enable them to develop proposals for solutions to complex problems, and to keep on developing, as well as critically questioning, the latter. In addition, graduates shall be able to carry out scientific work in an independent and self-reliant manner. Due to the subject-specific differences in the (compulsory) elective modules, students may place the focus of their studies on biophysical/theoretical, organic-chemical or biotechnological topics.

Graduates of the Master's Program in Biological Chemistry shall

- possess in-depth specialist knowledge and have a broad range of methods at their disposal;
- be able to plan and organize practical or experimental work, carry it out independently, as well as deal with, and answer, complex scientific questions in an independent manner;
- be capable of interdisciplinary thinking and acting – for example, by considering chemical interrelations on a molecular level in connection with biochemical/biotechnological questions and applying them to corresponding problems, as well as by integrating biochemical basic research into engineering-science practice;
- be able to critically assess information and new developments against the background of the latest findings in the field of Biological Chemistry and draw appropriate conclusions for their own work;
- be able to structure complex content and present this in an appropriate form, both written and spoken.

Due to the strong interdisciplinary orientation of the Master's Program in Biological Chemistry, the potential fields of activity for graduates are broad and varied. For instance, graduates can work as advisors, planners, developers, researchers or supervisors in industry and with public authorities and other institutions, and assume managerial responsibilities. In addi-

tion, the successful completion of the Master's Program in Biological Chemistry qualifies graduates to take up doctoral studies.

Section 4 – Program start, standard period of study, and required coursework

- (1) Students may begin their studies in the winter or summer semester.
- (2) The standard period of study, including completion of the Master's thesis, is four semesters.
- (3) The Master's program is worth 120 credits.
- (4) The teaching curriculum and the entire examination procedure are structured and organized in such a way as to enable students to complete the program within the standard period of study.

Section 5 – Program structure

(1) Students have the right to individually determine the order of progression of their own course of study. However, they are obliged to comply with the provisions of these Study and Examination Regulations. Students are recommended to follow the chronology of modules set down in the proposed course schedule in the Annex to these Regulations. This shall not apply to obligations arising from the definition of subject-specific admission requirements for modules.

(2) Students must achieve a total of 120 credits, 90 of which are awarded for modules and 30 for the Master's thesis.

(3) The compulsory part of the program is worth 33 credits. The modules assigned to the compulsory part of the program can be found in the module list (Annex 1).

(4) The compulsory elective part of the program is worth 42 credits and is structured as follows: Specialization in Biophysical/Theoretical Chemistry, Specialization in Biological Chemistry / Organic Chemistry, and Specialization in Biotechnology. The compulsory electives also include three project labs, each worth 9 credits.

The Project Labs I and II may be freely chosen from the range of project labs, while Project Lab III requires the successful participation in modules worth at least 15 credits from the chosen area of specialization. Upon consultation with the module supervisors, two project labs may also be linked together. In coordination with the students and module supervisors, the project labs may also cover elements of Learning by Research, so that the students' own project lab proposals can be realized.

The modules assigned to the different fields can be found in the module list (Annex 1).

(5) A total of 15 credits must be earned in elective modules. Elective modules shall enable students to acquire additional specialized and interdisciplinary skills as well as skills qualifying them for entry to a profession, and may be selected from the entire range of subjects offered at Technische Universität Berlin, other universities and equivalent institutions of higher education within the scope of application of the Framework Act for Higher Education (*HRG*), and foreign universities and institutions of higher education that have been accredited as equivalent. Students are recommended to choose interdisciplinary modules. The range of selectable modules also includes modules for learning foreign languages.

(6) In accordance with Section 33 (6) of the Regulations Governing General Study and Examination Procedures (*AllgStuPO*), the skills and knowledge to be taught in specific modules, the requirements for module examinations, and the relevant admission requirements, if any, shall be updated annually

in the form of program-specific module catalogs and published in the Official Gazette of TU Berlin (*Amtliches Mitteilungsblatt*) at the beginning of the winter semester in October and the beginning of the summer semester in April.

III. Requirements and conduct of examinations

Section 6 – Purpose of the Master's examination

The Master's examination determines whether a candidate has achieved the learning outcomes according to Section 3 of these Regulations.

Section 7 – Master's degree

On behalf of Faculty II – Mathematics and Natural Sciences, Technische Universität Berlin awards the academic degree "Master of Science" (M.Sc.) to students who have passed the Master's examination.

Section 8 – Scope of the Master's examination, calculation of the overall grade

(1) The Master's examination comprises the module examinations listed in the module list (Annex 1) and the Master's thesis according to Section 9.

(2) According to the principles stipulated in Section 47 (6) of the Regulations Governing General Study and Examination Procedures (*AllgStuPO*), the overall grade is to be determined by combining the grades achieved for those examinations arising from modules taken from the module list that are marked both as graded and for inclusion in the overall grade together with the grade achieved for the Master's thesis.

Section 9 – Master's thesis

(1) The Master's thesis is usually prepared in the fourth course semester. It amounts to 30 credits and is to be completed within 26 weeks. In the event that important grounds exist that prevent the completion of the thesis within this time frame, and these grounds lie outside of the student's control, the examination board shall grant an extension of the deadline for so long as the grounds in question continue to exist. The total possible extension must not exceed 26 weeks. In the event that the combined extensions exceed the stipulated maximum period of extension, the student may withdraw from the examination.

(2) To apply for admission to the Master's thesis, students must present proof of successfully completed module examinations, worth at least 59 credits, to the responsible department of the Central University Administration. The 59 credits must include at least the Project Lab III. Students have no entitlement to any specific topic area.

As a rule, students shall complete the Master's thesis in one of the areas in which they carried out a project lab.

In exceptional cases, and in response to a reasoned request, the examination board may approve admission to the Master's thesis without the above proof being provided.

(3) The topic of the Master's thesis may be rejected once, however only within the first four weeks of being issued by the responsible department of the Central University Administration.

(4) The procedures for applying for admission to and assessment of a final thesis are regulated in the current version of the Regulations Governing General Study and Examination Procedures (*AllgStuPO*).

(5) Following the completion of the research activities performed as part of the Master's thesis, and prior to submission of the written draft summarizing the way in which the work was carried out and the results, as well as for the purpose of discussing and classifying the results in the scientific context, students shall make a presentation of their Master's thesis to their respective working group. The presentation shall not be included in the grading of the Master's thesis.

Section 10 – Types of examination and examination registration

(1) The types of examination and the registration procedure for module examinations are regulated by current version the Regulations Governing General Study and Examination Procedures (*AllgStuPO*).

(2) For compulsory elective or elective modules studied at other faculties or institutions of higher education, the types of examination specified in the module descriptions shall apply.

IV. Annexes

Annex 1: Module list

Annex 1: Module list

Module	Credits	Type of examination	Graded	Weighting in overall grade ¹
Compulsory modules (33 credits)				
Interdisciplinary Basics	3	without examination	No	-
Microbiology and Genetics	9	portfolio evaluation	Yes	1
Biological Chemistry	9	oral	Yes	1
Advanced Biological-Chemical Project Lab	6	portfolio evaluation	No	-
Structural Biology	6	oral	Yes	1
Compulsory elective modules in Biophysical Chemistry / Theoretical Chemistry (15 credits)				
Biophysical Chemistry	9	oral	Yes	1
Optic Spectroscopy and Fluorescence of biological Macromolecules	6	portfolio evaluation	Yes	1
Introduction to Bioinformatics	6	oral	Yes	1
Modern Mass Spectrometry for Proteins	6	portfolio evaluation	Yes	1
Advanced Bioanalytics	6	portfolio evaluation	Yes	1
Advanced Bioanalytics Project Lab – A	6	oral	Yes	1
Advanced Bioanalytics Project Lab – B	6	oral	Yes	1
Compulsory elective modules in Biological Chemistry / Organic Chemistry (15 credits)				
Biotransformation and Synthetic Biology	6	oral	Yes	1
Natural Product and Agent Synthesis	3	oral	Yes	1
Stereoselective Synthesis Methods	3	oral	Yes	1
Organic Chemistry IV Synthesis Methods of Organic Chemistry	6	written	Yes	1
Synthesis and Catalysis: Strategies, Concepts and Methods	6	written	Yes	1
Medicinal Chemistry I	3	oral	Yes	1
Medicinal Chemistry II	3	oral	Yes	1
Compulsory elective modules in Biotechnology (15 credits)				
Applied and Molecular Microbiology I	9	portfolio evaluation	Yes	1
Applied and Molecular Microbiology IV	3	written	Yes	1
Regulation of Gene Expression	3	written	Yes	1
Molecular Medicine	3	written	Yes	1
Bio-Process Engineering I	6	written	Yes	1
Bio-Process Engineering II	3	written	Yes	1

¹ Specification “1” means that the grade will be weighted according to the number of credits (Section 47 (6) of the Regulations Governing General Study and Examination Procedures – *AllgStuPO*); “-” means the grade is not weighted; every further figure is a multiplication factor of the number of credits.

Bioprocess Development from High-Throughput Screening to Production	9	oral	Yes	1
Introduction to Bio-Electronics	6	portfolio evaluation	Yes	1
Industrial Anaerobic Bioprocesses - Bioenergy, Biogas, Biosolvents	6	written	Yes	1
Project Lab Bio-Process Engineering	6	oral	Yes	1
Modern Mass Spectrometry	6	portfolio evaluation	Yes	1
Advanced Bioanalytics	6	portfolio evaluation	Yes	1
Cell Biology	3	written	Yes	1
Practice of Applied and Molecular Microbiology	6	portfolio evaluation	Yes	1
Applied Microbial Biotechnology	6	portfolio evaluation	Yes	1
Applied Biotechnology from a Bio-Process Engineering perspective	6	written	Yes	1
Gene Therapy and Gene Expression	9	portfolio evaluation	Yes	1
RNA-Technologies	9	portfolio evaluation	Yes	1
Nucleic Acid Technologies in Molecular Medicine	9	portfolio evaluation	Yes	1
RNA-Interference as Molecular Tool	9	portfolio evaluation	Yes	1
Bio-Process Engineering I Project Lab	6	portfolio evaluation	Yes	1
Project Lab Cell Culture	3	written	Yes	1
Advanced Bioanalytics Project Lab – A	6	oral	Yes	1
Advanced Bioanalytics Project Lab – B	6	oral	Yes	1
Project Labs (27 credits)				
Project Lab Biological Chemistry	9	portfolio evaluation	No	-
Project Lab Organic Chemistry and Synthetic Biology	9	portfolio evaluation	No	-
Project Lab Synthesis of Organic Fine Chemicals	9	portfolio evaluation	No	-
Project Lab Metal-Organic Chemistry and Catalysis	9	portfolio evaluation	No	-
Project Lab Medicinal Biotechnology	9	portfolio evaluation	No	-
Project Lab Spectroscopy on Biomolecules	9	portfolio evaluation	No	-
Project Lab Bioenergetics I	9	portfolio evaluation	No	-
Project Lab Bioenergetics II	9	portfolio evaluation	No	-
Project Lab Bio-Process Engineering	9	portfolio evaluation	No	-
Project Lab Molecular Microbiology I	9	portfolio evaluation	No	-
Project Lab Molecular Microbiology II	9	portfolio evaluation	No	-
Electives (15 credits)				
	see selected modules			*)
Total	120			

Compulsory elective modules in Biological Chemistry and Organic Chemistry (12 credits)				
Biotransformation and Synthetic Biology	6	oral	Yes	1
Natural Product and Agent Synthesis	3	oral	Yes	1
Stereoselective Synthesis Methods	3	oral	Yes	1
Organic Chemistry IV Synthesis Methods of Organic Chemistry	6	written	Yes	1
Synthesis and Catalysis: Strategies, Concepts and Methods	6	written	Yes	1
Medicinal Chemistry I	3	oral	Yes	1
Medicinal Chemistry II	3	oral	Yes	1
Compulsory elective modules in Biotechnology (12 credits)				
Applied and Molecular Microbiology I	9	portfolio evaluation	Yes	1
Applied and Molecular Microbiology IV	3	written	Yes	1
Biorefining	3	written	Yes	1
Regulation of Gene Expression	3	written	Yes	1
Molecular Medicine	3	written	Yes	1
Bio-Process Engineering I	6	portfolio evaluation	Yes	1
Bio-Process Engineering II	3	portfolio evaluation	Yes	1
Bioprocess Development from High-Throughput Screening to Production	9	oral	Yes	1
Single-use Systems in Biotechnology	6	portfolio evaluation	Yes	1
Introduction to Bio-Electronics	6	oral	Yes	1
Industrial Anaerobic Bioprocesses - Bioenergy, Biogas, Biosolvents	6	portfolio evaluation	Yes	1
Process Analytical Technologies: Sensors, Monitoring, Process Controlling	6	portfolio evaluation	Yes	1
Modern Mass Spectrometry for Proteins	6	portfolio evaluation	Yes	1
Advanced Bioanalytics	6	written	Yes	1
Project Lab (27 credits)				
Project Lab Biological Chemistry	9	portfolio evaluation	No	
Project Lab Organic Chemistry and Synthetic Biology	9	portfolio evaluation	No	
Project Lab Synthesis of Organic Fine Chemicals	9	portfolio evaluation	No	
Project Lab Metal-Organic Chemistry and Catalysis	9	portfolio evaluation	No	
Project Lab Medicinal Biotechnology	9	portfolio evaluation	No	
Project Lab Spectroscopy on Biomolecules	9	portfolio evaluation	No	

Project Lab Bioenergetics I	9	portfolio evaluation	No	
Project Lab Bioenergetics II	9	portfolio evaluation	No	
Project Lab Bio-Process Engineering	9	portfolio evaluation	No	
Project Lab Molecular Biotechnology I	9	portfolio evaluation	No	
Project Lab Molecular Biotechnology II		portfolio evaluation	No	
Electives (9–15 credits)				
	see selected modules			
Total	120			

Please note that this is an **unofficial translation** of the **Application and Admission Regulations for the Master's Program in Biological Chemistry from 4 April 2018 (AMBI. TU 28/2018, p. 274ff).**

In case of inconsistency between the German and the English version the German version of the agreement prevails.

Application and Admission Regulations for the Consecutive Master's Program in Biological Chemistry at Faculty II – Mathematics and Natural Sciences – of Technische Universität Berlin

of 4 April 2018

On 4 April 2018, the Faculty Board of Faculty II – Mathematics and Natural Sciences – of Technische Universität Berlin adopted the following Application and Admission Regulations for the Consecutive Master's Program in Biological Chemistry in accordance with Section 18 (1) no. 1 of the Constitution of Technische Universität Berlin and Section 10 (5) of the Berlin State Higher Education Act (*Berliner Hochschulgesetz – BerlHG*) in the version of 26 July 2011 (Berlin Gazette of Laws and Ordinances [*GVBl.*], p. 378), last amended by Article 6 of the same Act of 2 February 2018 (Berlin Gazette of Laws and Ordinances, p. 160), in conjunction with Section 10 of the Act on the Admission to Higher Education Institutions in the State of Berlin to Degree Programs with Restricted Admission (*Berliner Hochschulzulassungsgesetz – BerlHZG*) in the version of 18 June 2005 (Berlin Gazette of Laws and Ordinances, p. 393), last amended by Article I of the same Act of 26 June 2013 (Berlin Gazette of Laws and Ordinances, p. 198):

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I. General regulations

Section 1 – Scope of application

These Application and Admission Regulations – in conjunction with the Regulations Governing General Study and Examination Procedures (*AllgStuPO*) and the Statutes of Technische Universität Berlin Governing University Selection Procedures (*AuswahlSa*), as amended from time to time – govern the application, admission and selection modalities for the Consecutive Master's Program in Biological Chemistry. The provisions of the *AllgStuPO* and *AuswahlSa* shall take precedence over the provisions of these Application and Admission Regulations, unless exceptions are expressly permitted therein.

Section 2 – Entry into force

These Application and Admission Regulations shall enter into force on the day after their publication in the Official Gazette of Technische Universität Berlin (Amtliches Mitteilungsblatt). They shall be applied for the first time to the procedures of the 2019 summer semester.

II. Application

Section 3 – Application requirements

(1) In addition to the general admission requirements set out in Sections 10 to 13 of the Berlin State Higher Education Act (*BerlHG*), applicants

1. must possess a bachelor's or equivalent university degree that has been acquired in a program in the subject areas of chemistry, biochemistry, biotechnology, molecular life sciences or a related course of study, and

2. all applicants must provide evidence of having attained the following:

- at least 10 credits in the field of Organic Chemistry,
- at least 6 credits in the field of Physical Chemistry, and
- at least 10 credits in the field of Life Sciences.

In no more than one field, up to 4 credits, out of the total number of credits required in the same field, may be compensated for by credits acquired in one of the other fields.

(2) Any course of study in the Natural or Engineering Sciences that fulfills the requirements set out in Section 3 (1) no. 2 shall be deemed to be a related field.

Section 4 – Procedure

(1) The fulfillment of the admission requirements must be proven during the registration procedure in accordance with Sections 16ff. of the Regulations Governing General Study and Examination Procedures (*AllgStuPO*), in cases outlined in Section 15 of the *AllgStuPO* as part of the application for admission. Supporting documents must be submitted in the original or in an officially certified form.

(2) The Central University Administration's office responsible for registration and admissions shall decide on whether study programs shall be deemed to be related within the meaning of Section 3 (1) no. 1, as well as on the existence and equivalence of the credits needed to fulfill the requirements laid down in Section 3 (1) no. 2 and Section 3 (2), and its decision shall be made on the basis of a vote by the examination board responsible for the study program.

III. Admission

Section 5 – Restriction of the number of eligible candidates

The number of eligible candidates in the selection procedure can be restricted. It must be at least double the designated number of admissions set down for the program. The selection criterion for participation in the selection process is the applicants' qualification level.

The selection committee decides on any restriction, the number of eligible candidates, and their selection at the beginning of the selection process.

Section 6 – Ranking Criteria

(1) A ranking of applicants shall be prepared according to the following selection criteria:

1. overall grade in the study program in accordance with Section 3 (1) with a weighting of 70 out of 100, and
2. relevance of the course content pursuant to Section 3 (1) for the Consecutive Master's Program in Biological Chemistry with a weighting of 30 out of 100.

(2) For the criterion according to Subsection 1, no. 1, up to 100 points shall be awarded according to the following table:

Grade	Points	Grade	Points
1.0	100	2.6	52
1.1	97	2.7	49
1.2	94	2.8	46
1.3	91	2.9	43
1.4	88	3.0	40
1.5	85	3.1	37
1.6	82	3.2	34
1.7	79	3.3	31
1.8	76	3.4	28
1.9	73	3.5	25
2.0	70	3.6	22
2.1	67	3.7	19
2.2	64	3.8	16
2.3	61	3.9	13
2.4	58	4.0	10
2.5	55		

(3) For the criterion outlined in Subsection 1, no. 2, up to 100 points shall be awarded in accordance with the following arrangement:

1. 100 points for study programs in Chemistry, Biochemistry, Biotechnology, Molecular Life Sciences, Biological Chemistry and Chemical Biology;
2. 50 points for other study programs with a focus on Chemistry, Biochemistry or Biology;
3. 0 points for all other subjects.

Section 7 – Procedure

(1) Proof of fulfillment of the selection criteria must be provided when submitting the application for admission. To this purpose, applicants must include the following documents in the original or as officially certified copies:

1. the documents required in the application form,
2. proof of meeting the additional admission requirements pursuant to Section 3, and
3. insofar as the course content in accordance with Section 3 (1) is not apparent from the degree certificate, evidence thereof, as a rule, in the form of module descriptions.

(2) For each selection criterion, the selection committee shall award points in accordance with Section 6 (2) and (3).

(3) The selection committee shall rank the applicants in order of preference. The ranking shall note the following information for each applicant in the selection procedure:

1. for each criterion, the number of points achieved,
2. for each criterion, the weighted number of points pursuant to Section 6 (1), and
3. the total number of points.