



K 066/863

Curriculum
for the
Joint Master's Degree Programme
Biological Chemistry

At the Faculty of Engineering and Natural Sciences
Johannes Kepler University Linz

and the

Faculty of Natural Sciences at the
University of South Bohemia in Budweis

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§ 1 Qualification Profile

(1) The cross-border joint Master's degree program "Biological Chemistry" offered together by the Faculty of Engineering and Natural Science at the Johannes Kepler University (JKU) and the Faculty of Natural Sciences (PRF) at the University of South Bohemia in Budweis (joint study programme) is an interdisciplinary combination of studies in chemistry, biochemistry, biology and biophysics. The Master's degree program will be held in English and expands on the material covered in the joint Bachelor's degree program in "Biological Chemistry" which is offered at both universities. Graduates of the Bachelor's degree program in "Technical Chemistry" at the JKU, and/or programs with an equivalent curriculum, may be admitted directly to the program after completion of a bridging course in biology. These students will also have to complete a specified number of mandatory and elective subjects in chemistry.

(2) The Master's degree program in "Biological Chemistry" focuses on the following fields of science and skills:

- Expanding base knowledge and focusing academically in the areas of Bioanalytical Chemistry, Organic Chemistry, Physical Chemistry, Biochemistry, Biology, Molecular Biology, Genetics, Biophysics and Structural Biology
- Specialized expertise and state-of-the-art knowledge of modern science by cooperating in research projects in the context of a Master's thesis.
- Experience with current bio-analytical and preparatory methods such as corresponding safety standards
- Problem solving skills to address issues in fields of chemistry and biology, expertise to undertake an interdisciplinary approach and communicating effectively in an international research environment
- Soft skills, meaning learning social graces of a general nature to communicate effectively in a foreign language as well as focusing on presentation skills, teamwork, legal and gender issues

(3) Successful completion of the Master's degree program provides graduates with a broad academic foundation to pursue challenging professions in the areas of research, development, and management in the following areas and beyond:

- Life Sciences
- Molecular Biology and Structural Biology
- White Biotechnology (organic procedures in chemical production)
- Red Biotechnology (biomedical sciences)
- Green Biotechnology (phytochemistry and biotechnologies)

- Bioanalysis and Environmental Analysis
- Medical Diagnosis and Technologies

(4) Various occupation opportunities at companies include:

- Biotech Industries
- Chemical Industries
- Pharmaceutical Industries
- Food Industry
- Private and Public Research Facilities
- Regional, national and international inspection authorities and agencies

(5) Graduates of the Master's degree program are expected to contribute significantly to the development of sustainable and environmentally friendly industrial procedures. The program is versatile, creating ideal conditions to qualify students to learn how to quickly and efficiently adapt to ever-changing demands and address new academic and technological developments in the field of Life Sciences and Biotechnologies. Students acquire a multi-faceted education and in addition to mandatory base modules in biology and chemistry, students may select two elective courses in chemistry and/or biology. The combination of courses in chemistry and biology has been designed to complement each other and teach students cutting-edge approaches to face challenges that arise due to the demands of sustainable production and "green technologies". The program is bilateral and held in English, allowing students to acquire skills and expertise in multidisciplinary fields as well as learn more about international academic communication and conducting academic research internationally.

§ 2 Admission Requirements

(1) In compliance with § 54 Section 1 of the Universities Act, the Master's degree program is officially part of academic studies offered by the Faculty of Natural Sciences.

(2) The Master's degree program in "Biological Chemistry" expands on material from the Bachelor's degree program in "Biological Chemistry" (SKZ 033/663). Graduates of the Bachelor's degree program can apply directly for admission to the Master's degree program. Students who have successfully completed a Bachelor's or Diploma degree in "Technical Chemistry" (SKZ 033/290 or 800) or a Diploma degree in "Industrial Engineering-Technical Chemistry (SKZ 840) at the Johannes Kepler University Linz may also be admitted to the Master's degree program in "Biological Chemistry" without any further admission constraints.

(3) Applicants with degrees from other universities, universities of applied sciences or other post-secondary institutions of education in Austria or abroad must prove that the acquired academic degree is equivalent in content and length to the Bachelor's degree program in "Biological Chemistry" (SKZ 033/663) at the JKU or equivalent to one of the above alternative degree programs (SKZ 033/290 or 800, or SKZ 840) at the JKU. Equivalency is then recognized when the following subjects meet ECTS credit requirements and of those, 32 ECTS credits must have been completed in chemical lab courses (for safety reasons). The courses should include lab exercises in chemistry and individual experimental activity:

(a) for the equivalency of a Bachelor's degree program in "Biological Chemistry"

- General and Inorganic Chemistry (14 ECTS credits)
- Analytical Chemistry (16 ECTS credits)
- Biochemistry, Biology, Molecular Biology (42 ECTS credits)
- Mathematics and Physics (10 ECTS credits)
- Organic Chemistry (10 ECTS credits)
- Physical Chemistry (9 ECTS credits)

(b) for the equivalency of a Bachelor's degree program in "Technical Chemistry":

- General and Inorganic Chemistry (20 ECTS credits)
- Analytical Chemistry (20 ECTS credits)
- Biochemistry and Biotechnology (4 ECTS credits)
- Computer Science, Mathematics and Physics (28 ECTS credits)
- Organic Chemistry and Polymer Chemistry (21 ECTS credits)
- Physical Chemistry (16 ECTS credits)

(4) For admission in compliance with Section 3 of the admission requirements, evaluators must determine whether equivalency falls under compliance with Section 3 under lit a or b, or under conditions for graduates of the Bachelor's degree program in "Biological Chemistry", or if the above mentioned conditions in regards to alternative studies under § 2 Section 2 apply.

(5) If equivalency has been approved aside from only a few individual supplementary courses, the Rectorate can declare equivalency after the student has passed examinations worth a maximum of 40 ECTS credits. The examinations must be taken during the Master's degree program.

(6) For students admitted to the program after successful completion of a Diploma degree (Mag.) program, the longer period of study will be recognized and, under § 78 of the Universities Act, successfully completed examinations from the Diploma degree program can count towards the Master's degree program for requirements that go beyond the scope of the Bachelor's degree program.

§ 3 Structure and Classification

(1) The Master's degree program in "Biological Chemistry" is a five-semester, joint cross-border academic degree program (Linz, Austria - České Budějovice, Czech Republic) comprised of 150 ECTS credits. The program has been organized jointly by the Johannes Kepler University (JKU) Linz and the Faculty of Natural Sciences (PRF) of the University of South Bohemia in Budweis. The curriculum has been designed to offer Chemistry in Linz during the first two semesters of the program and Biology during the third and fourth semesters at SBU. Upon approval, students may change the sequence. The fifth semester is for the completion of the Master's thesis and students can opt to select a thesis supervisor from one of the two locations where the thesis (or cooperative project) will be supervised.

The 150 ECTS credits are distributed in the following fields of study and study performance:

(a) For Graduates of a Bachelor's Degree Program in Biological Chemistry

Description	ECTS Credits
Mandatory Subjects (chemistry 17,8; biology 28; support 5,6)	51,4
Elective Subjects (chemistry 26,1; biology 26)	52,1
Master's Thesis (incl. Master's Thesis Seminar)	28
Master's Degree Examination	2
Open Coursework Credit	16,5
Total	150

(b) For graduates of an alternative degree program under § 2 Sec. 2 of the above listed alternative degree programs the following applies:

Description	ECTS Credits
Bridge Subject	14
Mandatory Subjects (chemistry 9,2; biology 28; support 5,6)	42,8
Elective Subjects (chemistry 20,2; biology 26)	46,2
Master's Thesis (incl. Master's Thesis Seminar)	28
Master's Degree Examination	2
Open Coursework Credit	17
Total	150

(2) In the context of open coursework credit, examinations (including course examinations) must be completed in the above mentioned capacity. These can be chosen from the entire selection of examinations in all Austrian and internationally recognized post-secondary institutes of education and serve to provide additional qualifications that go beyond the subject area of the Master's degree program. They can be completed during the duration of the program.

(3) The following options are available to complete the open coursework requirement in the context of the Master's degree program "Biological Chemistry": additional courses from the Master's degree programs in Bioinformatics, Biophysics, Molecular Biology, Polymer Chemistry, Technical Chemistry, Industrial Engineering-Technical Chemistry.

(4) A suggested ideal timeframe to complete the academic degree program is as follows:

Please note: the designation (L) and/or (B) refers to the location of either Linz or Budweis; this designation is also included in the following subject lists.

(a) Ideal Timeframe to Complete the Bachelor's Degree in "Biological Chemistry"

Semester 1 (WS)		Semester 2 (SS)		Semester 3 (WS)		Semester 4 (SS)		Semester 5 (WS)	
Fundamentals of Chemistry and Technology for Biological Chemists (L)	5,8	Fundamentals of Chemistry and Technology for Biological Chemists (L)	12	Advanced Biology and Biochemistry (B)	15	Advanced Biology and Biochemistry (B)	13	Master's Thesis (L or B)	25
Support Subjects (L)	5,6								
Elective in Chemistry 1 (L)	7,1	Elective in Chemistry 1 (L)	5,9	Elective in Biology 1 (B)	6	Elective in Biology 1 (B)	7		
Elective in Chemistry 2 (L)	6,5	Elective in Chemistry 2 (L)	6,6	Elective in Biology 2 (B)	6	Elective in Biology 2 (B)	7	Master's Thesis Seminar and Master's Degree Examination (L or B)	5
Open Coursework Credits	5	Open Coursework Credits	3	Open Coursework Credits	3	Open Coursework Credits	3		
30		30		30		30		30	

(b) Ideal Timeframe for Bachelor's/Dipl. Ing. Degree in Technical Chemistry/Chemistry

Semester 1 (WS)		Semester 2 (SS)		Semester 3 (WS)		Semester 4 (SS)		Semester 5 (WS)	
Fundamentals of Chemistry and Technology for Biological Chemists (L)	9,2	Bridge Subject: Fundamentals of Biology (B)	14					Master's Thesis (L or B)	25
Support Subjects (L)	5,6	Advanced Biology and Biochemistry (B)	13	Advanced Biology and Biochemistry (B)	15	Elective in Chemistry 2 (L)	5		
Elective in Chemistry 1 (L)	10			Elective in Biology 1 (B)	6	Elective in Biology 1 (B)	7		
Elective in Chemistry 2 (L)	5,2			Elective in Biology 2 (B)	6	Elective in Biology 2 (B)	7	Master's Thesis Seminar and Master's	5

Open Course-work Credits	0	Open Course-work Credits	3	Open Course-work Credits	3	Open Course-work Credits	11	Degree Examination (L or B)	
	30		30		30		30		30

§ 4 Mandatory Subjects/Modules

The following subjects are mandatory:

(a) For Graduates of the Bachelor's Degree Program in "Biological Chemistry"

Code	Course	ECTS Credits
863FCTB10	Fundamentals of Chemistry and Technology for Biological Chemists (L)	17,8
863SOSK10	Support Courses (L)	5,6
863ABBC10	Advanced Biology and Biochemistry (B)	28
	Total Mandatory Subjects	51,4

(b) For Graduates of an Alternative Degree Program in accordance with § 2 Abs 2

Code	Course	ECTS Credits
863FBTC10	Bridge Subject: Fundamentals of Biology for Technical Chemists	14,0
863FCTB10	Fundamentals of Chemistry and Technology for Biological Chemists (L)	9,2
863SOSK10	Support Courses (L)	5,6
863ABBC10	Advanced Biology and Biochemistry (B)	28
	Total Mandatory Subjects	56,8

§ 5 Elective Subjects/Modules

(1) The following elective subjects must be completed: The designation (L) and/or (B) refer to the location in either Linz or Budweis:

1. Two elective subjects in chemistry: two of the three elective subjects in chemistry must be selected from courses offered at the JKU.
2. Two elective subjects in biology: two out of three electives in biology offered at the SBU.

(2) In the context of **elective subjects in chemistry**, the following subjects are as follows (with the given learning expenditure):

(a) For Graduates of the Bachelor's Degree Program in Biological Chemistry:

Each student must select a total of 26,1 ECTS credits from two out of three chemical elective subjects, of those from each selected elective subjects at least 10 ECTS credits. Within the elective subjects there are individual courses that are mandatory if the respective elective subject is selected. This is indicated next to the individual subjects.

Code	Course	ECTS Credits
863ADCH10	Advanced Chemistry (L)	>=10
863APCB10	Advanced Physical Chemistry and Biophysics (L)	>=10
863STBC10	Structural Biochemistry	>=10
	Two from the above three are to be selected with a total learning effort	26,1

(b) For graduates of a listed alternative study program under § 2 Sec. 2

Each student must select a total of 20,2 ECTS credits from two out of three chemical elective subjects, of those from each of the selected elective subjects at least 7,5 ECTS credits.

Code	Course	ECTS Credits
863ADCH10	Advanced Chemistry (L)	>=7,5
863APCB10	Advanced Physical Chemistry and Biophysics (L)	>=7,5
863STBC10	Structural Biochemistry (L)	>=7,5
	Two from the above three are to be selected with a total learning expenditure	20,2

(3) In the context of **elective courses in Biology**, students can select from following subjects: each student must select a total of 26 ECTS credits from two of

the three elective courses in biology, and of those, each of the selected electives must be a minimum of 10 ECTS credits.

Code	Course	ECTS
863AIBS10	Advances in Biological Systems (B)	>=10
863MODB10	Molecular and Developmental Biology (B)	>=10
863STBT10	Structural Biology Techniques Module (B)	>=10
	Two from the above three are to be selected with a total learning expenditure	20,2

These courses are to be completed at the University of South Bohemia under the rules and regulations that apply at USB.

§ 6 Courses

(1) The JKU student handbook provides detailed information on courses, the types of individual courses in various fields of study as well as the number of ECTS credits and semester hours, the division number, procedures to determine course allocation for courses that accept only a limited number of student, as well as possible registration requirements.

(2) The applicable types of courses as well as rules regarding examination regulations have been regulated in §§ 12 – 16 of the statutes of the laws governing academic studies at the Johannes Kepler University Linz.

(3) The rules and regulations in effect at the University of South Bohemia in regards to course completion apply.

§ 7 Subjects and Course Substitution

Fields of study in compliance with §§ 4 and 5 and/or courses in compliance with § 6 Sec. 1 totaling 18 ECTS credits can be substituted by student request with other study specific fields of study and and/or courses as long as the academic objective is not impaired and the selection of the proposed field of study and/or courses supports the qualification profile and the academic correlation as well as the supplementary academic education appears reasonable. The application to substitute a subject area and/or a course must be submitted to the Vice Rector of Education.

§ 8 Master's Thesis

(1) In the context of the Master's degree program "Biological Chemistry" and in accordance with § 81 of the Universities Act as well as the legal regulations

governing university studies at the Johannes Kepler University Linz, students are required to write and submit a Master's thesis.

(2) In general, the Master's thesis should consist of experimental research work in which the results are documented in the form of written homework assignments. The Master's thesis is 25 ECTS credits.

(3) The Master's degree thesis proves the ability of the candidate to work independently, methodically, and correctly in regards to academic content, as well as develop and process a conceptual project. The topic is to be selected from one of the subjects in compliance with § 4 with the exception of the subject "Support Courses", or § 5 Sec. 2 or 3 completed subjects and is to be organized so that the thesis can be composed reasonably within a six-month period.

(4) The Studies Commission can waive the guidelines for the formal organization of the Master's thesis.

(5) The Master's thesis is an academic paper to be written and presented in English and only for general ethical scientific objectives.

(6) The Master's thesis seminar has been designed to accompany the composition of the thesis (3 ECTS credits). In the course, students will critically analyze and discuss their research results.

(7) In general, the Master's degree thesis for the Master's degree program "Biological Chemistry" is to be supervised by a post-doctorate academic in a field/area related to the thesis topic. If the thesis is of an interdisciplinary nature, the student is permitted to have two supervisors. If thesis research is conducted evenly in both locations, a post-doctorate supervisor from each field in each location is required. In this case the grade will be determined jointly by both supervisors.

§ 9 Examination Regulations

(1) The JKU studies handbook provides detailed information on examination regulations for subject examinations as well as examination standards for course examinations.

(2) In regards to courses and subject examinations taken at the University of South Bohemia, the rules regulations in effect at the University of South Bohemia (SBU) apply.

(3) The Master's degree program "Biological Chemistry" will conclude with a Master's degree examination.

(4) The Master's degree examination is comprised of two parts: the first part of the Master's degree examination consists of the successful completion of mandatory and elective subjects in accordance with §§ 4 and 5.

(5) The second part of the Master's degree examination (2 ECTS credits) is an oral comprehensive examination by committee. The requirements to be allowed to take the second part of the Master's degree examination include the successful completion of the first part, a positive grade on the Master's thesis and in the Master's Thesis Seminar as well as in open coursework.

(6) The second part of the Master's degree examination consists of a presentation and defence of the Master's thesis. The concluding examination discussion will be comprised of material from the selected subject area, the topic of the students' Master thesis, as well as a second subject area determined by the student's thesis supervisor due to first-hand knowledge of the student's Master's thesis.

(7) The 3-person examination committee will be selected by the Vice Rector of Education, taking into account the students' right to make recommendations. In general, the thesis supervisor is to be included. The head of the examination committee will grade the student's presentation of his/her Master's degree thesis and the other two examiners will grade in their respective field of study.

(8) As a general rule, if the majority of the Master's degree thesis was completed at the University of South Bohemia, the student must comply with the requirements, rules and regulations in effect at SBU.

(9) The university encourages including examiners from both universities for the Master's degree examination in "Biological Chemistry".

(10) To convert grades awarded by the University of South Bohemia (SBU), the following chart will apply:

Grades at the SBU	Grades at the JKU
excellent 1	sehr gut 1
excellent minus 1-	sehr gut 1
very good 2	gut 2
very good minus 2-	befriedigend 3
good 3	genügend
unsatisfactory 4	nicht genügend 5
successful participation	mit Erfolg teilgenommen
unsuccessful participation	ohne Erfolg teilgenommen

(11) For grading purposes, the final academic transcript will include the grades awarded by SBU in each subject completed at the SBU, the SBU grade will be transferred in accordance with the above chart (Sec. 10).

§ 10 Academic Degree

(1) Graduates of the Master's degree program in "Biological Chemistry" will be awarded the academic degree "Master of Science", abbrev. "MSc" or "MSc (JKU)". In the Czech Republic the academic degree will be "Magistr" (Mgr.).

(2) The official diploma will state that the program is a "joint study programme" in cooperation with the University of South Bohemia and was held in English.

(3) The official written confirmation will be issued in both German and English.

§ 11 Legal Validity

The academic degree program curriculum will be in effect as of October 1, 2010.