These degree programme and examination regulations have been worded carefully to be up to date; however, errors cannot be completely excluded. The official German text available at the Examinations Office is the version that is legally binding.

Degree Programme and Examination Regulations for the Bachelor's Degree Programme in Integrated Life Sciences - Biology, Biomathematics and Biophysics (BSc ILS) and the Master's Degree Programme in Integrated Life Sciences - Biology, Biomathematics and Biophysics (MSc ILS) at the Faculty of Sciences of Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) – FPO BAMA ILS –

Dated 28 October 2019

Based on Section 13 (1)(2), Section 43 (5)(2), Section 58 (1) and Section 61 (2)(1) of the Bavarian Higher Education Act (Bayerisches Hochschulgesetz, BayHSchG), FAU enacts the following examination regulations:

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Part I: General Provisions

Section 40 Scope

The degree programme and examination regulations for the Bachelor's degree programme in Integrated Life Sciences – Biology, Biomathematics and Biophysics (BSc ILS) and the Master's Degree Programme in Integrated Life Sciences – Biology, Biomathematics and Biophysics (MSc ILS) supplement the current version of the General Degree Programme and Examination Regulations for Bachelor's and Master's Degree Programmes at the Faculty of Sciences at FAU (**ABMPO/NatFak**).

Section 41 Bachelor's Degree Programme, Subject-Related Degrees

(1) [1]The Bachelor's degree programme in ILS shall consist of modules worth 180 ECTS credits distributed over six semesters. [2]This includes the period for working on the Bachelor's thesis.

(2) [1]Subject-related degrees within the meaning of Section 28 (1)(2) **ABMPO/NatFak** are Bachelor's degrees in biomathematics or biophysics. [2]Due to considerable differences, especially in the area of the mathematics modules, the Bachelor's degree programme in Biology at the Faculty of Sciences at FAU explicitly does not count as a subject-related degree in this context.

Section 42 Master's Degree Programme, Subject-Related Degrees, Start of Degree Programme, Teaching and Examination Language

(1) [1]The Master's degree programme in ILS builds on the contents of the Bachelor's degree programme in ILS. [2]It consists of modules worth 120 ECTS credits including the Master's thesis, distributed over four semesters.

(2) The Master's degree programme may only be started in the winter semester.

(3) Section 4 (4) **ABMPO/NatFak** applies with the proviso that the teaching and examination language is English and that individual teaching units and examinations may be held in German; otherwise, Section 4 (4) **ABMPO/NatFak** shall remain unaffected.

Section 43 Examinations Committee

[1]The Examinations Committee for the Bachelor's and Master's degree programmes in ILS shall consist of three members in total, one each from the departments of Biology, Physics and Mathematics. [2]The chairperson, their deputy and the further members of the Examinations Committee shall be professors from the departments of Biology, Physics and Mathematics appointed by the Faculty of Sciences' Faculty Council based on the departments' recommendation.

Part II: Special Provisions

1. Bachelor's Examination

Section 44 Structure of the Bachelor's Degree Programme

(1) [1]The Bachelor's degree programme in ILS consists of compulsory, compulsory elective and elective modules. [2]The distribution across the semesters, the type and duration of the examinations in the modules and the required number of ECTS credits are set forth in **Appendix 1**.

(2) Modules no. 1 to 21 and 28 and 29 in **Appendix 1** are compulsory.

(3) [1]Modules no. 22 to 26 in **Appendix 1** are compulsory elective modules. [2]Further details are stipulated in Section 46.

(4) The elective module, module 27, can be selected from the key qualifications offered at FAU.

(5) Notwithstanding Section 33 (1) and (2) **ABMPO/NatFak**, taking additional modules pursuant to Section 33 **ABMPO/NatFak** is not permitted in the Bachelor's degree programme in ILS.

Section 45 Grundlagen- und Orientierungsprüfung (GOP)

(1) The Grundlagen- und Orientierungsprüfung (GOP) shall consist of the following modules:
- ILS-M1 Mathematics for integrated life sciences I (10 ECTS credits),
- ILS-P1 Foundations of experimental physics (5 ECTS credits),
- ILS-B1 Foundations of cell biology (7.5 ECTS credits).

(2) The GOP shall have been passed when all modules listed in (1) have been evaluated as ‘bestanden’ (passed) or given a grade of at least ‘ausreichend’ (sufficient).

Section 46 Compulsory Elective Modules

(1) [1]Students may choose between the following compulsory elective modules as stipulated in Section 44 (3):
1. Compulsory elective module in biophysics,
2. Compulsory elective module in computational biology (part 1 and part 2),
3. Compulsory elective module in molecular biology (part 1 and part 2).

[2]Two of the three possible compulsory elective modules must be chosen.

(2) [1]The compulsory elective module in biophysics with 15 ECTS credits includes a lecture and a laboratory course. [2]The compulsory elective module in computational biology parts 1 and 2 (modules 23 and 24) consists of a module part 1 (lecture and tutorial) and part 2 (lecture with tutorial and laboratory course), each worth 7.5 ECTS credits, and which each have to be taken in combination with one another. [3]The compulsory elective modules in molecular biology (modules 25 and 26) each consist of a module part 1 (lecture with seminar) worth 5 ECTS credits and a module part 2 (practical part with seminar) worth 10 ECTS credits, which each have to be taken in combination with one another. [4]The compulsory elective modules in molecular biology are equivalent to the subject modules described in Section 46 (2) of the degree programme and examination regulations for the Bachelor’s degree programme in Biology (BSc Biology) and the Master’s degree programme in Cell and Molecular Biology (MSc ZMB) (FPO BAMA Bio).

(3) [1]Possible examination achievements in the compulsory elective modules pursuant to Section 6 (3) and (4) **ABMPO/NatFak:** Written examination (written examination 45-90 mins; written assignment 5-10 pages or report 5-10 pages), oral examination (15-45 mins), electronic examination (EE, e-examination 45 mins), tutorial achievement (TA, report 5-10 pages or exercises 15-30 pages), practical achievement (PA, report 5-10 pages, series of reports 20-40 pages), seminar achievement (SA, presentation

30 mins, report 5-10 pages) or excursion achievement (ExA, report 5-10 pages or series of reports 10 pages); combinations are also possible in exceptional cases pursuant to Section 6 (2)(3) **ABMPO/NatFak**. [2]In particular, it is possible to combine a written or oral examination with achievements as set forth in Section 6 (4) **ABMPO/NatFak**. [3]In the event of a combination of several examinations, the individual partial achievements are either incorporated in equal parts into the final grade for the module or in the ratio 60:40 or 80:20. The Examinations Committee can agree other weightings at the beginning of the semester. [4]Further details are stipulated in the module handbook.

(4) [1]The Examinations Committee shall decide on any deviations or accept compulsory elective modules other than those stated in (1) upon request. [2]A compulsory elective module can only be admitted if it is compatible with the learning outcome of the Bachelor's degree and the subject is taught by a professor. [3]In the event that other compulsory elective modules are allowed, it is possible that deviations may arise from the examination achievements listed in (3) above within the context of the regulations stipulated in Section 6 (3) and (4) **ABMPO/NatFak**.

Section 47 Bachelor's Thesis

(1) Students are required to have achieved at least 90 ECTS credits in order to be allocated a subject for the Bachelor's thesis.

(2) [1]The Bachelor's thesis module accounts for a total of 15 ECTS credits, with 12 ECTS credits allocated to the written Bachelor's thesis and 3 ECTS credits to the oral examination. [2]Requirements for the Bachelor's thesis module shall be such that it can be completed within 12 weeks.

(3) [1]The Bachelor's thesis shall generally be completed at one of the departments involved in the degree programme in ILS. [2]The chairperson of the Examinations Committee may give approval for the Bachelor's thesis to be completed in departments not involved in the degree programme upon request.

(4) [1]All full-time university lecturers who have completed a habilitation who are involved in the Bachelor's or Master's degree programmes in ILS shall be entitled to allocate subjects for Bachelor's theses (supervisors). [2]The Examinations Committee shall have the right to grant exceptions.

2. Master's Examination

Section 48 Admissions Committee for the Master's Degree Programme

[1]The Admissions Committee for the Master's degree programme in ILS shall consist of one university lecturer from the Department of Biology, the Department of Physics or the Department of Mathematics who shall assume the role of chairperson and two further university lecturers. [2]The two further members of the Admissions Committee shall be members of the two departments listed in sentence 1 of which the chairperson is not a member. [3]The two further members and their deputies shall be appointed by the Faculty of Sciences' Faculty Council at the recommendation of the departments of Biology, Physics and Mathematics.

Section 49 Qualification for a Master's Degree, Certificates and Admission Requirements

(1) [1]A subject-specific degree within the meaning of Section 34 (1)(1)(1) **ABMPO/NatFak** is a Bachelor's degree or a Diplom degree in the subject integrated life sciences. [2]Bachelor's degrees in (bio)physics and (bio)mathematics in particular shall be recognised as subject-related degrees within the meaning of Section 34 (1)(1)(1) **ABMPO/NatFak**. [3]Applicants with a subject-related degree shall only be admitted to the Master's degree programme after passing an oral admission examination. [4]The minimum number of ECTS credits required in the event of a student not having yet completed their Bachelor's degree pursuant to Section 34 (3) **ABMPO/NatFak** is 135 ECTS credits.

(2) The application for admission to the qualification assessment process according to (2)(2)(3) of the **Appendix** to **ABMPO/NatFak** shall include proof of English language proficiency at level B2 (Common European Framework of Reference for Languages – CEFR) vantage or upper intermediate.

(3) In the oral admission examination according to (5)(3) et seq. of the **Appendix** to **ABMPO/NatFak**, applicants shall be evaluated according to the following equally weighted criteria:

1. Knowledge of topics and methods in the field of mathematics, physics and molecular biology (weighting 1/2),
2. The ability to find interdisciplinary connections between the subjects stated in no.1 (weighting 1/2).

Section 50 Scope and Structure of the Master's Degree Programme

(1) [1]The Master's degree programme consists of compulsory modules and compulsory elective modules, which with the exception of the module ILS-MA-M1, the specialisation module and the Master's thesis are split into three module groups (MG) with different subject specialisations. [2]The module groups allow students to establish a subject-specific profile. [3]Two of the following topic specialisations must be chosen:

1. Module group 1 (MG1): Mathematical modelling and system biology
2. Module group 2 (MG2): Bio-imaging and biophysics
3. Module group 3 (MG3): Biological structures and processes.

(2) [1]The Master's examination shall consist of the required module examinations including the Master's thesis module. [2]The Master's examination shall have been passed when all of the following required module examinations and the Master's thesis module – worth a total of 120 ECTS credits – have been passed according to **Appendix 2**:

1. The compulsory module ILS-MA-M1 worth 5 ECTS credits.
2. Compulsory and compulsory elective modules from one of the possible module groups stated in (1) worth 30 ECTS credits.
3. Compulsory and compulsory elective modules from another of the three possible module groups worth 35 ECTS credits.
4. A specialisation module worth 20 ECTS credits.
5. The Master's thesis module worth 30 ECTS credits.

[3]The distribution of the modules across the semesters, type and duration of the module examinations and the required number of ECTS credits are set forth in **Appendix 2** and in the module handbook.

(3) [1]A catalogue of compulsory modules and compulsory elective modules for each of the module groups which can be chosen pursuant to (1) is available as stipulated in Section 51 in conjunction with **Appendix 2**. This catalogue is drawn up by the Examinations Committee and published in the module handbook. [2]Students choose their specialisations by registering for the first examination. [3]Other compulsory elective modules can be approved by the Examinations Committee upon request, provided the contents covered are clearly related to the learning outcomes of the degree programme. [4]If this is the case, the approved module will be added to the module handbook before lectures commence.

(4) [1]Before starting the Master's degree programme, each student shall choose one of the full-time professors from the Faculty of Sciences involved in the degree programme to act as a mentor. [2]Mentors shall advise students in particular on the selection of compulsory elective modules and shall help them with questions regarding their studies. [3]This mentoring relationship shall be maintained throughout the Master's degree programme.

(5) Notwithstanding Section 33 (1) and (2) **ABMPO/NatFak**, taking additional modules pursuant to Section 33 **ABMPO/NatFak** is not permitted in the Master's degree programme in ILS.

Section 51 Learning Outcomes and Examinations in the Elective Module Groups

(1) [1]The overriding learning outcomes of the module groups which can be chosen pursuant to Section 50 (1) are to allow students to gain a more advanced knowledge of selected specialist areas. [2]This should allow them to acquire skills of relevance to research.

(2) In module group 1 'Mathematical modelling and system biology', interdisciplinary topics of modern biological sciences are linked with mathematical and biological methods in order to acquire skills predominantly in describing biological processes in mathematical terms and in system biology.

(3) In module group 2 'Bioimaging and biophysics', interdisciplinary topics of modern biological sciences are combined with physical and biological methods in order to acquire skills predominantly in the theory and application of physical and biological methods in the imaging of biological systems.

(4) In module group 3 'Biological structures and processes', interdisciplinary topics of modern biological sciences are combined with physical and biological methods in order to acquire skills predominantly in theoretical, computer-aided and experimental description of biological structures (e.g. proteins, membranes).

(5) [1]Possible examination achievements in the compulsory elective modules in the three module groups pursuant to Section 6 (3) and (4) **ABMPO/NatFak:** Written examinations (written examination 45-90 mins; written assignment 5-10 pages or report 5-10 pages), oral examination (30 mins), electronic examinations (EE, e-examinations 45 mins), tutorial achievements (TA, report 5-10 pages or exercises 15-30 pages), practical achievement (PA, report 5-10 pages, series of reports 20-40 pages), seminar achievement (SA, presentation 30 mins, report 5-10 pages) or excursion achievements (ExA, report 5-10 pages or series of reports 10 pages); combinations are also possible

in exceptional cases pursuant to Section 6 (2)(3) **ABMPO/NatFak**. [2]Further details are stipulated in the module handbook.

(6) [1]The compulsory elective modules in the module groups are listed in the module handbook. [2]Compulsory elective modules are generally worth 5, 7.5 or 10 ECTS credits. [3]Modules amounting to 5 ECTS credits usually consist of lectures (2 SWS) and tutorials (2 SWS). [4]Any exceptions are detailed in the module handbook.

(7) If other compulsory elective modules are admitted, deviations from the provisions stipulated in (5) and (6) may be possible within the framework of Section 6 (3) and (4) **ABMPO/NatFak**.

Section 52 Master's Thesis

(1) Students are required to have achieved at least 60 ECTS credits in order to be allocated a subject for the Master's thesis.

(2) [1]The Master's thesis is intended to show that the student is capable of dealing with a problem from the field of the degree programme in Integrated Life Sciences – Biology, Biomathematics and Biophysics (ILS) independently and according to scientific methods within a set period, presenting the results in accordance with the standards of the field and using the correct language, and putting them in relation to current specialist literature. [2]It must have an international focus and be research-oriented.

(3) The Master's thesis shall generally be written in English; the Examinations Committee shall decide whether to grant exceptions.

(4) [1]30 ECTS credits shall be awarded for the Master's thesis. [2]The results of the written work (27 ECTS credits) shall be presented in a brief presentation (3 ECTS credits).

(5) Section 47 (4) shall apply accordingly.

Part III: Concluding Provisions

Section 53 Legal Validity

(1) [1]These examination regulations shall come into effect on the day after their publication. [2]They shall apply to all students who start the Bachelor's or Master's degree programme in Integrated Life Sciences – Biology, Biomathematics, Biophysics (ILS) in the winter semester 2019/2020 or later.

(2) [1]Students who are already studying under the previously valid degree programme and examination regulations for the Bachelor's degree programme in Integrated Life Sciences – Biology, Biomathematics, Biophysics (BSc ILS) and the Master's Degree Programme in Integrated Life Sciences – Biology, Biomathematics and Biophysics (MSc ILS) at the Faculty of Sciences of Friedrich-Alexander-Universität Erlangen-Nürnberg – FPOILS – in the version of 22 July 2015 shall be examined according to those regulations. [2]The degree programme and examination regulations mentioned in sentence 1 shall become invalid as of 30 September 2024. [3]Examinations pursuant to the degree programme and examination regulations stated in sentence 1 will be offered for the last time for the Bachelor's degree programme in summer semester 2024 and for the Master's degree programme in winter semester 2022/2023.

Appendix 1: Degree Programme Structure for the Bachelor's Degree Programme in ILS

Compulsory modules: green; compulsory elective modules: orange; key qualifications: grey

	Module title	Teaching unit	SWS (semester hours)				ECTS credits	Workload per semester in ECTS credits						Type and scope of the examination/course achievement	Grade factor
			L	T	Lab	S		1. sem.	2. sem.	3. sem.	4. sem.	5. sem.	6. sem.		
1	**ILS-M1: Mathematics for Integrated Life Sciences I**	Mathematics for engineers I (course C)	4				10	5						EA: Written examination 90 mins + CA: PA 50 mins (ungraded)	1
		Tutorial: Mathematics for engineers I		2				1.5							
		Statistical methods for Integrated Life Sciences	1					2.5							
		Computer tutorial: Statistical methods for Integrated Life Sciences		1				1							
2	**ILS-M2: Mathematics for Integrated Life Sciences II**	Mathematics for engineers II (course C)	4				5		3					EA: Written examination 90 mins	1
		Tutorial: Mathematics for engineers II		2					2						
3	**ILS-M4: Stochastic models**	Stochastic models	2				5			3				EA: Written examination 90 mins	1
		Tutorial: Stochastic models		1						1					
		Practical course: Stochastic models			1					1					
4	**ILS-M5: Differential equation models**	Differential equation models	2				5				3			EA: Written examination 90 mins	1
		Tutorial: Differential equation models		2							2				
5	**ILS-M6: Mathematical methods in bioinformatics**	Mathematical methods in bioinformatics	2				5				3			EA: Written examination 90 mins	1
		Tutorial: Mathematical algorithms in bioinformatics		2							2				
6	**ILS-P1: Foundations of experimental physics 1**	Foundations of experimental physics 1	3				5	4						EA: Written examination 90 mins	1
		Tutorial: Foundations of experimental physics 1		1				1							
7	**ILS-P2: Foundations of experimental physics 2**	Foundations of experimental physics 2	3				5		4					EA: Written examination 90 mins	1
		Tutorial: Foundations of experimental physics 2		1					1						
8	**ILS-P3: Foundations of experimental physics 3**	Practical course: Foundations of experimental physics			3		5		5					CA: PA (ungraded)	0

	Module title	Teaching unit	SWS (semester hours)				ECTS credits	Workload per semester in ECTS credits						Type and scope of the examination/course achievement	Grade factor
			L	T	Lab	S		1. sem.	2. sem.	3. sem.	4. sem.	5. sem.	6. sem.		
9	**ILS-P4: Structural physics**	Structural physics	4				7.5			5				EA: Written examination 90 mins	1
		Tutorial: Structural physics		2						2.5					
10	**ILS-P5: Physics of biological matter**	Physics of biological matter	3				7.5				4			EA: Written examination 90 mins	1
		Tutorial: Physics of biological matter		3							3.5				
11	**ILS-B1: Foundations of cell biology and genetics**	Foundations of cell biology and genetics	5				7.5	7.5						EA: Written examination 90 mins	1
12	**ILS-B2: Molecular biology**	Molecular biology	3				7.5		3.5					EA: Written examination 90 mins + CA: PA (ungraded)	1
		Tutorial: Molecular biology		5					4						
13	**ILS-B3: Biochemistry and physiology**	Biochemistry and physiology	3				7.5			4				EA: Written examination 90 mins + CA: PA (ungraded)	1
		Tutorial: Biochemistry and physiology		3						3.5					
14	**ILS-B4: Cell-cell communication, signal processing and development**	Cell-cell communication, signal processing and development	3				7.5				4			EA: Written examination 90 mins + CA: PA (ungraded)	1
		Tutorial: Cell-cell communication, signal processing, and development		3							3.5				
15	**ILS-C1: Introduction to chemistry**	General chemistry	4				5		3					EA: Written examination 120 mins	1
		Tutorial: General chemistry		3					2						
16	**ILS-C2: Laboratory course in chemistry**	Laboratory: Chemistry			1.5		5		3					CA: PA (ungraded)	0
		Seminar for laboratory course: Chemistry				0.5			2						
17	**ILS-C3: Physical chemistry**	Foundations of physical chemistry	2				5			2.5				EA: Written examination 90 mins	1
		Tutorial: Foundations of physical chemistry				2				2.5					
18	**ILS-I1 Optics and microscopy**	Optics and microscopy	1				5	1						EA: PA (approx. 50 pages series of reports)	1
		Tutorial: Optics and microscopy		4				4							
19	**ILS-I2: Genome analyses and phylogeny**	Genome analyses and phylogeny	2				5			2.5				EA: Written examination 90 mins	1
		Practical course: Genome analysis and phylogeny			3					2.5					

	Module title	Teaching unit	SWS (semester hours) L	T	Lab	S	ECTS credits	Workload per semester in ECTS credits 1. sem.	2. sem.	3. sem.	4. sem.	5. sem.	6. sem.	Type and scope of the examination/course achievement	Grade factor
20	**ILS-I3: Molecular biophysics and structural biology**	Molecular biophysics and structural biology	2				5				3			EA: Written examination 90 mins	1
		Tutorial: Molecular biophysics and structural biology		2							2				
21	**ILS-I4: Metabolic networks**	Metabolic networks	2				5						3	EA: Written examination 90 mins	1
		Tutorial: Metabolic networks		2									2		
22	**Physical biology: Compulsory elective module**	Lecture: Modern applications of biophysical methods	2				15					5		EA: oral examination 90 mins + EA: PA (approx. 50 pages series of reports)	1
		Tutorial and seminar: Modern applications of biophysical methods		11								10			
23	**Compulsory elective module: Computational biology (part 1)**	Lecture: Computational biology (part 1)	2				7.5					3		EA: Written examination 90 mins (80 %) + EA: SA 20 mins (20 %)	1
		Tutorial and seminar: Computational biology (part 1)		4.5								4.5			
24	**Compulsory elective module: Computational biology (part 2)**	Lecture: Computational biology (part 2)	2				7.5					3		EA: Written examination 90 mins	1
		Tutorial: Computational biology (part 2)		2.5	2							4.5			
25	**Compulsory elective module in molecular biology (part 1)[1)]**	Lecture	2				5					5		EA: Written examination 45 mins	2
26	**Compulsory elective module in molecular biology (part 2)[1)]**	Laboratory course/seminar: Molecular biology		13			10					10		see Section 46 (3)[2)]	1
27	**Key qualifications[3)]**	Dependent on module	4				5						5	CA: dependent on module (ungraded)	0
28	**Specialisation module [4)]**	Tutorial and seminar from the area in which Bachelor's thesis is written		3		1	5						5	CA: see Section 6 (3) and (4) **ABMPO/NatFak**[4)]	0
29	**Bachelor's thesis**	Bachelor's oral examination					15						3	EA: Written thesis approx. 7,000 words + CA: Seminar presentation approx. 20 mins (ungraded)	1
		Bachelor's thesis											12		
		Total SWS:	63-65	60-66	8-10,5	3.5									
		Total ECTS credits:					180	27.5	32.5	30	30	30	30		

[1] Subject modules from the Bachelor's degree programme in Biology pursuant to Section 46 (2) FPO BAMA Bio. The compulsory elective module in molecular biology (part 1) corresponds to the subject module (part 2) and the compulsory elective module (part 2) corresponds to the subject module (part 1).

[2] see Section 46 (3). The type and scope of the examination and its weighting when determining the grade for the compulsory elective module in molecular biology depend on the specific manner in which the respective module is taught; see module handbook for details.

[3] Courses can be selected from the range of key qualifications offered at FAU. The type and scope of the examination depend on the specific manner in which the respective module is taught and are regulated by the applicable **degree programme and examination regulations** and/or the relevant module handbook.

[4] The specialisation module (4 SWS) is intended to prepare students for the Bachelor's thesis and is based on taking special seminars on current research topics, seminars offered by the various subject areas (biology, biomathematics, biophysics) or a laboratory course in preparation for the Bachelor's thesis. The type and scope of the examination in the specialisation module depend on the specific manner in which the respective advanced classes are taught; see module handbook for details. As a rule, a series of reports has to be submitted for practical achievements and a report or a written assignment for a tutorial achievement.

Key:
L = lecture
T = tutorial
Lab = laboratory course
S = seminar
SWS = semester hours
ECTS = credits from European Credit Transfer System
CA = course achievement
EA = examination achievement
PA = practical achievement pursuant to Section 6 (4) **ABMPO/NatFak**
SA = seminar achievement pursuant to Section 6 (4) **ABMPO/NatFak**
TA = tutorial achievement pursuant to Section 6 (4) **ABMPO/NatFak**

Appendix 2: Degree Programme Structure for Master's Degree Programme in Integrated Life Sciences

[1]See Sections 50 and 51. [2]In the Master's degree programme in Integrated Life Sciences, three module groups are offered (MG 1, MG 2 and MG 3). They each focus on a different area of specialisation and allow students to establish a subject-specific profile. [3]Each student must choose two of these module groups, obtaining 35 ECTS credits in one of these module groups and 30 ECTS credits in the other. [4]Each module group includes compulsory and compulsory elective modules. [5]The compulsory modules are listed below in the Degree Programme Structure, whilst the compulsory elective modules are stipulated in the module handbook. [6]In addition, the module ILS-MA-M1, the specialisation module and the Master's thesis are classed as compulsory modules in the curriculum.

Module code	Module title	Teaching unit	SWS (semester hours)				ECTS credits	Distribution of workload per semester in ECTS credits				Type and scope of the examination	Grade factor
			L	T	Lab	S		1. sem.	2. sem.	3. sem.	4. sem.		
Compulsory module													
ILS-MA-M1	**Introduction to statistics and statistical programming**	Introduction to statistics	2				5		2			EA: Written examination 90 mins + CA: TA[1)]	1
		Tutorial: Introduction to statistics (problem session)		1					1.5				
		Lab class Statistical programming		1					1.5				
	Total ECTS credits						**5**	**0**	**5**	**0**	**0**		
Compulsory modules in module group 1: Mathematical modelling and systems biology, see Sections 50 and 51													
ILS-MA-M2	**Biomathematics**	Biomathematics	4				10	7				EA: Oral examination 30 mins or written examination 90 mins[2)] + CA: TA[1)]	1
		Tutorial for biomathematics		2				3					
ILS-MA-B1	**Systems biology**	Systems biology	2				5	3				EA: Written examination 60 mins	1
		Laboratory course: Systems biology		1				2					
	Total ECTS credits						**15**	**15**	**0**	**0**	**0**		
Compulsory modules in module group 2: Bioimaging and biophysics, see Sections 50 and 51													
ILS-MA-I1A	**Bioimaging & biophysics A**	Bioimaging & biophysics I	2				7.5	2.5				EA: written examination 90 mins or oral examination 40 mins[2)] + CA: PA[1)]	1
		Laboratory course: Bioimaging & biophysics I		4				5					
ILS-MA-I1B	**Bioimaging & biophysics B**	Bioimaging & biophysics II	2				7.5		2.5			EA: Written examination 90 mins or oral examination 40 mins[2)]	1
		Laboratory course: Bioimaging & biophysics II		4					5				
	Total ECTS credits						**15**	**7.5**	**7.5**	**0**	**0**		

Module code	Module title	Teaching unit	SWS (semester hours)				ECTS credits	Distribution of workload per semester in ECTS credits				Type and scope of the examination	Grade factor
			L	T	Lab	S		1. sem.	2. sem.	3. sem.	4. sem.		
Compulsory modules in module group 3: Biological structures and processes, see Sections 50 and 51													
ILS-MA-I2A	**Interactions of biological macromolecules A**	Interactions of biological macromolecules A	2				5	3				EA: Written examination 120 mins or oral examination 60 mins[2)] + CA: TA[1)]	1
		Seminar/tutorial: Interactions of biological macromolecules A		1.5		0.5		2					
ILS-MA-I2B	**Interactions of biological macromolecules B**	Interactions of biological macromolecules B	2				5		3			EA: Written examination 120 mins or oral examination 60 mins[2)]	1
		Seminar/tutorial: Interactions of biological macromolecules B		1.5		0.5			2				
	Total ECTS credits						**10**	**5**	**5**	**0**	**0**		
Compulsory elective modules in module groups 1-3													
	Module group 1 pursuant to module handbook						**15-20**	**15-20[4)]**			**0**	**see Section 51 (5)**	
	Module group 2 pursuant to module handbook						**15-20**	**15-20[4)]**			**0**	**see Section 51 (5)**	
	Module group 3 pursuant to module handbook						**20-25**	**20-25[4)]**			**0**	**see Section 51 (5)**	
	Total ECTS credits						**35-40**	**35-40**			**0**		

Specialisation													
ILS-MA-VM	**Specialisation module**	Lecture, seminar, practical training in chosen subject					20			20		EA: Oral examination 30 mins	1
ILS-MA-TH	**Master's thesis**	Master's thesis					30				30	EA: Written thesis, approx. 20,000 words + CA: Seminar presentation 30 mins (presentation of results)	1
	Total ECTS credits						50			20	30		
	Total semester hours and ECTS credits		**3)**	**3)**	**3)**	**3)**		**30[4,5)]**	**30[4,5)]**	**30[4,5)]**	**30**		
							120						

1) TA or PA pursuant to Section 6 (4) **ABMPO/NatFak**. Tutorials or laboratory courses include tutorial achievements (TA) or practical achievements (PA). As a rule, these are weekly assignments which are collected in an exercise log or series of reports and then assessed. Unless stated otherwise, this is an ungraded course achievement.
2) The examination form of the module, i.e. written or oral, depends on the specific manner in which the module is taught in the relevant seminar and is announced at the beginning of the semester.
3) The total number of required semester hours (SWS) per semester depends on the individual choice of the compulsory elective modules listed in the module handbook.
4) Depending on the chosen module group combination (MG 1/MG 2, MG 1/MG 3 or MG2/MG3), the number of compulsory elective modules which have to be taken varies in semesters 1-3 in order to ensure a workload of 30 ECTS credits/semester. The credits required from compulsory elective modules vary in the first semester between 7.5 and 17.5 ECTS credits and between 12.5 and 20 ECTS credits in the second semester, whilst 10 ECTS credits have to be taken in the third semester.
5) Depending on which compulsory elective modules are taken, deviations of +/- 2.5 ECTS credits are possible during a year of study. A total of 120 ECTS credits are required in order to be awarded a Master of Science degree. The strongly modular character of the degree programme may mean that a compulsory elective module has more credits than a student needs to obtain exactly 30 or 35 ECTS credits in the chosen module group combination. In this case, when calculating the final grade for the Master's degree this module grade is considered to have the weight of the number of ECTS credits which are still required and not the actual number of credits it is worth. The additional workload completed by the student can be documented in the transcript of records.

Glossary:

Modules and teaching units:
Specialisation module = Vertiefungsmodul
Lab class = Rechnerübung
laboratory course = praktische Laborübung
Master's thesis = Masterarbeit
seminar = Seminar
tutorial = Übung

Abbreviations of forms of teaching:
P = Praktikum = *laboratory course*
S = Seminar = *seminar*
Ü = Übung oder Laborübung = *tutorial or laboratory course*
V = Vorlesung = *lecture*
ECTS = Credit points of the European Credit Transfer Systems
SWS = Semesterwochenstunden (*semester hours*)

Abbreviations of forms of examination:
PL = benotetete Prüfungsleistung (*EA, examination achievement = graded task*)
SL = unbenotete Studienleistung (*CA, course achievement = ungraded task*)
pÜL = praktische Übungsleistung gemäß § 6 Abs. 4 **ABMPO/NatFak** (*PA, practical achievement, or method of examination for a laboratory course pursuant to Section 6 (4) **ABMPO/NatFak***)
SeL = Seminarleistung gemäß § 6 Abs. 4 **ABMPO/NatFak** (*SA, seminar achievement = method of examination for a seminar pursuant to Section 6 (4) **ABMPO/Nat-Fak***)
ÜL = Übungsleistung gemäß § 6 Abs. 4 **ABMPO/NatFak** (*TA, tutorial achievement = method of examination for a tutorial pursuant to Section 6 (4) **ABMPO/NatFak)***

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Erlangen, 28 October 2019

Prof. Dr.-Ing. Joachim Hornegger
President

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