

University of Tübingen exam regulations for the study program in Bioinformatik / Bioinformatics culminating in an examination for a Master of Science (M.Sc.) degree – Special Provisions –

In accordance with §§ 19 paragraph (1) sentence 2 no. 9, 32 paragraph (3) of the law governing institutions of higher education, LHG of 1 January 2005 (GBl. p. 1), in the version published 1 April 2014 (GBl. p. 99) most recently amended by article 1 of the law dated 24 June 2020 (GBl. p. 426), the University of Tübingen Senate on 11.03.2021 passed the Special Provisions of these exam regulations for the study program in Bioinformatics at the University of Tübingen culminating in an examination for a Master of Science (M. Sc.) degree.

Approved by the President and Vice-Chancellor on 25.03.2021.

Contents

- A. Validity of General Provisions and admission requirements
 - § 1 Validity of General Provisions
 - § 2 Requirements for admission to program
- B. Goals, content and structure of the program
 - § 3 Goals and contents of program, regular duration of study, scope of program
 - § 4 Academic degree
 - § 5 Program Structure
 - § 6 Module coursework
 - § 7 Languages of instruction and examination
- C. Assessment in the program
 - I. General Provisions for assessed coursework
 - § 8 Related degree programs
 - § 9 Multiple-choice procedure
 - II. Special provisions for the final module
 - § 10 Final module
 - § 11 Subject-specific requirements for admission
 - § 12 Repetition for a better grade
- D. Deadlines for examinations in the program
 - § 13 Deadlines for completion of module coursework
 - § 14 Deadline for completion of studies
 - § 15 Student counselling
- E. Master's overall grade, certificate and other documentation
 - § 16 Calculation of Overall Grade
- F. Closing remarks
 - § 17 Effective date and transitional arrangements

A. Validity of General Provisions and admission requirements

§ 1 Validity of General Provisions

The University of Tübingen exam regulations for Master's degree programs culminating in the academic degree of Master of Science (M.Sc.) / Master of Arts (M.A.) – Master's degree framework exam regulations (MRPO) – as amended represent the General Provisions of these exam regulations and are an integral part of them, insofar as no more specific provisions have been made.

§ 2 Requirements for admission to program

(1) ¹A prerequisite for studies in this Master's program is a grade of 2.5 or better in a Bachelor's

degree in the subject of Bioinformatics, Biology, Informatics, in a related program covering basically the same material, or an equivalent degree. ²The responsible examination board decides on the equivalency of a degree, and the validity of a degree in Bioinformatics according to para. (3). ³The board may transfer this decision revocably to the head of the board. ⁴If there is a restricted number for admission, the articles may specify that the selection committee formed for the relevant selection process decides instead.

- (2) ¹To take part in the Master's program, applicants must also document knowledge of English at least at the level of C1/B2 of the Common European Framework of Reference for Languages (CEFR).²Notwithstanding § 4a para. (3) of the University of Tübingen statute governing admissions and enrollments, no particular grade is required in the school subject of English from year 8 until the final year of school, in the case of a German higher education entrance qualification.
- (3) Students who have a Bachelor's degree in Bioinformatics are not required to prove their German language proficiency.

B. Goals, content and structure of the program

§ 3 Goals and contents of program, regular duration of study, scope of program

(1) ¹Studies in Master of Science program (M. Sc.) in Bioinformatik / Bioinformatics (hereinafter: the program) enable students to acquire the specific qualifications, competencies, knowledge, abilities and skills required for a Master's degree in the subject of Bioinformatik / Bioinformatics under § 7 (1) of the Master's degree framework exam regulations (MRPO). ²The objective of the degree program is to deepen or expand the knowledge acquired in the Bachelor's degree program, thus providing the basis for the development and/or application of the student's own ideas (application or research-oriented); graduates possess a broad, detailed and critical understanding at the cutting edge of knowledge in one or more specialized fields and

- are able to apply their knowledge and understanding as well as their problem-solving skills in new and unfamiliar situations related to their field of study in a wider or multidisciplinary context (instrumental competencies),
- to integrate knowledge and deal with complexity,
- and to make scientifically sound decisions on the basis of incomplete or limited information, taking into account social, scientific and ethical findings resulting from the application of their knowledge and from their decisions,
- to acquire new knowledge and skills independently and to carry out largely self-directed and/or autonomous independent research- or application-oriented projects (systemic competencies)
- to communicate their conclusions and the information and motives underlying them to expert representatives and laypersons in a clear and unambiguous manner, to exchange information, ideas, problems and solutions with both experts and laypersons on a scientific level and to assume prominent responsibility in a team (communicative competencies).

³Further details of the course objectives are set out in the module handbook.

(2) ¹The regular duration of study for this degree program is 4 semesters. ²The program comprises 120 credit points (CP).

(3) ¹Over and above the number of credit points prescribed for the degree program according to these regulations, students may obtain no more than a 30 additional credit points from the degree program modules specified in § 5, para. (1); in all other respects, § 2, paras. (4) and (5) of the Master's degree framework exam regulations apply.

§ 4 Academic degree

The academic degree "Master of Science" (abbr. "M.Sc.") is awarded on the basis of a successful

completion of a Master of Science examination (hereinafter: M. Sc.).

§ 5 Program Structure

(1) ¹Students complete a program to earn credit points as set out in § 3 para. (2); the program consists of the following modules. ²Students who have a Bachelor's degree in Bioinformatics study according to variant A. ³Students who have a Bachelor's degree in Biology study according to variant B. ⁴Students who have a Bachelor's degree in Informatics or a related subject study according to variant C. ⁵In cases of doubt, the doctoral examination committee will make the decision.

Semester no.	Module no.	P/WP	Module title	Work for assessment	as-CP
All variants					
1	BIO-4110	P	BIO-SEQ: Sequence Bioinformatics	K	9
2	BIO-4120	P	BIO-STRUC: Structure and Systems Bioinformatics	K	9
Study area In-depth Bioinformatics (BIO-BIO) with a workload of 15 ECTS					
1-3	BIO-4103	P	Group Project Bioinformatics	R,H	3
1-3	BIO-4371	WP	Structure-based Drug Design	K	6
1-3	BIO-4311	WP	Microbiome Analysis	K	6
Study area Practical Bioinformatics (BIO-PRAK) with a workload of 6 ECTS					
1-3	BIO-4240	WP	Bioinformatics Tools	R,H	3
1-3	BIO-4220	WP	Integrative Bioinformatics	R,H	3
Study area Seminar Bioinformatics (BIO-SEM) with a workload of 3 ECTS					
1-3	BIO-4322	WP	Metagenomics	R,H	3
2-3	BIO-4373	WP	Bioinformatics and Machine Learning	R,H	3
Final module					
4	BIO-4999	P	Master's thesis (final module)*	Master's thesis, R	30
Variant A					
Study area Practical Informatics (INFO-PRAK) with a workload of 6 ECTS					
1-3	ML-4102	WP	Data Literacy	K	6
Study area Theoretical Informatics (INFO-THEO) with a workload of 6 ECTS					
1-3	INFO-4419	WP	Advanced Topics in Algorithmics	K	6
Study area In-depth Informatics (INFO-INFO) with a workload of 18 ECTS					

1-3	ML-4103	WP	Deep Learning	K	6
1-3	INF3223	WP	Applied Statistics 1	K	6
1-3	ML-4410	WP	Neuronal Data Analysis	K	6
Study area In-depth Life Sciences (BIO-LIFE) with a workload of 18 ECTS					
1-3	BIO-4039	WP	Concepts of Molecular Cell Biology	K, mP	6
1-3	BIO-3037	WP	Molecular and Cellular Proteomics	K, R	6
1-3	BIO-3028	WP	Introduction to Computational Neuroscience	K, R	6
Variant B					
Study area Basic Informatics (BIO-INFO) with a workload of 27 ECTS					
1	BIO-1001	WP	Introduction to Programming and Data Structures	mP	9
1	INFM1110	WP	Practical Informatics 1: Declarative Programming	K	9
2	INFM1120	WP	Practical Informatics 2: Imperative/Object-oriented Programming	K	9
2	BIO-INFM2110	WP	Basic Bioinformatics	K	9
2	INFM2310	WP	Technical Informatics 2: Informatics of Systems	K	9
Study area In-depth Informatics (INFO-INFO) with a workload of 9 ECTS					
1-3	INF3131	WP	Introduction to Relational Database Systems (DBI)	K	9
Study area In-depth Life Sciences (BIO-LIFE) with a workload of 12 ECTS					
1-3	BIO-4039	WP	Concepts of Molecular Cell Biology	K,mP	6
1-3	BIO-3037	WP	Molecular and Cellular Proteomics	K,R	6
Variant C					
Study area Basic Life Sciences (BIO-BASICLIFE) with a workload of 24 ECTS					
1-2	Bio-101	WP	Biomolucules and Cells	K	6
1-2	CHE-AC0020	WP	General and Anorganic Chemistry for Scientists	K	6
1-2	CHE-OC0100	WP	Organic Chemistry for Scientists	K	3
1-2	BCH-BIO-107	WP	Biochemistry for Bioinformatics	K	3
1-3	Bio-111	WP	Molecular Biology I	K	6
Study area In-depth Life Sciences (BIO-LIFE) with a workload of 12 ECTS					
1-3	ML-4102	WP	Principles of Molecular Cell Biology	K	6
1-3	INF3223	WP	Introduction to Computational Neuroscience	K	6

Study area In-depth Informatics (INFO-INFO) with a workload of 12 ECTS					
1-3	ML-4102	WP	Data Literacy	K	6
1-3	INF3223	WP	Applied Statistics 1	K	6

- 1) A maximum of three seminars may be selected in the program.
- 2) Students must select modules to make up the required total of credit points. The modules given in the table above may be selected, subject to any changes in the module handbook. Further modules for possible selection may be set out in the module handbook. For the study areas INFO-PRAK, INFO-THEO and INFO-INFO, modules from the study areas INFO-PRAK, INFO-THEO and INFO-INFO of the Informatics Master's programs may be chosen as electives. If such elective options exist, students must make use of them so that the required number of credit points is reached in each study area or sub-area, unless the board of examiners approves a differing points schedule. A student may only select a module from a study area if he/she has not already selected that module in another study area.
- 3) Only one research project (Module no. BIO-4998) may be selected in this program.
- 4) 2) In the INFO-INFO study area and (BIO-BIO), a student may also select modules totaling up to 18 ECTS credits from the Bachelor's programs in Informatics, Bioinformatics, Media Informatics and Medical Informatics which are recommended for the fifth to sixth semester (module nos. begin with 3) in those Bachelor's programs, provided the student has not already taken the modules within the framework of his/her Bachelor's degree studies.

FS = recommended semester (subject to availability and change, see module handbook); module no. = current module no. or abbreviation (subject to change, see module handbook), P = compulsory, WP = required elective, CP = credit points, K = written exam, H = assignment; mP = oral defense; R = class presentation; *Master's project (final module): Master's thesis and accompanying final colloquium on the contents of the Master's thesis.

§ 6 Module coursework

¹Details of the module coursework required in each of the modules is set out in the module table in these regulations (§ 5) and in the module handbook. ²Assessment must be clearly specified as to its type and scope, if this is not set out in the module table. ³For the imported modules, students may be directed to the module handbook of the respective department with which the modules originate.

§ 7 Languages of instruction and examination

¹German and English are the languages of instruction and examination in this degree program. ²Classes and module coursework may be conducted, promoted and taught in the following languages:

- English;
- German.

³Furthermore, teachers and examiners may promote and/or conduct classes and/or module coursework in another language for the purpose of teaching that language. ⁴Exams are usually conducted in the language in which the relevant classes were held; other assessment is usually conducted in the language in which the relevant classes were held. ⁵It is therefore assumed that students have sufficient knowledge of the relevant languages.

C. Assessment in the program

I. General Provisions for assessed coursework

§ 8 Related degree programs

(2) Related programs with basically the same content as defined in § 17 paragraph (2) sentence 2 of the MRPO are:

- M.Sc. Bioinformatik / Bioinformatics
- M.Sc. Media Informatics
- M.Sc. Medizininformatik / Medical Informatics
- M.Sc. Cognition Science

(3) The examination board responsible for the degree program shall decide on other related programs with basically the same content.

§ 9 Multiple-choice procedure

(1) ¹Written assessment in the form of examinations may, in the following cases, be wholly or partly conducted in such a way that the candidate must indicate which of the answers - presented with the examination questions - he or she considers to be correct (multiple-choice procedure). ²The conditions for the conducting of examinations including multiple-choice questions are:

- the examination tasks are set by the person or persons acting as the examiner, and
- the examinations, after they have been completed, are corrected in their entirety by the person or persons acting as examiners, and
- the examinations are graded by the person or persons acting as examiners according to their respective individual grading scheme according to § 19 MRPO.

³Prior to the correction of the examinations, no determination may be made regarding certain assessments, such as the setting of certain grades if a certain proportion of the examination questions are answered correctly or if a certain number of points is achieved.

(2) Regarding assessment conducted via online attendance in accordance with § 12 MRPO, para. (1) applies accordingly.

II. Special provisions for the final module

§ 10 Final module

(1) ¹In the final module, 30 credit points must be obtained. ²Of these, 27 CP are obtained in the Master's thesis and 3 CP in the oral examination in the final module [this takes the form of a final colloquium as part of the Master's thesis process (3 CP)]. ³The Master's thesis and the oral examination in the final module are regulated by § 28 MRPO.

(2) The time limit for writing a Master's thesis - from the issuing of the topic to submission of the thesis - is six months.

(3) The oral exam in the final module under para. (1) is assessed by one examiner and takes place without the additional presence of an observer; for grading, § 19 MRPO applies.

§ 11 Subject-specific requirements for admission

In addition to the prerequisites set out in the MRPO, the subject-related prerequisites for admission to the Master's thesis and the oral exam in the final module are:

- the successful completion of modules worth a total of at least 45 ECTS credits.

§ 12 Repetition for a better grade

Assessment resulting in a pass may not be repeated.

D. Deadlines for examinations in the program

§ 13 Deadlines for completion of module coursework

Deadlines for the completion of coursework or module-specific assessment are not currently provided for.

§ 14 Deadline for completion of studies

¹All coursework and assessment required under the exam regulations for the module coursework must be completed by the end of the student's 7th semester in the subject. ²If this time limit is exceeded, the student's right to be examined is lost, unless the failure to meet the deadline is beyond the control of the student.

§ 15 Student counselling

In order to ensure academic success within the limits of the law, students may be called for an interview by the appropriate academic advisor if the following CP have not been achieved:

- by the end of the 2nd subject-specific semester: 40 CP.

E. Master's overall grade, certificate and other documentation

§ 16 Calculation of Overall Grade

¹The overall grade for the Master's examination process is calculated from the average of all graded modules, as weighted by credit points. ²Notwithstanding § 19 (3) sentence 3 MRPO, calculation takes into account whole numbers and the first two decimal places only; all further decimal places are deleted with no rounding.

F. Closing remarks

§ 17 Effective date and transitional arrangements

¹These exam regulations come into effect on the date of their publication in the University of Tübingen's official bulletin, the Amtliche Bekanntmachungen. ²Their first semester of validity is the winter semester 2021/22. ³Students who commenced their studies in this program at the University of Tübingen prior to the semester specified in sentence 2 are - subject to the following provisions - entitled to complete their module coursework in this degree program at the University of Tübingen by 30.09.2024 under the previously valid rules; however, regarding the examination board, § 6 MRPO applies. ⁴Students who commenced their studies in this program at the University of Tübingen prior to the semester specified in sentence 2, are entitled to switch and complete their module coursework in the degree program under these current exam regulations upon written application, which must be submitted to the responsible examination office by 30.09.2022. ⁵If no application under sentence 4 above is lodged, then - after the deadline specified in sentence 3 - the module coursework in the degree program must be completed under these current regulations. ⁶Module coursework completed previously will only be accredited according to the new exam regulations

and the corresponding module handbook, subject to the following provisions. ⁷These exam regulations do not grant any new or additional right to be assessed in an area already assessed; any fails in assessed work under the previous exam regulations will be included. ⁸Furthermore the responsible board of examiners may agree suitable transitional arrangements in individual cases, particularly if previous classes are no longer offered as before or if certain classes have been completed, possibly offering partial accreditation and/or requiring certain conditions to be fulfilled, particularly if a “learning agreement” is to be considered.

Tübingen, 25.03.2021

Professor Dr. Bernd Engler
President