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Examination Regulations
for the Bachelor's Programme
Data, Science and AI
at the University of Bayreuth
dated 25 March 2025

On the basis of Art. 9 sentence 1 in conjunction with Art. 80 para. 1 sentence 1 and Art. 84 para. 2 sentence 1 of the Bavarian Higher Education Innovation Act (BayHIG), the University of Bayreuth issues the following regulations:

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§ 1
General examination and study regulations

[1]The bachelor's programme in Data, Science and AI is governed by the General Examination and Study Regulations for the bachelor's and master's degree programmes at the University of Bayreuth (APSO). [2]Supplementary and deviating regulations for studying the bachelor's programme Data, Science and AI are listed in these regulations.

§ 2
Aim and structure of the degree programme

(1) [1]The bachelor's degree programme in Data, Science and AI provides students with a solid knowledge of the fundamentals of higher mathematics and computer science as well as theoretical and practical knowledge of data science and AI. As part of a specialization, students are offered a specialization in a chosen field of mathematics, computer science or an application subject. [2]The following competencies are achieved:

- The ability to abstract
- Precision in analytical thinking
- Truthfulness in argumentation
- The ability to structure complex contexts
- Insight into interdisciplinary issues
- Perseverance in solving difficult problems
- Problem-solving skills
- The ability to work in a team of mathematicians, computer scientists, natural scientists, engineers and economists in industry and business
- The ability to carry out further scientific work

[3]The bachelor's degree programme in Data, Science and AI, including all examinations, is held in English. [4]Modules can also be taken in German. [5]Upon successful completion of the bachelor's examination, the Faculty of Mathematics, Physics & Computer Science awards the academic degree of Bachelor of Science (abbreviated to B.Sc.). [6]In the specializations Applied AI/Data Science and Human-Centered Data Science, the academic degree Bachelor of Arts (abbreviated: B.A.) can also be awarded by the Faculty of Mathematics, Physics & Computer Science upon application by the mentor (see appendix) by decision of the board of examiners by the time the bachelor's thesis is submitted at the latest.

(2) [1]The bachelor's programme can be completed as a full-time or part-time degree programme. [2]The course can be started in the winter semester.

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§ 3
Admission to the degree program

(1) In addition to or deviating from the requirements specified in § 23 para. 1 APSO, the following additional requirements apply for admission to the bachelor's degree program in Data, Science and AI:

1. in deviation from § 23 para. 1 No. 2 APSO, proof of German language proficiency of at least level A1 of the Common European Framework of Reference for Languages for applicants who have not obtained their higher education entrance qualification in German. Applicants who do not meet this requirement will be enrolled on the condition that they submit proof of the required language skills by the end of the second semester at the latest and

2. proof of English language proficiency of at least level B2 of the Common European Framework of Reference for Languages for applicants who have not obtained their higher education entrance qualification in English and

3. for persons who are not EU citizens and have obtained their higher education entrance qualification outside the European Union, the presentation of a TestAS certificate (consisting of the core test and the subject module "Mathematics, Computer Science and Natural Sciences") or proof of an SAT math score is also required. The test scores required for admission are decided by the board of examiners and published on the University of Bayreuth website.

§ 4
Additions and deviations

(1) In deviation from § 2 para. 1 sentence 3 APSO, the board of examiners consists of five members and one substitute representative each, whereby all specializations are to be represented by one member each.

(2) [1]In addition to § 6 APSO, it is possible to take further examinations beyond the compulsory and core elective modules once selected up to a total of 30 credit points. [2]There is no obligation to repeat further examinations that have not been passed. [3]The additional examinations will be listed on the certificate unless the student requests otherwise; the grades achieved will not be included in the calculation of the overall grade.

(3) Notwithstanding § 14 para. 1 sentence 1 APSO, the overall grade is calculated from the average of the module grades weighted with the credit points of the modules listed accordingly in the appendix, which are weighted according to the information in the appendix.

(4) Deviations from or additions to § 25 APSO:

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1. In addition to para. 2 sentence 1, the chair of examiners may appoint two examiners for an interdisciplinary topic.

2. Notwithstanding para. 4 sentence 1, the bachelor's thesis may only be submitted in English.

3. In addition to para. 7 sentence 1, the Examinations Office shall pass on the bachelor's thesis to the appointed examiners if the topic is interdisciplinary.

4. By way of derogation from para. 8 sentences 1 and 2, the two examiners shall hold a discussion in which they shall attempt to agree on a grade, taking into account technical aspects. If they cannot agree, they shall inform the chairperson of the board of examiners. In such cases, the chairperson will appoint a third assessor who will then determine the final grade on the basis of the two assessments.

5. In addition to the bachelor's thesis, the student defends his or her own bachelor's thesis and accompanies the defenses of other bachelor's theses in a colloquium. The contents of the bachelor's thesis must be presented to the examiners in a lecture. The presentation is followed by a discussion that places the content of the bachelor's thesis in a broader academic context. The presentation lasts between 20 and 30 minutes and the subsequent discussion lasts around 10 minutes. The colloquium is graded by the examiners.

(5) [1]In addition to § 26 APSO, the bachelor's examination is definitively failed if a student has not successfully completed modules A1.1, B1.1, B1.3 by the end of the fourth semester in full-time studies or by the end of the eighth semester in part-time studies for reasons for which he or she is responsible. [2]A notice of final failure will be issued in accordance with § 2 para. 5 APSO in conjunction with Art. 41 of the Bavarian Administrative Procedure Act.

(6) [1]In addition to § 26 APSO, the bachelor's examination is definitively failed if a student has not successfully completed all required modules from areas A, B and C by the end of the sixth semester in full-time studies or by the end of the twelfth semester in part-time studies for reasons for which he or she is responsible. [2]A notice of final failure will be issued in accordance with § 2 para. 5 APSO in conjunction with Art. 41 of the Bavarian Administrative Procedure Act.

§ 5
Entry into force

[1]These regulations enter into force on 26 March 2025. [2]They apply to students starting the bachelor's degree programme in Data, Science and AI from the winter semester 2025/2026.

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Appendix: Module overview

The bachelor's degree programme consists of two phases:

1. Foundation and orientation phase (1st - 3rd semester):
2. Specialization (4th-6th semester):

   After the third semester, the student must choose one of the following specializations:

   a) Mathematics (Math.)

   b) Computer Science (CS)

   c) Natural and Life Sciences (NLW)

   d) Applied AI / Data Science (AI/DS)

   e) Human-Centered Data Science (HCDS)

   The choice of a specialization requires the successful completion of the assigned modules in the compulsory elective area C2. The student must inform the programme moderator of the chosen specialization by the beginning of the fourth semester. The student will be assigned a mentor to advise him or her during the specialization phase when he or she chooses the respective specialization. The mentor is appointed by the board of examiners from the department responsible for the specialization. In consultation with the mentor, the inclusion of external (e.g. German-language) modules in areas D, E and F is permitted; § 5 APSO must be observed.
   A change of specialization is possible by the end of the fifth semester at the latest.

The bachelor's degree programme in Data, Science and AI has a modular structure. The module areas, the respective modules, credit points (CP) and the associated examinations are listed below.

Modules that can be assigned to several areas may only be taken once. In the core elective and elective areas, there is no obligation to repeat modules as long as the required credit points per area are achieved.

In addition to the modules listed here in the elective areas G1 to G5, further selectable modules from other degree programmes can be taken from the module handbook. These must correspond to the learning objective of the area and equally ensure that the qualification objectives of the degree programme are achieved. For these modules, the regulations on examination forms and credit points of the respective (subject) examination and study regulations of the associated degree programme apply. The respective faculty councils decide on inclusion in the module handbook at the request of the board of examiners.

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Abbreviations:

K written examination
mP oral examination
P presentation
semA semester assignments
B contribution
lab laboratory practical course
| Vertical lines between examination forms mark possible alternatives.
+ Plus signs define multiple examinations.
* Examinations marked with '*' are not included in the calculation of the module grade or overall grade.

CO identifier	Identifier	Area / Module	CP	Exam	Weighting
	Basic and orientation phase:				
	A1	**Grundlagen Mathematik / Foundations of Mathematics Pflichtbereich / Compulsory Modules**	**28**		
Fak128231	A1.1	Foundations of Higher Mathematics	14	Portfolio examination: (**K** | **mP**) + **semA***	1
Fak128232	A1.2	Mathematical Analysis	9	Portfolio examination: (**K** | **mP**) + **semA***	1
Fak128233	A1.3	Linear Algebra	5	Portfolio examination: (**K** | **mP**) + **semA***	1
	B1	**Grundlagen Informatik / Foundations of Computer Science Pflichtbereich / Compulsory Modules**	**31**		
Fak128234	B1.1	Introduction to Programming	8	**K | mP**	1
Fak127976	B1.2	Data Analysis and Deep Learning in Python	5	Portfolio examination: (**K** | **mP**) 17/20 + **semA** 3/20	1
Fak128235	B1.3	Theoretical Computer Science I	8	Portfolio examination: (**K** | **mP**) + **semA***	1
Fak128236	B1.4	Algorithms and Data Structures	5	**K | mP** |	1
Fak125291	B1.5	Graph Processing and Machine Learning (GPML)	5	**K | mP** |	1
	C1	**Grundlagen Anwendungen / Foundations of Applications Pflichtbereich / Compulsory Modules**	**13**		
Fak528411	C1.1	Logic and Argumentation Theory	5	**semA**	1
Fak128412	C1.2	Introduction to Specializations	8	**semA***	0

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CO identifier	Identifier	Area / Module	CP	Exam	Weighting
	C2	**Grundlagen Anwendungen / Foundations of Applications Wahlpflichtbereich / Core Elective Modules**			
		Math.	**10**	**C2.1 + (C2.3 | C2.5)**	
		CS	**10**	**C2.1 + (C2.3 | C2.5)**	
		NLW	**20**	**C2.1 + C2.2 + C2.3 + C2.4**	
		AI/DS	**17**	**C2.5 + C2.6**	
		HCDS	**17**	**C2.6 + C2.7**	
Fak128413	C2.1	General Physics I	5	**K |mP**	1
Fak128414	C2.2	General Physics II	5	**K | mP**	1
Fak228417	C2.3	General Chemistry I	5	**K | mP**	1
Fak228418	C2.4	General Chemistry II	5	**K | mP**	1
Fak328421	C2.5	Process Mining I	5	**K**	1
Fak324808	C2.6	Applied Artificial Intelligence	12	**K**	1
Fak528426	C2.7	Basics of Data Analysis	5	**K | mP**	1
	Specializations:				
	Spezialisierung Mathematik / Specialization Mathematics				
	D1	**Pflichtbereich / Compulsory Modules**	**23**		
Fak128428	D1.1	Introduction to Numerical Mathematics	8	**K | mP**	2
Fak128429	D1.2	Probability Theory and Statistics	10	Portfolio examination: (**K** | **mP**) + **semA***	2
Fak128431	D1.4	Mathematical Seminar	5	**semA**	2
	D2	**Wahlpflichtbereich A / Core Elective Modules A**	**16**	**Permitted additional modules: Modules from module area B (except B-AM1b, B-AM2c) of the bachelor's degree programme in Mathematics**	
Fak128433	D2.1	Introduction to Iterative Numerical Methods	8	**K | mP**	2
Fak128434	D2.2	Linear Optimization	8	**K | mP**	2
	D3	**Wahlpflichtbereich B / Core Elective Modules B**	**20**	**Permitted additional modules: Modules from module area C of the Bachelor's degree programme in Mathematics**	
Fak128436	D3.3	Mathematical Control Theory	10	**K | mP**	2
Fak128438	D3.4	Nonlinear Optimization	10	**K |mP**	2

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CO identifier	Identifier	Area / Module	CP	Exam	Weighting
Fak128437	D3.5	Modelling, Simulation, and Optimization with Ordinary Differential Equations	10	**K | mP**	2
Fak128432	D3.6	Numerical Methods for Partial Differential Equations	10	**K | mP**	2
Fak128439	D3.7	Foundations of Mathematical Data Science	10	**K | mP**	2
Fak128435	D3.8	Integer Linear Optimization	10	**K | mP**	2
	G1	**Wahlbereich / Free Elective Modules**	**24**	**C2, E, F, G3, G4, G5 (all without additional modules);** **Permitted additional modules: Modules from module areas B (except B-AM1b, B-AM2c) and C as well as modules A3 and A4 of the bachelor's degree programme in Mathematics**	
	<u>Specialization Computer Science / Specialization Computer Science:</u>				
	E1	**Pflichtbereich / Compulsory Modules**	**43**	**plus D1.1 + D1.2**	
Fak127952	E1.1	Software Engineering	8	Portfolio examination: (**K** | **mP**) 9/10 + **semA** 1/10	2
Fak128440	E1.2	CS Individual Project	6	**semA**	2
Fak128441	E1.3	CS Team Project	6	**semA**	2
Fak128045	E1.4	Foundations of Data Management	5	**K | mP**	2
	E2	**Wahlpflichtbereich / Core Elective Modules**	**20**	**Permitted additional modules: Modules from D2, D3 as well as the modules Computer Architecture and Computer Networks, Operating Systems, Parallel and Distributed Systems I, Databases and Information Systems I, Compiler Construction as well as all modules from Area A: Computer Science (elective modules) of the bachelor's degree programme in Computer Science**	
Fak128075	E2.1	Theoretical Computer Science II	5	**K | mP**	2
Fak127978	E2.2	Information Visualization	5	Portfolio examination: (**K** | **mP)** 3/4 + **semA** 1/4	2

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CO identifier	Identifier	Area / Module	CP	Exam	Weighting
Fak127977	E2.3	Intelligent User Interfaces	5	Portfolio examination: (**K | mP**) 3/4 + **semA** 1/4	2
Fak128443	E2.4	Knowledge-based Systems	5	Portfolio examination: (**K** | **mP**) 17/20 + **semA** 3/20	2
Fak127980	E2.5	Advanced Software Engineering	5	Portfolio examination: (**K** | **mP**) 3/4 + **semA** 1/4	2
Fak127981	E2.6	Biomedical Time Series Analysis	5	Portfolio examination: (**K** | **mP**) 17/20 + **semA** 3/20	2
Fak128442	E2.7	CS Seminar	5	**semA**	2
	G2	**Wahlbereich / Free Elective Modules**	**20**	**C2, E, F, G3, G4, G5 (all without additional modules);** **Permitted additional modules: Modules Computer Architecture and Computer Networks, Operating Systems, Parallel and Distributed Systems I, Databases and Information Systems I, Compiler Construction as well as all modules from Area A: Computer Science (elective modules) of the bachelor's degree programme in Computer Science**	
	Specialization Natural and Life Sciences / Specialization Natural and Life Sciences				
	F1	**Pflichtbereich / Compulsory Modules**	**53**	**plus D1.1 + D1.2 + D3.6**	
Fak128444	F1.1	General Physics Lab.	5	**Lab**	2
Fak228419	F1.2	General Chemistry Lab.	5	**Lab**	2
Fak228445	F1.3	General Life Sciences	5	**K	mP**	2
Fak128415	F1.4	Research Internship	10	Portfolio examination: **P** 1/4 + **B** 3/4	2
	G3	**Wahlbereich / Free Elective Modules**	**20**	**C2, G4, G5 (all without additional modules)**	
Fak128446	G3.1	Applied Theoretical Physics	5	**P**	2
Fak128416	G3.2	Methods of Molecular Simulation	5	**K	mP**	2
Fak228452	G3.3	Seminar Science and Life sciences	5	**semA**	2

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CO identifier	Identifier	Area / Module	CP	Exam	Weighting
Fak228420	G3.4	Quantum Chemistry: Methods and Algorithms	5	Portfolio examination: (**K** | **mP**) + **semA**	2
Fak728447	G3.5	Biochemistry and Biotechnology	5	Portfolio examination: (**K** | **mP**) 7/10 + **semA** 3/10	2
Fak728448	G3.6	Food Chemistry and Analytics I	5	Portfolio examination: (**K** | **mP**) 3/5 + **semA** 2/5	2
Fak728449	G3.7	Food Chemistry and Analytics II	5	Portfolio examination: (**K** | **mP**) 3/5 + **semA** 2/5	2
Fak626619	G3.8	Fundamentals of Signals and Systems for Electrochemical Energy Storage Systems	5	**K**	2
Fak626617	G3.9	Fundamentals of Electrical Engineering for Electrochemical Energy Storage Systems	5	**K**	2
Fak228450	G3.10	Geology and Geophysics	5	**K | mP**	2
Fak228451	G3.11	Physics of Planetary Bodies	7	**K | mP**	2
Fak228453	G3.12	Bioinformatics: Molecular Modeling	5	Portfolio examination: (**K** | **mP**) + **B***	2
	Specialization Applied AI / Data Science / Specialization Applied AI / Data Science				
	F2	**Pflichtbereich / Compulsory Modules**	**56**	**plus F3.1 + F3.3 + F3.4 + D1.2**	
Fak328454	F2.1	Human-AI Collaboration	6	Portfolio examination: **K** 1/2 + **B** 1/4 **+P** 1/4	2
Fak328422	F2.2	Process Mining II	5	**K**	2
Fak328455	F2.3	Foundations of Entrepreneurship I	5	**P**	2
Fak328456	F2.4	Foundations of Entrepreneurship II	5	**P**	2
Fak328423	F2.5	Data Science Project	5	**semA**	2
Fak328424	F2.6	Seminar Applied AI	5	**semA**	2
	G4	**Wahlbereich / Free Elective Modules**	**20**	**C2, D2, D3, E, G3, G5 (all without additional modules)**	
Fak328425	G4.1	Data Analysis and Visualization	5	**K**	2
	Spezialisierung Human-Centered Data Science / Specialization Human-Centered Data Science				
	F3	**Pflichtbereich / Compulsory Modules**	**56**		
Fak528457	F3.1	Introduction to Practical Philosophy	5	**K | mP | semA**	2

CO identifier	Identifier	Area / Module	CP	Exam	Weighting
Fak528458	F3.2	Qualitative Research Methods	5	Portfolio examination: **K** 3/4 + **P** 1/4	2
Fak428459	F3.3	Applied Data Analysis I	5	**B** | **semA**	2
Fak428460	F3.4	Applied Data Analysis II	5	**B** | **semA**	2
Fak528466	F3.5	Philosophy of Social Science	10	Portfolio examination: **K** 4/10 + **B** 5/10 + **semA** 1/10	2
Fak528467	F3.6	AI in Society I	5	**B | mP** | **semA**	2
Fak428461	F3.7	Critical Data Studies	6	**B** | **semA**	2
Fak428462	F3.8	Digital Humanities / Computational Social Science Lab	10	**B** | **semA**	2
Fak128430	F3.9	Probability Theory and Statistics (for HCDS)	5	Portfolio examination: (**K** | **mP**) + **semA***	2
	G5	**Wahlbereich / Free Elective Modules**	**20**	**C2, E, F (all without additional modules)**	
Fak528469	G5.1	Introduction to Theoretical Philosophy	5	**K | mP** | **semA**	2
Fak428463	G5.2	Data Modeling and Knowledge Generation	5	**K | mP** | **semA**	2
Fak528427	G5.3	Causal Inference	5	**K | mP**	2
Fak428464	G5.4	Technology and Society I	5	**K | mP** | **semA | P | B**	2
Fak428465	G5.5	Technology and Society II	5	**K | mP** | **semA | P | B**	2
Fak528468	G5.6	AI in Society II	5	**B | mP** | **semA**	2
	H	**Bachelorarbeit / Bachelor's Thesis**	**15**		
Fak128311	H1	Bachelor's Thesis	12	**Bachelor's thesis**	3
Fak128312	H2	Colloquium	3	**P**	3

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Issued on the basis of the decision of the University of Bayreuth's Senate dated 11 December 2024 and by circulation procedure as well as the approval of the President of the University of Bayreuth of 24 March 2025, Ref. A-3710.03.

Bayreuth, 25 March 2025

UNIVERSITY OF BAYREUTH
THE PRESIDENT
[seal] [signature]
Professor Dr. Stefan Leible

These regulations were deposited at the University on 25 March 2025.
They were announced on 25 March 2025 by posting at the university.
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