Degree Program and Examination Regulations for the Master's Degree Program in Artificial Intelligence at the Faculty of Engineering at Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)
– FPOMScAI –
Dated March 28, 2024

Based on Section 9 (1) in conjunction with Section 80 (1)(1), section 84 (2)(1), Section 88 (9), Section 90 (1)(2) and Section 96 (3) Bavarian Higher Education Innovation Act dated August 5, 2022 (**BayHIG**), Friedrich-Alexander-Universität Erlangen-Nürnberg enacts the following degree program and examination regulations:

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Part I: General Provisions

Section 39 Scope

The degree program and examination regulations for the Master's degree program in Artificial Intelligence complement the current version of the General Examination Regulations for Bachelor's and Master's Degree Programs at the Faculty of Engineering of FAU (**ABMPO/TechFak**).

Section 40 Master's Degree Program, Part-time Study, Start of Degree Program, Teaching and Examination Language, Related Degree Programs

(1) [1]The Master's degree program in Artificial Intelligence builds on the content covered in the Bachelor's degree program in Computer Science and consists of compulsory elective modules (total workload of 50 ECTS credits), the module group Projects (20 ECTS credits total), an advanced seminar (5 ECTS credits), modules in a minor subject (15 ECTS credits total) and the Master's thesis (30 ECTS credits). [2]The type and scope of the examinations and the distribution of modules across the semesters in the standard duration of study are included in the following provisions and **Appendix 1** (full-time study) and **Appendix 2** (part-time study).

(2) [1]The Master's degree program in Artificial Intelligence can be completed as a full-time or as a part-time degree program. [2]It can be started in either the summer or the winter semester.

(3) [1]Notwithstanding Section 4 (5) **ABMPO/TechFak**, the teaching and examination language in the Master's degree program in Artificial Intelligence shall be English; individual teaching units and examinations may be held in German. [2]The Master's thesis shall be written in English. [3]Exceptions shall require the approval of the Degree Program Committee. [4]This shall not affect the rest of Section 4 (4) **ABMPO/TechFak**.

(4) The provisions in Section 34 (3)(2) **ABMPO/TechFak** do not apply to related degree programs.

Part II: Special Provisions

Section 41 Admissions Committee for the Master's Degree Program

The Admissions Committee for the Master's degree program in Artificial Intelligence pursuant to **Section 14 ABMPO/TechFak** consists of four university lecturers employed as their main occupation at FAU pursuant to Section 19 BayHIG and three research associates.

Section 42 Qualification for a Master's Degree, Certificates, Admission Requirements

(1) [1]A subject-specific degree as defined in Section 33 (1)(1) ABMPO/TechFak is a Bachelor's degree program in computer science from FAU or a degree from a university in Germany or another country with equivalent content, provided it includes skills in computer science accounting for the following number of credits:
 1. Programming and algorithms worth 20 ECTS credits,
 2. Theoretical computer science and logic worth 15 ECTS credits,
 3. Databases and conceptual modeling worth 5 ECTS credits,
 4. Mathematics in computer science (foundations of analysis, linear algebra, stochastics) worth at least 20 ECTS credits and software engineering worth at least 10 ECTS credits.

[2]Applicants who have completed their Bachelor's degree at another university must submit the module descriptions for the modules named above. [3]Notwithstanding sentence 1, the admissions committee can invite applicants with a degree that is otherwise equivalent to the Bachelor's degree to participate in the qualification assessment process if applicants acquired the skills named in sentence 1 not as part of their first undergraduate degree but still at a university; the relevant proof must be

attached to the application in a suitable form (e.g. transcript of records, certificates or similar). [4]Up to 5 ECTS credits for each individual area stated in sentence 2 may be compensated for by imposing conditions that must be met pursuant to Section 33 (2)(2) **ABMPO/TechFak**, although no more than 20 ECTS credits may be compensated for in this manner; if there are any more extensive differences in the various skills areas, these shall be considered to be significant differences and the applicant shall be rejected.

(2) [1]As stipulated in Section (2)(6)(3) of the **Appendix to ABMPO/TechFak**, applicants are required to provide additional proof of English language skills equivalent to at least Level B2 of the Common European Framework of Reference (CEFR) by submitting either relevant school reports or certificates issued by a language school or university. [2]Proof of language skills can in particular be provided by submitting a school leaving certificate or another certificate issued by the school providing evidence that English courses have been taken at school up until a level equivalent to B2 CEFR. [3]Proof of language proficiency does not need to be submitted if the applicant acquired their university entrance qualification or relevant undergraduate degree in English.

(3) [1]Notwithstanding paragraph 5(2) **Appendix to ABMPO/TechFak**, applicants with a degree deemed to be equivalent pursuant to paragraph 1 will be considered qualified for acceptance to the Master's degree program in Artificial Intelligence if the overall grade of the equivalent degree or in the case of Section 33(3) **ABMPO/TechFak** the average of achievements obtained to date is 1.75 or better. [2]The qualification of applicants who could not be admitted directly to the degree program pursuant to sentence 1 and whose overall grade of the equivalent degree or the average of their achievements to date is between 1.76 and 3.0 will be assessed in accordance with paragraph 4. [3]Sentence 1 shall apply accordingly in the case of paragraph 1(3) if the average of the skills proved separately is 1.75 or better. [4]Applicants whose total grade for the equivalent degree or average of achievements to date is 3.01 or poorer shall be considered unsuitable and shall receive a rejection letter including reasons and information on legal remedies. [5]Sentence 4 shall apply accordingly in the case of paragraph 1(3) if the average of separately proven skills is 1.76 or worse.

(4) [1]Applicants meeting the requirements stipulated in paragraph 3(2) or paragraph 3(3) shall be invited to participate in an electronic test via a secure examinations platform. [2]Notwithstanding Section 7 **Appendix ABMPO/TechFak**, this test shall be conducted as an open book examination, last 60 minutes and comprise solving problems from the areas of programming, algorithms, theoretical information, logic, databases/modeling, software engineering and mathematics in computer science (analysis, linear algebra, ODE, stochastics). [3]Further information about the test and about the permitted aids will be communicated to the applicants when the test date is announced; Section 31 (7)(5) **ABMPO/TechFak** shall apply accordingly. [4]Applicants qualify for admission if they achieve the grade "gut" (good) as defined in Section 21 (1)(1)**ABMPO/TechFak** or better in the test. [6]Applicants who achieve lower grades in the admission tests will be deemed unsuitable and cannot be admitted to the Master's degree program.

Section 43 Master's Degree Examinations

(1) The Master's degree program comprises the following module groups in accordance with **Appendix 1** and **Appendix 2**:
1. 50 ECTS credits from modules from the compulsory elective module area pursuant to Section 44,

2. A total of 20 ECTS credits from the project module group in accordance with Section 45.
3. 5 ECTS credits from the advanced seminar pursuant to Section 46,
4. 15 ECTS credits from the minor subject pursuant to Section 47,
5. 30 ECTS credits from the Master's thesis in accordance with Section 48.

(2) [1]One interim grade each is given for the compulsory elective module area and the minor subject that receive a weighting of 50 and 15 ECTS credits respectively in the overall grade of the Master's examination. [2]Section 45 (5) and Section 46 (2) shall apply to the weighting of the projects and the advanced seminar module group when calculating the overall grade.

(3) The Master's examination shall have been passed if the modules specified in paragraph 1 have been passed.

Section 44 Compulsory Elective Modules

(1) [1]Compulsory elective modules are offered in the following three specializations:
1. Symbolic artificial intelligence, focusing predominantly on research approaches concerning logic, knowledge representation, modeling and inference (classical and statistical)
2. Subsymbolic AI/machine learning, focusing predominantly on pattern recognition, neural networks, reinforcement learning, decision trees and random forests, deep learning, statistical and convex optimization, generative and discriminative models and other classical procedures from machine learning.
3. AI systems and applications, in which methods of artificial intelligence are applied to research-oriented issues from other sectors; the learning outcome focuses predominantly here on the instantiation and adaption of methods to application scenarios.

(2) [1]Students choose compulsory elective modules worth 50 ECTS credits from a catalog defined by the Degree Program Committee for each of the three specializations defined in paragraph 1 above. [2]Of the 50 ECTS credits in the compulsory electives, 10 ECTS credits must come from each of the three specializations defined in paragraph 1 above; the other 20 ECTS credits can be chosen freely. [3]The elective modules available are published each semester in a module catalog. [4]The module catalog is published in accordance with local practice.

(3) [1]The overriding learning outcome of the compulsory elective modules is to allow students to gain a more in-depth knowledge of selected skills. [2]The second learning outcome has a research focus, with students learning subject-related methods of research and exploring their subject in more depth. [3]Thirdly, the element of choice allows students to tailor their profile in view of their career plans. [4]The requirements in paragraph 2 ensure that students acquire methods and knowledge from all areas of artificial intelligence and prevent students from specializing too quickly in one particular area. [5]The wide scope of topics covered is a particular feature of the degree program. [6]The specific learning outcomes for the individual modules depend on the chosen module and the relevant **degree program and examination regulations** or module description.

(4) [1]The type and scope of examinations depend on the skills taught in modules that are worth 5, 7.5, 10 and 15 ECTS credits respectively. Depending on the student's choice, modules may also be worth 2.5 ECTS credits. The type and scope of

examinations are described in the module handbook. [2]One examination achievement is stipulated per module. [3]Examinations in the modules shall take one of the following forms: written examination (60, 90, 120 min), oral examination, seminar achievement, or tutorial achievement pursuant to Section 7 (3) **ABMPO/TechFak**. [4] Section 7 (2)(3) **ABMPO/TechFak** stipulates that in justified exceptional circumstances, combinations of the individual achievements stated in sentence 3 may also be possible.

(5) [1]Compulsory elective modules amounting to 5 ECTS credits usually consist of a lecture (2 SWS) and a tutorial (2 SWS) or a lecture (3 SWS) and a tutorial (1 SWS). [2]Any exceptions (and further details on module credits) are provided in the module handbook.

Section 45 Projects

(1) [1]The first learning outcome of the project module group is to allow students to expand the knowledge they have already gained in areas of interest to them in the field of artificial intelligence, in particular by working on complex problems within the scope of research-oriented projects. [2]A second learning outcome is aimed at promoting personal and social skills through independently preparing, reporting on, and presenting a topic from current research and defending ideas in a discussion at the Master's level, as well as working in a group to develop and test subject-related applications and possibilities for implementation with respect to the chosen subject. [3]Thirdly, the element of choice allows students to tailor their profile in view of their career plans. [4]The projects ought to cover two of the three focus areas of the Master's degree in Artificial Intelligence pursuant to Section 44 (1) in order to ensure that students cover a certain range of methods and subjects and gain an overview of research approaches in the area of artificial intelligence in spite of focusing on their chosen specialization. [5]The specific learning outcomes for the individual projects depend on the chosen project and the relevant **degree program and examination regulations** or the relevant module description.

(2) [1]A total of 20 ECTS credits must be obtained as part of the project module group. [2]Modules worth 5 or 10 ECTS credits are available for students to choose from. (2) [3]The projects shall each have a workload of approximately 300 hours (10 ECTS credits) or 150 hours (5 ECTS credits), enabling students to complete them within six months. [4]The projects must be selected from one of the specializations listed in Section 44 (1) and may not all be chosen from the same specialization. [5]If the projects are split into more than two modules, only a total of 10 ECTS credits may be taken from one specialization.

(3) [1]The type and scope of the examination are dependent on the specific project. Details can be found in the module handbook. [2]Students must complete one seminar achievement as an examination achievement and one laboratory achievement as a course achievement per module; Section 7(3) **ABMPO/TechFak** shall apply.

(4) [1]Project modules amounting to 10 ECTS credits usually consist of an advanced seminar (2 SWS) and a research laboratory course (6 SWS). [2]Any exceptions, particularly for the modules amounting to 5 ECTS credits, are detailed in the module handbook.

(5) Each of the projects contribute individually to the overall grade with the respective number of their ECTS credits.

Section 46 Module Group Advanced Seminar

(1) [1]The main learning outcome of the module group Advanced seminar is to allow students to gain initial insights into the topics of the areas of interest to them in the field of artificial intelligence and to gather, analyze and interpret information relevant to their subject. [2]A second learning outcome is aimed at promoting personal and social skills through preparing, reporting on and presenting a topic relating to the subject for a specialist audience at a Master's level and in a manner tailored to suit the target group, as well as working under supervision in a group to develop and test subject-related applications and possibilities for implementation with respect to the chosen subject. [3]Thirdly, the element of choice allows students to tailor their profile in view of their career plans. [4]This module group is not restricted to the main focus areas of the Master's degree program, as the topic of the seminar may be chosen in view of the Master's thesis and students should be given the opportunity to explore the most recent research questions (state of the art). [5]The specific learning outcomes for the individual modules therefore depend on the chosen module and the relevant **degree program and examination regulations** or module description.

(2) [1]The module group Advanced seminar generally consists of a seminar module amounting to 5 ECTS credits, but may also consist of two seminar modules each amounting to 2.5 ECTS credits. [2]If two modules worth 2.5 ECTS credits are chosen, each module shall contribute individually to the overall grade

(3) [1]The type and duration of the examination is set forth in the module handbook. [2]The examination achievement per module shall be taken as an seminar achievement pursuant to Section 7 (3) **ABMPO/TechFak**. [3]The module catalog is published before the beginning of the semester in accordance with local practice.

Section 47 Minor Subject

(1) [1]The main learning outcome of the minor subject is to allow students to gather, analyze and interpret information relevant to their subject from an area of application of artificial intelligence that has a practical professional or subject-related relevance to the field of artificial intelligence. [2]Secondly, a further learning outcome is aimed at promoting personal and social skills by providing a wide range of interdisciplinary qualifications in the area of application, as well as working under supervision to develop and test subject-related applications and possibilities for implementation with respect to the chosen subject. [3]Thirdly, the element of choice allows students to tailor their profile in view of their career plans in the area of application. [4]The following is a non-exhaustive list of possible minor subjects, which can be added to at any time; further details shall be published in accordance with local practice:
1. *Biomedical engineering*: Applications for artificial intelligence in medical engineering, in medical image and data processing, and in medical diagnostics.
2. *High-performance computing*: Application and theory of AI methods and interaction with methods of high-performance computing.
3. *Robotics and automation*: Developing and implementing AI techniques in robotics and automation technology.
4. *Business economics*: Fields of application for artificial intelligence in business.

[5]The specific learning outcomes of the other minor subjects are stipulated in the relevant **degree program and examination regulations** and module descriptions.

(2) [1]At least 15 ECTS credits must be completed from modules that are related to each other that are offered by FAU examiners and that have a practical professional or

subject-related relevance to the field of artificial intelligence. [2]The selected combination of modules must be approved as a minor subject by the Degree Program Committee pursuant to Section 11 (1)(4) **ABMPO/TechFak**. [3]The combinations of minor subjects that can be selected are listed in the relevant catalog that is announced in accordance with local practice. [4]Exceptions can be granted by the Degree Program Committee upon receiving a justified request. [5]Due to the specific subject competencies that must be acquired as part of the qualification goals of the Master's degree program as defined in the module description, only modules which have not already been taken as a compulsory elective module may be taken as a minor subject.

(3) [1]The type and scope of teaching units and examinations in the modules accounting for 2.5, 5, 7.5, 10 or 15 ECTS credits respectively depend on the specific manner in which the respective module is taught and are regulated by the applicable **degree program and examination regulations** and/or the module handbook. [2)] The type of examinations and the number of semester hours depend on the specific manner in which the respective module is taught and are regulated by the applicable **degree program and examination regulations** or the relevant module description.

Section 48 Master's Thesis

(1) The requirements for allocating a subject for the Master's thesis shall be as follows:
1. achievement of at least 60 ECTS credits in the Master's degree program
2. submission of relevant certificates if admission to the Master's degree program was granted subject to conditions according to Section 33 (2) or (3) **ABMPO/TechFak**.

(2) [1]The Master's thesis module shall be worth 30 ECTS credits. [2]It comprises a written Master's thesis (27 ECTS credits) and a presentation (3 ECTS credits) about the Master's thesis.

(3) [1]The thesis shall deal with a scientific subject from the field of artificial intelligence. [2]The requirements for the written Master's thesis shall be such that it can be completed with a workload of approximately 900 hours within six months.

(4) [1]Full-time and part-time university lecturers at FAU as defined in Section 19 (1) **BayHIG** involved in the degree program in seminars, projects or compulsory elective modules pursuant to Section 44 shall be entitled to assign and supervise Master's theses. [2]The chair of the Degree Program Committee may approve exceptions upon application.

(5) [1]The presentation shall last around 30 minutes and deal with the topic of the written Master's thesis. [2]The date of the presentation shall be determined by the supervising lecturer either after the student has submitted their Master's thesis or during the final stage of thesis work and the student shall be informed of the date at least one week in advance. [3]The presentation is graded pursuant to Section 21 (1) of **ABMPO/TechFak**.

Part III: Final Provisions

Section 49 Legal Validity and Transitory Provisions

(1) [1]These degree program and examination regulations shall come into effect on April 1, 2024. [2]They shall apply to all students starting their degree program as of summer

semester 2024 and those students already studying in accordance with the degree program and examination regulations for the Master's degree program in Artificial Intelligence at the Faculty of Engineering of Friedrich Alexander Universität Erlangen-Nürnberg (FAU) – FPOAI – dated November 11, 2020 in the version dated March 23, 2023 at the time these regulations come into effect.

(2) [1]The degree program and examination regulations for the Master's degree program in Artificial Intelligence at the Faculty of Engineering at Friedrich Alexander Universität Erlangen-Nürnberg (FAU) – FPOAI – dated November 11, 2020, last amended by statute of March 23, 2023 shall become invalid as of March 31, 2024.

Appendix 1: Structure of the Master's Degree Program in Artificial Intelligence – Full-time study

Module name[1]	Teaching unit	SWS (semester hours)				Total ECTS credits	Distribution of workload per semester in ECTS credits				Type and scope of the examination
		L	T	P	S		1. sem.	2. sem.	3. sem.	4. sem.	
Compulsory elective module area	see Section 44 (5)					**50**	20	20	10		EA, see Section 44 (4)
Projects[2]	see Section 45 (4)					**20**		10	10		Each EA and CA, see Section 45 (3)
Advanced seminar					2–4	**5**			5		EA, see Section 46 (2)
Minor subject	see Section 47 (3)					**15**	10		5		EA or CA, see Section 47 (3)
Master's thesis						**30**				30	See Section 36 (1)(5) **ABMPO/TechFak** and Section 48 (4) (90 % + 10 %)
					2–4		30	30	30	30	
Total SWS and ECTS credits[3]:						120					

Abbreviations:
SWS = semester hours
S = seminar
L = lecture
EA = examination achievement
T = tutorial
CA = course achievement
P = Practical course

[1] Due to the specific subject competencies that must be acquired as part of the learning outcome of the Master's degree program, students are expected to prove on the basis of the module description that they will acquire additional skills compared to the skills acquired in their previous Bachelor's degree. This is detailed in the relevant module description in the context of the learning outcomes of the Master's degree program.

[2] See Section 45. Students must select modules amounting to a total of 20 ECTS credits; modules worth 5 and 10 ECTS credits are available.

[3] The total number of required semester hours (SWS) depends on the chosen modules and teaching units.

Appendix 2: Structure of the Master's Degree Program in Artificial Intelligence – Part-time study

Module name[1]	Lecture	SWS (semester hours)				Total ECTS credits	Distribution of workload per semester in ECTS credits								Type and scope of the examination
		L	T	P	S		1. sem.	2. sem.	3. sem.	4. sem.	5. sem.	6. sem.	7. sem.	8. sem.	
Compulsory elective module area	see Section 44 (5)					**50**	15	15	10	10					EA, see Section 44 (4)
Projects[2]	see Section 45 (4)					**20**					10	10			EA and CA, see Section 45 (3)
Advanced seminar					2–4	**5**						5			EA, see Section 46 (2)
Minor subject	see Section 47 (3)					**15**			5	5	5				EA or CA, see Section 47 (3)
Master's thesis						**30**							15	15	See Section 36 (1)(5) **ABMPO/TechFak** and Section 48 (4) (90%+10%)
Total semester hours and ECTS credits[3]:					2–4		**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	
						120									

Abbreviations:
SWS = semester hours
S = seminar
L = lecture
EA = examination achievement
T = tutorial
CA = course achievement
P = Practical course

[1] Due to the specific subject competencies that must be acquired as part of the learning outcome of the Master's degree program, students are expected to prove on the basis of the module description that they will acquire additional skills compared to the skills acquired in their previous Bachelor's degree. This is detailed in the relevant module description in the context of the learning outcomes of the Master's degree program.

[2] See Section 45. Students must select modules amounting to a total of 20 ECTS credits; modules worth 5 and 10 ECTS credits are available.

[3] The total number of required semester hours (SWS) depends on the chosen modules and teaching units.